An Investigation into the Commonalities of Students Who Are Braille Readers in a Southwestern State Who Possess Comprehensive Literacy Skills

by

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A Dissertation

In

Special Education

Submitted to the Graduate Faculty
of Texas Tech University in
Partial Fulfillment of
the Requirements for
the Degree of

DOCTOR OF EDUCATION

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August, 2017

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ACKNOWLEDGEMENTS

First and foremost, I extend my eternal gratitude to my Prince of Peace, my blue-eyed Jesus, who instilled in me a love of learning and a desire to achieve more than what was expected of me.

Two phenomenal women were my first introduction to what an extraordinary teacher of students with visual impairments (TVI) should be. Adalaide Ratner, who planted the seed of literacy in me at an early age, thank you for showing me that my future would be limited without the dots. Thanks to Ora Potter who watered the seed and propelled me further into independence with her encouragement and no-nonsense attitude about blindness.

I am grateful for my beautiful Little Lady Godiva who patiently waited through endless hours at the library and lying on her favorite chair in my study while I worked; never complaining when the embosser woke her up and never grumbling about the late nights and early mornings.

I thank Amador, my husband, my friend, research assistant, and driver, with all my heart and soul. Your unfailing encouragement and belief in me kept me moving forward; especially in the tough times, and boy, there were tough times. I want to thank you for the numerous computer hours, for keeping me fed, driving endless miles, and many, many cups of tea. I am grateful to my beautiful daughters, Amanda, LuzAndrea, and Annai: Manda for your editing and powerpoint help; LuzAndrea, for your assistance with research, tables, and PowerPoints; and Annai, for your support and prayers. Each of you are a great source of affirmation, laughter, and provided me with a much needed kick in the rear at times. Your prayers, along with your Daddy's prayers, saw me through.

A very gratitude filled thanks goes to Dr. Max Manley. Dr. Manley, from you I not only learned concepts of special education in my first special education class at Texas Tech, I also learned what it was to find compassion and understanding for people who do not have the heart for our children. Teachers of the visually impaired should know that our walk as special educators is observed not only by our students but by those who serve them. Thank you to Dr. Bill Danley; you not only got me through my undergraduate statistics class, but you taught me that, as teachers, if through our interactions with our students we give them some dignity, that is a great accomplishment.

Great thanks to my Compadre Dr. Ralph Carter, who believed in me and encouraged me to continue my studies. You are greatly missed.

I thank my dear friend Mary Faires, a braille literacy advocate and braillist. Rae Cunningham, I thank you for your unfailing belief in me and your tireless computer assistance and your beautiful braille graphics.

Thanks to Ms. Minerva Alanis who introduced me to graduate level research and allowed me never to forget that I would reach the end of my doctoral journey.

Thank you, Dr. Nora Griffin-Shirley. Your tireless attempts kept me on track and moving forward. Dr. Rona Pogrund, thank you for providing direction and encouragement. Thank you, Dr. Lee Duemer, my methodologist, for your support and direction.

I also want to thank my Dissertation Coach, Dr. Marcelo Schmidt who provided endless hours of assistance, never stepped back when I cried, and encouraged me when the process knocked the stuffing out of me; ¡A La Lona!

Dr. Sonya Sherrod, thank you for your time, your qualitative expertise, and your encouragement.

Ms. Pamela Lindell, thank you for the numerous hours of editing. Thank you for never complaining about reformatting my braille documents into APA Graduate School approved documents and for your positive attitude and multiple productive work sessions.

Rick Sellers, from HIMS, Inc., thank you for your wonderful assistance. Your expertise with hardware and software facilitated my data collection and the completion of this study. I also appreciate your help in locating gatekeepers.

Additionally, I would like to thank the gatekeepers who launched my participant recruitment.

Finally, a big thank you to my four participants: David, Esther, Luke, and Peter. Without you, this study would not have happened. It was an honor to meet you and to briefly be a part of your lives.

TABLE OF CONTENTS

ACKNOWLEDGEMENT ii

ABSTRACT ix

CHAPTER

I. INTRODUCTION 1

Statement of the Problem 5

Purpose of Study 6

Research Question 6

Significance of the Study 6

Theoretical Framework 7

Rationale for Using Qualitative Research Methods 7

Delimitations of the Study 8

Limitations of the Study 8

Definition of Terms 8

Organization of Dissertation 17

Summary 18

II. REVIEW OF LITERATURE 20

Introduction 20

History of Braille 25

Educational Historical Perspective 32

Reading 43

Family Support 49

Emergent Literacy and Early Education 62

Literacy....71

Hand Mechanics....97

Spelling and Phonological Awareness....100

Speed, Fluency, and Comprehension....119

Summary....130

III. METHODOLOGY....132

Introduction....132

Research Question....132

Strategy and Rationale....133

Strengths and Limitations of Qualitative Research and Grounded Theory....142

Context of the Study....144

Data Sources....145

Data Collection....147

Strengths and Limitations in the use of Questionnaires....148

Semi-structured Interviews....149

Strengths and Limitations of Semi-structured Interviews....152

Direct Observation....152

Data Analysis....157

Data-Management Plan....160

Trustworthiness....161

Triangulation....161

Summary....162

IV. RESULTS....164

Introduction.....164

Research Disclosure.....164

Analytical Approach.....166

Data Analysis.....167

Commonalities.....222

V. Discussion.....226

Introduction.....226

Braille Literacy Skills.....226

Discussion of Findings.....234

Unanticipated Findings.....239

Implications for Practice.....243

Limitations of Study.....243

Implications for Further Research.....245

Summary.....246

Conclusion.....246

REFERENCES.....249

APPENDICES.....284

Appendix A: *Recruitment Email*.....284

Appendix B: *Gatekeeper Inclusion Criterion Questionnaire*.....286

Appendix C: *Recruitment Letter to Parents of Student Participants*.....287

Appendix D: *Informed Consent Form for Parents/Legal Guardians of Minor Student Participants*.....289

Appendix E: *Assent Form for Student Participant*.....291

Appendix F: *Assent Form for Student Participant in Braille*.....292

Appendix G: *Student Participant Interview Protocol* 293

Appendix H: *Assessment of Braille Literacy Skills* 295

Appendix I: *Example of John's Basic Reading Inventory Literacy Evaluation* 297

Appendix J: *Example of John's Basic Reading Inventory Comprehension Evaluation* 298

Appendix K: *Assessment of Braille Literacy Skills* 300

Appendix L: *Summaries of Students' Reading Performance* 302

ABSTRACT

Children who happen to be blind or visually impaired deserve the same educational experiences as their peers who are sighted. In order to level the playing field for these children, literacy, whether it is braille or print literacy, and the opportunity to grow and develop should be the norm and not the exception. Much has been written in past decades regarding the education of children who are blind or visually impaired. Studies have been conducted, books and articles have been written, and many people have made careers in the field of education for people who are blind.

These children deserve the opportunity to develop braille literacy skills. It is unconscionable to think that a child who is sighted would not be afforded the opportunity of literacy. This study proposes that it is also unconscionable to think that a child who is blind or visually impaired would not be afforded the same opportunity.

The purpose of this dissertation qualitative study was to identify and compare commonalities among four students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills. The study examined what academic factors, personal and/or family dynamics, and environmental or social components influenced the learning of braille for these students.

Through this dissertation study, four young people in high school shared their braille literacy skill development experiences. Their experiences and their suggestions were gathered through in-depth interviews, literacy evaluations, and direct observations. From this data, interpretations of their experiences were made to identify and compare commonalities among these four high school students who possessed comprehensive braille literacy skills. The most significant finding of the study was that the academic

component was the most influential in their braille literacy development. The students' personal determination, motivation, and initiative also had a significant role in their braille literacy while the social component had the least influence in braille literacy development. Additional subthemes were also identified from the research data. It is my hope that this study will provide the field of education of students with visual impairments with some thought-provoking considerations when it comes to teaching our children to be independent, self-sufficient, literate individuals.

CHAPTER I
INTRODUCTION

The development of literacy is the educational foundation on which all else is built (Argyropoulos & Martos, 2006). If students are going to be successful in mathematics, science, history, and language arts, their ability to read and write is essential. Reading and writing is an integral part of every content area taught in public and private schools.

Literacy is defined by Argyropoulos and Martos (2006) as the ability to read and write at such a level as to be able to meet daily living needs. The understanding and the voicing of knowledge and ideas are the purposes of reading and writing. In the United States, learning reading and writing skills is regarded as a birthright (Geisler, 1994). The ability to read and write has become a survival skill affecting daily life, employment, and quality of life. It is the key to social and economic opportunity (Rex, Koenig, Wormsley, & Baker, 1995). Literacy is entwined into daily life, with a direct impact on both physical and psychological well-being (LaRose, 2001b). There is no substitute for the ability to read and write.

Literacy has evolved to be a central issue of national concern. Factors relating to literacy have been examined by legislators, educators, policy makers, and the media (Rex, 1989). Recently, there has been a thread of rich articles and books addressing critical issues in the field of literacy examining the theoretical perspectives and their implications in educational and policy contexts (Street, 2003). This is an issue of great concern in states where children's reading skills are assessed by standardized statewide tests beginning in third grade. According to the American Library Association, there is a

ninety-percent probability that if a child is a poor reader at the end of the first grade, he will be a poor reader at the end of the fourth grade (Souza, 2007).

The Reading First Program instituted by No Child Left Behind (NCLB) (2002), mandates evidence-based literacy instruction for all students, kindergarten through third grade (U.S. Department of Education, 2014). The importance of reading and writing skills is highlighted in the NCLB Act of 2001 (2002). This mandate ensures that all children have access to the general education curriculum, regardless of disability, including students who are blind or who have a visual impairment. According to the Individuals with Disability Education Improvement Act of 2004, the definition for visual impairment and blindness "... is an impairment in vision that, even with correction, adversely affects a child's educational performance, including both partial sight and blindness" (Sec. 20 U.S.C. §§ 1400 *et seq*, 2004).

Research supports the claim that braille is the path to literacy success for children whose vision loss impedes their ability to read and write print (CNIB, 2013). Experts in the field of the education of children who are blind or visually impaired have recognized the importance of teaching braille to students whose vision is not enough to read regular print comfortably and at a competitive rate for a sustained period of time (Ryles, 1996; Schroeder, 1997; Willoughby & Duffy, 1989). Braille is a literacy building block, and in turn, literacy is a building block for independence (CNIB, 2013).

Braille is a tactile code utilized by people who are blind or visually impaired to read and write. Each letter of the English alphabet is represented by a unique dot configuration consisting of one to six dots. Uncontracted braille represents each letter of the alphabet and punctuation as one braille character or cell. Contracted braille represents

common letter combinations or words, usually one or two characters or braille cells (National Braille Press, 2013). There are 189 contractions, often compared to shorthand (National Braille Press, 2013).

Each dot in the cell is identified by its placement number, dot 1 through dot 6. Various combinations of the six dots represent letters, numbers, word contractions, and punctuation. A braille cell is the framework that holds the dots. Each dot is approximately one mm in diameter, within a framework of two columns and three rows, with 1.5 mm between the midpoints of each adjacent dot (Toussaint, Tiger, & Rehfeldt, 2010).

The Federal Quota Census report from The American Printing House for The Blind, of January 3, 2015 (Fiscal Year 2016), shows students who are registered as being blind or visually impaired in the United States. The report includes students registered in four major types of educational programs (American Printing House for the Blind, 2016). For the purpose of this dissertation study, two of the four programs will be reported: state departments of education (school districts) and schools for the blind. These programs include students in academic programs pre-school through 12th grade where 3,914 students were reported to be braille readers.

Students who are braille readers have a much greater possibility of participating in full mainstream literacy instruction during their school career if they develop solid literacy skills and a positive attitude towards reading and writing in their first few years of school (Swenson, 2008). For children with a visual impairment or blindness, being able to read and write braille is the key to literacy, successful future employment, and independence (CNIB, 2013). Children need comprehensive literacy skills, as well as a foundation in numeracy, in order to enjoy intellectual freedom, personal security, and

equal opportunities as adults; listening alone is not enough. Research shows that braille provides a viable medium for students to learn grammar, language, math, and science (National Braille Press, 2013). If people who are blind or visually impaired are to live full and productive lives, the most necessary tool is literacy (Schroeder, 1996).

Literacy is crucial for students who are blind or visually impaired if they are going to compete successfully in an increasingly demanding world market (Schroeder, 1996). Additionally, braille literacy directly correlates between academic achievement and employment. Ryles (1996) found that, among congenitally legally blind adults, reading braille was a common skill directly affecting higher employment rates and higher education levels than those who utilized print as a primary medium. Those individuals utilizing braille as their primary reading medium had a significantly lower unemployment rate, 44%, than those who utilize print as their primary reading medium. Ryles contends that individuals who learned braille when they were children and used braille extensively as their primary reading medium were employed at a higher rate (1996).

Additional research shows a direct correlation between braille literacy, academic achievement, and employment (National Braille Press, 2013). A study by Bell and Mino, (2013) was conducted to determine the current employment status of adults who are blind or visually impaired and to analyze its consistency with federal reports. Considered were demographics, education, civic involvement, and rehabilitation experiences to determine if some of these factors were contributing to the employment outcomes.

Results indicated that the employment rate for adults who are blind or visually impaired is 37%, which is consistent with previous research (Bell & Mino, 2013). A gender gap exists, with a significant difference in annual earnings between men and

women. Education and rehabilitation-related factors seemed to affect outcomes. Higher educational attainment is associated with better employment outcomes. Bell and Mino concluded that, for persons who read braille on a weekly basis and used a white cane, the likelihood of being employed and receiving higher earnings was higher than those who did not use these tools. Seventy-four percent of working-age adults who are blind or visually impaired are unemployed and dependent on support such as disability income benefits. The majority of the 26% who are employed are braille readers (National Braille Press, 2013).

Statement of the Problem

Literacy plays a key role in the life of a person who is blind or visually impaired, just as it does in the life of a person who is sighted (National Braille Press, 2013). The research is clear; braille is extremely important for people who are blind or visually impaired to become literate, and it is a critical component supporting educational advancement and increased employment prospects. Regardless of the research linking braille literacy to higher education and employment, braille literacy rates for school-age children who are blind or visually impaired have declined from greater than 50% forty years ago, to only 12% (National Braille Press, 2013).

A "Braille Bill" was passed by a Southwestern state in the United States in 1991 by its state legislature. This piece of legislation mandates a specific legal requirement, stating that braille reading and writing instruction be provided by a certified teacher of students with visual impairments (TVI) to students who can benefit from such instruction (Texas State Legislature, 1991). IDEA stipulates services must be determined by the individual needs of each student, disregarding factors such as the program that is already

in place (Wedding, 1997). Even with the safety net stipulated by Braille Bills and IDEA, many students who are blind or visually impaired graduate high school with less than adequate braille literacy skills.

Purpose of Study

The purpose of this dissertation qualitative study was to identify and compare commonalities among four students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills. This study may serve as a starting point when attempting to determine improvements or changes in frequency of instruction, service-delivery model, and/or curriculum used when teaching children braille.

Research Question

In my study, I sought to determine what academic factors, personal and/or family dynamics, and environmental or social components influence the learning of braille for a student who is blind or visually impaired.

Significance of the Study

Because children with blindness or visual impairment are a low-incidence population, studies regarding the development of their literacy skills are limited. However, regardless of the research-based evidence linking braille literacy to higher education and employment, braille literacy rates have declined from (National Braille Press, 2013). Considering the data, the significance of this study may be valuable to TVIs and Individualized Education Program (IEP) teams when considering braille instruction for students who are blind or visually impaired. Results of this study may be a starting

point when attempting to determine improvements or changes in frequency of instruction, service-delivery model, or curriculum used when teaching children braille.

Theoretical Framework

This study included four students in grades 10-11 in a Southwestern state in the United States. Literacy skills important to this study were: fluency, comprehension, and transferability of skills. Student participants and gatekeepers (teachers of students with visual impairments) were recruited for this study via e-mail on a professional organization list serve, and from the Education Service Centers' list serves.

Rationale for Using Qualitative Research Methods

Qualitative research seeks to examine where, why, and how something occurs or evolves. The data builds a comprehensive picture, analyzes words, and reports detailed views of participants. Qualitative analysis allowed me to derive conclusions about why and how students develop comprehensive braille literacy skills. This qualitative study was student-participant oriented; quantitative methods were not employed (Glaser, 1992). The nature of qualitative research involves perceptions and interpretations, which generated rich data found in the perceptions and interpretations of the four participants regarding their braille literacy skills.

Grounded theory, an approach accounting for variation and providing flexibility to researchers, was utilized to conduct the data analysis. Analysis was modified as the data was collected. Grounded theory is comprised of four components: (a) fit, (b) work, (c) relevance, and (d) modifiability (Denzin & Lincoln 2003; Glaser, 1992). Grounded theory analysis afforded me the opportunity to tentatively generate theory regarding the commonalities of students who possess comprehensive braille literacy skills.

Delimitations of the Study

Participation in this study was delimited to students who (a) were in grades 9-12 in a Southwestern state in the United States, (b) had developed fluent braille literacy skills, (c) were English language braille users, and (d) had no additional disabilities other than blindness or visual impairment.

Limitations of the Study

As with any data collection method, this one had its limitations. I had to plan each question with great care, making every effort to insure questions were appropriate and avoiding such questions that may have been subjective; thus, creating problems with trustworthiness. When analyzing data gathered from questionnaires, I was aware that questionnaires do not provide direct answers to research questions (Alreck & Settle, 1995). Additionally, limitation was found in the amount of time required to compile the information provided by the questionnaire. Another limitation was, if I was not cautious and the process was too rigid, it would have been easy to force data into categories instead of allowing the categories and concepts to emerge from the data. Finally, a possible limitation of this study may be the influence of the Hawthorne effect. This term refers to the tendency of some people to work harder and perform better when participating in a study. The concern is that the student participants may change their behavior or answer interview questions based on my background and the attention they are receiving from me, rather than because of any independent thought (Cherry, 2016).

Definition of Terms

For the purpose of this study, the following definitions were employed:

Assessment of Braille Literacy Skills (ABLS): A braille literacy assessment tool,

comprising a summary of different skill sets that may be met at various grade levels. This assessment can be utilized to track student progress toward Braille literacy proficiency, (Koenig & Farrenkopf, 2004).

Bilateral Aphakia: The absence of the lens of the eye. Most often resulting from the surgical removal of a cataract. The eye is unable to adjust its focus for seeing at different distances, (American Foundation for the Blind, 2017b). The term Bilateral Aphakia refers to the loss of the lens in both eyes.

Braille: A tactile writing code utilizing patterns of raised dots representing unique characters for letters, words, punctuation, and symbols specific to the code (National Braille Press, 2013).

Braille and Audio Reading Download (BARD): A free library service comprised of recorded and braille books and magazines available to residents of the United States and to American citizens abroad, who are unable to read or use standard print because of a visual or physical disability. This service is provided by the National Library Service for the Blind and Physically Handicapped Library of Congress, in partnership with a network of regional and sub-regional libraries. (National Library Service for the Blind and Physically Handicapped, 2017a).

Braille Bill: State legislation mandating assessment and opportunity for provision of instruction of braille reading and writing for students with visual impairments by a TVI (Wedding, 1997).

Braille Challenge: The Braille Challenge® is an academic competition consisting of a two-stage contest designed to motivate blind and visually impaired students to focus on their development of braille skills. Local events progressing to national events are held

throughout the U.S. and Canada every year. The regional contest is open to students of all skill levels; however, the top-scoring 50 contestants nationally are invited to Los Angeles in June for a final round. Braille Challenge contest categories include: (a) reading comprehension, (b) braille speed and accuracy, (c) proofreading, (d) spelling, and (e) reading tactile charts and graphs (Braille Institute of America, 2016).

Braille contractions: Abbreviated ways of writing braille, making reading and writing braille faster, and the braille takes less space (Louis Braille School, n.d.).

Braille Writer: A machine used to create Braille manually; the Perkins Brailler® is the most widely known and used brailler in the world. David Abraham, a teacher at Perkins School for the Blind invented the Brailler in 1951. Withstanding the test of time, due to its great durability, reliability and ease of use, more than 300,000 braillers have been sold to over 170 countries, (Perkins School for the Blind, 2017).

Certified Teacher of Students with Visual Impairments (CTVI): A certified teacher of students with visual impairments; also known as a teacher of the visually impaired, a vision specialist, VI teacher, vision itinerant teacher, etc. This teacher is a licensed special education teacher who has earned certification and specialized training, in meeting the educational needs of students who are blind or visually impaired, ages birth through 21. States vary on the criteria for certification as a teacher of students with visual impairments. These teachers hold an instructional position, as opposed to a related service or vision therapy position (C. Willings, 2015).

Commitment: Something pledged (Commitment, 2017).

Comprehensive Braille Literacy Skills: Comprehensive: "covering completely or broadly" (Comprehensive, 2017). Braille literacy: Proficiency in the use of braille to

accomplish reading and writing tasks (Koenig & Holbrook, 2000b). Skill: "a learned power of doing something competently" (Skill, 2017). Skills Proficiency in the use of braille to accomplish reading and writing tasks (Koenig & Holbrook, 2000a).

Congenital visual impairment: Loss or impairment of vision present at birth (Koenig & Holbrook, 2000b).

Consultative Services: Services are provided by a TVI to the educational team that work with the student. The TVI intermittently observes students within their educational environment to determine the most appropriate adaptations to materials, environment, and instruction (Willings, n.d. a) in collaboration with service providers such as teachers and therapists as determined by an IEP committee. In some instances collaboration with the student is appropriate.

Conventional Literacy: Making meaning out of reading and writing (Koenig & Holbrook, 2000a).

Conventional Literacy Skills: Decoding, oral reading fluency, reading comprehension, writing, and spelling. These skills are utilized within all literacy experiences and components (National Early Literacy Panel, 2009).

Cortical Visual Impairment: A temporary or permanent visual impairment caused by a disruption of the posterior visual pathways and/or occipital lobes of the brain. Severity may range from a severe visual impairment to total blindness. The visual systems of the brain do not understand or interpret what the eyes see consistently (Bernas-Pierce, 1998).

Direct Instruction: Instruction is provided to an individual child or to a small group of children with similar needs. These services are provided to assist a child meet the goals and objectives set forth on the child's IEP (Pacer Center, 2010).

Emergent Literacy: Early attempts by young children to correlate meaning with reading and writing (Koenig & Holbrook, 2000b).

Expanded Core Curriculum (ECC): This curriculum encompasses nine specific skills needed by students who are blind or visually impaired (American Foundation for the Blind, 2017d).

Functionally Blind: A visual impairment in which some useful vision may or may not be present, and the most effective learning channels are tactile and auditory (Koenig & Holbrook, 2000b). A person who is functionally blind uses tactual media, including braille, as a primary tool for learning and communicating, reading and writing to the same extent as others of comparable ability use print (Wedding, 1997).

Functional Literacy Skills: The development of literacy skills by using a variety of literacy tools such as auditory and technology, in order to accomplish daily tasks in the home, school, community, and work settings (Koenig & Holbrook, 2000b). A functional literacy program focuses on the teaching of these skills.

Functional Vision Evaluation (FVE): Evaluation conducted by a TVI and/or a Certified Orientation and Mobility Specialist (COMS) to determine a student's functional vision and how that vision is utilized. The FVE addresses both near and distance vision in both indoor and outdoor environments (Koenig & Holbrook, 2000b).

Gatekeeper: Individuals who provide assistance to identify participants (Creswell, 2008).

General Education: Provides students a curriculum that all students are expected to master, including language arts, science, mathematics, and social studies (Koenig & Holbrook, 2000b).

Grounded Theory Analysis: The theory develops from the data as it is collected and analyzed, therefore, the analysis takes place from the first time that data begins to be collected and proceeds until the research study is completed (Cohen & Crabtree, 2006).

Inclusion: Classroom "… placement of a student with a disability in a general education classroom for all or part of the school day … mainstreaming" (Koenig & Holbrook, 2000b, p. 812).

Incidental Learning: Learning achieved by observing people and activities around us, day by day (Family Connect, 2016).

Itinerant Teacher: A teacher who travels from one location "… to another to provide instruction and support to students with special needs…" (home to home, school to hospital, or school to school), (Koenig & Holbrook, 2000b, p. 813).

John's Basic Reading inventory (BRI): This is an individualized informal reading assessment, comprising of a series of graded word lists and graded passages. The inventory helps teachers gain insights into student's reading behavior (Johns, 2012).

Learning Media Assessment (LMA): Assessment process conducted by a TVI that is designed to determine the most effective learning and literacy media for a student who is blind or visually impaired. This process is based on observation of sensory channels across a variety of environments (Koenig & Holbrook, 2000b) and also by assessing reading rate and comprehension, if appropriate.

Leber's Congenital Amaurosis: This is an inherited condition, conceivably caused by degeneration of the retina; resulting in blindness at birth or development of severe vision loss soon after birth. There is no treatment for this condition (American Foundation for the Blind, 2017b).

Legally Blind: A visual acuity of 20/20 is considered typical vision. In a Southwestern state in the United States, a visual acuity of 20/50 prohibits driving without special aids. A visual acuity of 20/70 is considered a visual impairment, and when a person's acuity is 20/200 or worse in his or her better eye with the best possible correction on that eye, that person is considered to be "legally blind." A person can see with uncorrected 20/200 vision; however, often too little is recognized to be very helpful (Texas Department of State Health Services, 2014).

Literacy: The ability to read and write at such a level to be able to meet daily living needs (Argyropoulos & Martos, 2006).

Literacy Tools: Specific methods or devices such as braille, print, low vision devices, live readers, notetakers, word processing, and recorded media that are used to access literacy media and accomplish literacy tasks (Koenig & Holbrook, 2000b).

Low-incidence Disabilities: Disabilities comprising a small percentage of the population such as hearing impairment, visual impairment, deafblindness, significant developmental delay, complex health issues, serious physical impairment, severe disabilities, multiple impairments, orthopedic impairments, and autism. Most local schools have little if any knowledge of how to best educate these students, of what technologies are available to assist them, and of how to obtain needed and appropriate support services from outside agencies (Jackson, 2005).

Mandates: Policies or laws legislatively established in an attempt to reach many entities (Wedding, 1997).

National Federation of the Blind: An organization governed by individuals who are blind or visually impaired whose mission is to educate, empower, and advocate so that people

with visual impairments can achieve full societal integration (National Federation of the Blind of Texas, 2017).

National Library Service for the Blind and Physically Handicapped (NLS): Through a national partnership of cooperating libraries, NLS oversees a free library program of braille and audio materials circulated to patrons in the United States by postage-free mail, (National Library Service for the Blind and Physically Handicapped, 2017b). Participants in this study use the term NLS and BARD interchangeably.

Nemeth Braille Code: A braille code for the use in science and mathematics (Koenig & Holbrook, 2000b).

Qualitative Research: explores the quality of things through the use of words, images, and descriptions (Berg, 2009), attempting to answer questions based on the perceptions of personal experiences, referring to meaning, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. Qualitative research seeks to examine the why, how, and where a given phenomenon occurs or evolves.

Reading: Interpretation and comprehension of tactual/print characters or symbols by deriving meaning from their characters or symbols. When combined with previous knowledge, reading provides meaningful information (Wedding, 1997). At a basic level, reading is the recognition of words, from simple recognition of individual letters and how these letters form particular words, to what each word means, not just on an isolated level, but as part of a text (Tennant, 2000).

Reading Efficiency: The speed at which reading occurs with comprehension. The interaction between reading rate and reading comprehension, usually measured in the number of words read per minute with comprehension (Koenig & Holbrook, 2000b).

Reading Rate: Words read per minute, involving automaticity of reading. The speed at which an individual reads continuously with comprehension (Anthony, 2016).

Reading Readiness: The point at which a child is capable of learning to read, (Smith & Chapel, 1970).

Retinopathy of prematurity (ROP): A condition associated with premature birth. The growth of blood vessels in the retina stops, and abnormal blood vessels develop, resulting in an increased risk of retinal detachment. Retinopathy of prematurity can lead to reduced vision or blindness. Laser treatment can help if diagnosis and treatment occur early (American Foundation for the Blind, 2017b).

Screen Reader: A software program that reads the text displayed on a computer monitor via a speech synthesizer or braille display (American Foundation for the Blind. (2017c).

Self-empowerment: Taking control of our life, setting goals, making positive choices, understanding our strengths and weaknesses, and believe in ourselves (Shah, 2016).

Sensory Channels: The senses by which the student gains information. The primary sensory channel is the sensory channel (visual, tactual, or auditory) primarily used to the greatest extent in performing given tasks (Koenig & Holbrook, 2000b).

Slate and Stylus: A portable device used to write braille by hand. It consists of a slate (a metal or plastic template with a series of braille cells) and a stylus (the tool used to press braille dots into the paper) (Koenig & Holbrook, 2000b).

Sociology: The study of social relationships and institutions (University of North Carolina at Chapel Hill, 2014).

Tactile Graphic books: Books which reproduce non-textual information such as pictures, maps, graphs, diagrams, and other images, with tactile representations. A student who is

blind or visual impaired can read these raised lines and surfaces in order to gain the same information as people who are sighted receive when looking at pictures or other visual images (Paths to Literacy, n.d.b).

Teacher of Students with Visual Impairments (TVI): A certified teacher of students with visual impairments; also known as teacher of the visually impaired, a vision specialist, VI teacher, vision itinerant teacher, etc. This teacher is a licensed special education teacher who has earned certification and specialized training, in meeting the educational needs of students who are blind or visually impaired ages birth through 21. States vary on the criteria for certification as a teacher of students with visual impairments. These teachers hold an instructional position, as opposed to a related service or vision therapy position (Willings, 2015). For the purpose of this study, these professionals will be referred to as TVIs in order to preserve the integrity of the participants' comments.

Tenacity: The quality of retaining something (Tenacity, 2017).

Unified English Braille (UEB): A single unified Braille code for all English-speaking countries (Perkins School for the Blind, n.d.).

Visual impairment: Impairment in vision that, after correction, significantly affects educational performance [Individuals with Disabilities Education Improvement Act (IDEIA), 2004].

Organization of Dissertation

This dissertation consists of five chapters, an appendix section, and references. Chapter I includes: Introduction to Braille Literacy, Statement of the Problem, Purpose of the Study, Research Question, Significance of the Study, Theoretical Framework, Rationale, Delimitations of the Study, Limitations of the Study, Definition of Terms,

Organization of Dissertation, and a Summary. Chapter II contains a Review of the Literature. Chapter III explains the research methodology and rationale. Chapter IV presents and explains the findings and results of the study. Finally, Chapter V includes implications for practice, future research, strengths, and limitations of the study. The appendix section includes: a) Recruitment Email, b) Gatekeeper Inclusion Criterion Questionnaire, c) Recruitment Letter to Parents/Legal Guardians of Student Participants, d) Informed Consent Form for Parents/Legal Guardians of Minor Student Participants, e) Assent Form for Student Participant, f) Assent Form for Student Participants in Braille, g) Student Participant Interview Protocol, h) Assessment of Braille Literacy Skills, i) Example of *The John's Basic Reading Inventory* Literacy Evaluation, j) Example of *The John's Basic Reading Inventory* Comprehension Evaluation, k) *The Assessment of Braille Literacy Skills*, and l) Summaries of Students' Reading Performance.

Summary

In order for children to be successful in mathematics, science, history, and language arts, the ability to read and write is essential. Therefore, reading and writing is an integral part of every content area taught in public and private schools. In the United States, learning reading and writing skills is regarded as a birthright (Geisler, 1994). According to the American Library Association, there is a ninety-percent probability that if a child is a poor reader at the end of the first grade, he will be a poor reader at the end of the fourth grade (Souza, 2007).

Because braille is a literacy building block, and in turn literacy is a building block of independence (CNIB, 2013), how students develop comprehensive braille literacy skills is important to the education of children who are blind or visually impaired.

Qualitative research seeks to examine why, where, and how something occurs or evolves; therefore, a grounded-theory approach within qualitative research was employed by me to answer questions regarding the development of comprehensive braille literacy skills of four students who are blind or visually impaired in grades 10-11 in a Southwestern state in the United States. Participation in this study was delimited to students who (a) were in grades 9-12 in a Southwestern state in the United States, (b) possessed fluent braille literacy skills, (c) were English language braille users, and (d) had no additional disabilities other than blindness or visual impairment. The development of literacy is the educational foundation on which all else is built (Argyropoulos & Martos, 2006).

CHAPTER II
REVIEW OF LITERATURE

Introduction

"Now we are ready as a nation to affirm full literacy as a value that we cannot do without" (Newman & Beverstock, 1990, p. vi). Persons who are blind or visually impaired, along with educators who provide specialized services and parents of children who are blind or visually impaired join in this declaration of full literacy. Braille literacy is an issue of great concern to students and adults who are blind or visually impaired, parents of children who are blind or visually impaired, and teachers (Blake, 2003b).

In 1990, the Council of Executives of American Residential Schools for the Visually Handicapped (CEARSVH) defined literacy as the mastery and application of reading, writing, and computing, allowing an individual to function efficiently now and in the future. Argyropoulos and Martos (2006) define literacy as the ability to read and write at a level to be able to meet daily living needs, asserting that the cornerstone of education is the development of literacy. Literacy is achieved when communication occurs successfully between an individual and an intended audience; it is not something one has or does not have; it cannot be judged on the basis of literacy versus illiteracy (Koenig, 1992). Literacy encompasses the symbols as the means (Schroeder, 1989) or medium (Koenig & Holbrook, 1989) and the knowledge and meaning for the total process of reading and writing (Rex, 1989).

"Braille is the key to information, and the ability to manage and manipulate information is essential to a person's self-sufficiency and self-esteem" (Spungin, 1996, p. 271). Without braille, it is unlikely that students who are blind or visually impaired would

experience the level of education and independence that they do today (Koenig & Holbrook, 2000a).

Braille literacy is specifically addressed in the 1997 Amendment to the Individuals with Disabilities Education Act (1997). Regulations from the Individuals with Disabilities Education Improvement Act (IDEIA) (2004) relating to the provision of accommodations, including literacy instruction for children who are blind or visually impaired, include three possible options for conventional literacy instruction: (a) instruction in braille and the use of braille, unless the Individual Education Program (IEP) team determines that instruction in braille or the use of braille is not appropriate for the child after an evaluation of the student's reading and writing skills, needs, and appropriate reading and writing media, including an evaluation of the student's future needs for instruction in braille or the use of braille; (b) instruction in print, with or without low vision and/or electronic devices, to be determined after a clinical low vision evaluation of the student's potential for using vision to access appropriate general education reading and writing materials near and distant; (c) instruction in both braille and print (dual media), with or without prescribed low vision and/or electronic devices, determined after a Learning Media Assessment (LMA) and a Clinical Low Vision Evaluation [Association for Education and Rehabilitation of the Blind and Visually Impaired (AER) 2013].

The Texas "Braille Bill" was passed into law in 1991 by the Texas Legislature. This piece of legislation mandates a specific legal requirement, stating that braille reading and writing instruction be provided by a certified TVI to students who can benefit from such instruction (Texas State Legislature, 1991).

However, literacy is more than legal terminology and involves more than the ability to read and write. It is a continuum from basic reading and writing skills all the way to various technical literacies. It is different for different people, in distinct times and various places (Troughton, 1992). Literacy development proceeds along a continuum, and children develop literacy skills in a variety of ways and at different ages (Johnson, 1999).

The 80% statistic that all learning is visual is relevant only to people who are sighted (Castellano, 2005). Students who are blind or visually impaired are capable of learning everything their sighted peers of comparable cognitive ability learn, using their hands, ears, taste, smell, and any possible level of vision they may have. Blindness or visual impairment does not affect a person's ability to understand because the brain is an equal opportunity employer, not caring which path the information takes (Cutter, 2004). The possibility of broad communication opportunities along with literacy, spelling, and writing is afforded to persons who are blind or visually impaired through the use of braille (Cylke, 2001).

The skills of reading and writing are fundamental contributions to a successful and independent life. Braille reading allows interaction between the reader and the text, providing information about how language is constructed, learning the mechanics of punctuation and the spelling of unfamiliar words, and text formatting, including where and how to place titles, subtitles, chapter headings, and other organizational features (Cylke, 2001). Exploring these conventions are critical for developing good writing skills for all learners, blind, visually impaired, and sighted alike (Cylke, 2001). As with print readers, encountering these features by the braille reader reinforces the development of

literacy (Ranalli, 2008). Braille readers can achieve literacy levels equal to and sometimes surpassing those of sighted peers (Castellano, 2005). Literacy provides the possibility of freedom, and in turn, freedom brings forth the possibility of endless realization, pleasant living, and significant social contributions (Cylke, 2001). Braille is a tool for personal dignity, privacy, and independence (Dixon, 2001).

Instruction in braille to students who are blind or visually impaired has declined since the 1960s. Federal statistics indicate that 50% of legally blind school-age children were able to read braille in 1960 (Ranalli, 2008). In 1963, 57% of students who were blind or visually impaired knew braille, and by 1998, that percentage dropped to less than 10% (Ryles, 2001). In 2008, of the 55,000 legally blind school-age children in the United States, approximately 12% were able to read braille (Ranalli, 2008). This drop in literacy skills of children who are blind and visually impaired is not exclusive to the United States; braille literacy rates dropped around the world (Ranalli, 2008).

The Federal Quota Census report of January 3, 2015 (Fiscal Year 2016) from The American Printing House for The Blind shows students who are registered as being blind or legally blind in the United States. The report includes students registered in four major types of educational programs (American Printing House for the Blind, 2016). For the purpose of this dissertation study, two of the four programs will be reported: state departments of education (school districts) and schools for the blind. These programs include students in academic programs pre-school through 12th grade. The census is broken down into several literacy mediums. For the purpose of this dissertation study, visual readers, auditory readers, and braille readers are considered. A total of 16,162 students were reported to be visual readers; 3,154 students were reported to be auditory

readers; and 3,914 were reported to be braille readers. The departments of education had more students registered in each medium than the schools for the blind.

When looking at the census information reported by APH, it is important to keep several things in mind. Many students registered with APH, identified as being blind or visually impaired may not be braille readers due to several reasons. They may have enough vision to read print efficiently. They may not have the cognitive ability to learn braille, or to read at all. They may be at a functional literacy level. Certain physical disabilities will prevent students from using their hands for reading. Additionally, some learning disabilities necessitate students to be auditory learners. It is true that there may be some students reported as being blind or visually impaired on the census who are not getting braille and who do need it as their literacy mode. Ferrell, Shaw, and Deitz (1998) determined that the majority of children with visual impairments have additional disabilities. Many of these students are not able to learn braille and/or cannot learn to read at all. It is also important to note that many students included in the census have Cortical Visual Impairment (CVI), which is the number one cause of visual impairment in children. Many of these students can read print and/or may have other disabilities that prevent them from reading at all (R. Pogrund, personal communication, April 27, 2017).

Educators and those who advocate for the education of students who are blind or visually impaired believe there are numerous causes for the steep drop in braille usage. These include school budget constraints, advances in technology, and philosophical differences over how children who are blind or visually impaired should be taught (Ranalli, 2008). Existing surveys stressed the fact that fewer students read and write braille in the general population (Gray & Wilkins, 2005; McCall, 1997). Researchers

have pointed out that the excessive usage of assistive technology may benefit people with severe visual impairments tremendously, but on the other hand, the cultivation of literacy skills may be delayed significantly (Argyropoulos, Martos, & Leoutsakos, 2005; Spungin, 1996; Sullivan, 1996).

The purpose of this dissertation was to identify and compare commonalities among four students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills as measured by the Academic Section of *The Assessment of Braille Literacy Skills* (*ABLS*) and *The John's Basic Reading Inventory* (*BRI)* (See Appendices J and L). In the literature relating to blindness and visual impairment, there is a great deal of thought, research, and best practice policies concerning braille literacy. However, I found no studies specific to the identification and comparison of commonalities among students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills. Children who are blind or visually impaired are a low-incidence population, and as such, many times are not included in larger studies related to literacy development. This chapter is a review of scholarly literature relating to the development of comprehensive literacy skills including: A History of Braille; an Educational Historical Perspective; Reading; Family Support; Emergent Literacy and Early Education; Literacy; Hand Mechanics; Spelling and Phonological Awareness; Speed, Fluency, and Comprehension; and a Summary.

History of Braille

With the inception of formal education for students who were blind or visually impaired, developing literacy was, and still is, a major goal for educators, parents and students. The initial hurdle was the development of a formalized written communication

system. Carving indentations in sticks, putting pinpricks in paper, tying knots on a rope, or sticking pins in pincushions were established forms of communication (Harley, Truan, & Sanford, 1997). Next came the reproducing of print letters, in the form of paper letters strung together to form 3-dimensional wooden letters, cardboard letters, and cast iron letters (Harley et al., 1997). These systems were cumbersome and inefficient, not facilitating large amounts of reading. Following this came the attempt to emboss print letters on paper, first done by hammering 3-dimensional letters into wax tablets (Harley et al., 1997). This gave way to the development of several different large typefaces, resulting in a great deal of discussion regarding which was most effective (Harley et al., 1997).

Another system of embossing books was the process of applying soaked paper to raised letter forms, so that the tactile shape of the specially crafted large round cursive letters remained after the paper dried. The pages were then glued back to front, producing two-sided sheets. This process was time intensive and difficult to produce, and almost as slow and difficult to read because each letter had to be traced individually (Kimbrough, 2008).

Louis Braille, a student who was blind and later became a French educator, focused his work on the premise that tactile literacy is different from visual literacy; therefore, more was needed than merely reproducing print in order for people who are blind and visually impaired to become effective and efficient readers (Wedding, 1997). When Charles Barbier de la Serre, a Frenchman who had developed the dot-and-dash based "night writing" artillery code for the French military, demonstrated his system at the Royal Institution for Blind Children, Braille knew he had found his medium, quickly

learning to use Barbier's "ruler," which greatly resembles a more complex version of today's slate (Kimbrough, 2008). Braille quickly saw the drawbacks in Barbier's system:

1. The system used a huge cell, more than the pad of the finger can cover.

2. The cells represented thirty-six basic sounds instead of letters.

3. The large board used to write the sound symbols had six cells across and six cells down.

4. No punctuation marks, numbers, or musical signs were provided.

5. There were horizontal dashes (Kimbrough, 2008).

Captain Barbier was not willing to speak with Braille about his ideas for improving the code, and intimidated by the Captain, Braille stopped asking his advice (Kimbrough, 2008). Nevertheless, Braille continued experimenting with the code on his own, trying various modifications that enabled the letter symbols to fit under the pad of the finger (Kimbrough, 2008).

At the beginning of the 1824 school year, when Braille was fifteen years old, he revealed his new alphabet (Kimbrough, 2008). There were sixty-three ways to use a six-dot cell, and some dashes were still included. Teachers who were sighted resented the new code with its demand that they learn something so different and complaining that the sound of punching was disrupting classes (Kimbrough, 2008).

By 1828, Braille had found a way to copy music using his code and eliminated the dashes (Kimbrough, 2008). In 1829, when Braille was twenty years old, he published his first comprehensive book about his system, *Method of Writing Words, Music, and Plain Songs by Means of Dots, for Use by the Blind and Arranged for Them*, and revised it in 1837 (Kimbrough, 2008). The same year, students at the school published a three-volume

history of France, the first braille textbook in the world. At this time, Assistant Director Armand Dufau, a former geography teacher at the school, published *The Blind: Considerations on Their Physical, Moral and Intellectual State, with a Complete Description of the Means Suitable to Improve Their Lot Using Instruction and Work*, winning the prestigious prize from the Académie Française (Kimbrough, 2008).

Dufau strongly opposed the braille code, believing it made the blind too independent (Kimbrough, 2008). Having official support, he procured a large budget increase for the school, and changed the school's standard reading medium, not using Braille's code but adopting a British system invented by John Alston of the Asylum for the Blind in Glasgow, another print-like tactile system. Dufau destroyed many of the existing books he found printed or hand transcribed in Braille's code, burning the school's entire library; burning the work of nearly fifty years (Kimbrough, 2008). He confiscated the slates, styli, and other braille-writing equipment. Without Dufau's knowledge, student rebellion resulted in their writing braille without slates. Messages were sent, and secret diaries were kept written with knitting needles, forks, and nails. The punishment for braille use, including being slapped and starved, was completely ineffective with older students, who taught younger students the system in secret (Kimbrough, 2008). Braille, once learned, proved impossible to quell (Kimbrough, 2008).

Joseph Guadet, Dufau's assistant, became a fervent braille supporter, teaching himself to read and write the code (Kimbrough, 2008). Guadet persuaded Dufau that, if powerful people in government became aware that students were willfully defying his authority, his job might be at risk. However, if a student developed something successful,

such as Braille's code, the school would share the credit enhancing the director's reputation.

In November 1843, when the school moved to a new location, Dufau provided every student with a new braille slate (Kimbrough, 2008). Significant to note, students took up a petition sending it to the government, in which they nominated Louis Braille for the French Legion of Honor for making true communication possible for the blind; however, the petition was ignored (Kimbrough, 2008). The following February at the dedication ceremony for the new building, Dufau described Braille's system of writing with raised dots. It was at this time that the dot system began to be called "braille," and a growing number of inquiries regarding it were coming to the school from all over the world (Kimbrough, 2008). In 1850, Dufau published the second edition of his book, devoting several pages to the braille system (Kimbrough, 2008).

Louis Braille died on January 6, 1852, two days after his forty-third birthday with no Paris newspaper noting his death. In 1854, France accepted braille as its official communications system for people who were blind (Kimbrough, 2008).

Students at the school, friends, and former students continued to develop new ways of working with the code. Victor Ballu experimented with a phonetic shorthand, and as early as 1867, working with school superintendent Levitte, used two-sided stereotyping. Levitte published a guide to the code in 1880, using the same numbering system for the position of the six dots (calling the letter a dot 1 and so forth) that we still use today (Kimbrough, 2008). By the late 1880s, Ballu had developed an inter-point system for printing two-sided pages. Soon after, the braille system extended to Switzerland (Kimbrough, 2008).

Tremendous resistance was found in other countries, often for the same reasons; the braille code's obscurity and difficulty to the sighted because of its lack of resemblance to print (Kimbrough, 2008). It seemed not to have occurred to many educators that people who were blind might want to write because they had something to say, as well as read what others have written (Kimbrough, 2008).

Many educators had made a mission out of devising conflicting codes with little regard for practical implications. As a result, competitive prejudice in favor of these codes arose, mostly with no input from potential readers (Kimbrough, 2008). Thomas Rhodes Armitage, a wealthy English doctor who was visually impaired himself, assembled a committee of people who were blind who had knowledge of at least three systems and who had no financial interest in any, to evaluate the various codes and make a decision on which one would be best for Britain (Kimbrough, 2008). The committee deliberated for two years, surveying dozens of blind readers, and eventually braille was selected. It was many years, however, before it was fully implemented (Kimbrough, 2008).

Although many of the competing codes did not survive much past the end of the 19th century, often the innovators they attracted moved braille publishing forward in unexpected ways (Kimbrough, 2008). In 1868, William Bell Wait, the Superintendent of the New York Institute for the Blind, promoted a now almost forgotten code called "New York Point" (Kimbrough, 2008). Eventually obscured by braille, this system was a cell that was two dots high and with a varying cell width that was for years used in book and magazine production. In 1879, Wait spoke eloquently at the Senate Education Committee, helping secure the first annual grant from Congress for embossed books for

the blind, ensuring an important financial channel for publishing for the blind in the United States (Kimbrough, 2008).

The Missouri School for the Blind, located in St. Louis, Missouri, was the first American institution to adopt braille as a literacy medium. The superintendent of the Missouri school initially resisted the use of braille, claiming it was not satisfying to the eye (Kimbrough, 2008). In spite of this, in 1860, the school officially adopted braille as its official code.

The braille dots still do not resemble print letters, and unbelievably, this complaint is still heard today (Kimbrough, 2008). Braille has been adapted to nearly every language on earth, remaining the major medium of literacy for people who are blind everywhere (Kimbrough, 2008).

After the adoption of braille as the official tactual code, any student with a visual impairment, regardless of degree of residual vision, was taught to read and write using braille (Wedding, 1997). The premise was that students with a visual impairment should avoid using any residual vision in order to prevent further loss of sight. This was known as sight saving, and prevailed as best practice until the theory of visual efficiency in which students were trained how to use their residual vision, (Barraga, 1963; Harley et al., 1997; Rex et al., 1995).

At that time in the United States, a decline in the number of braille readers occurred (Nolan, 1965; Nolan & Bott, 1971). Later, this decline was thought to be the result of several reasons: (a) an increase in the number of students labeled as non-readers because of additional disabilities, (b) an increase in the number of students with low vision using large print and optical devices, (c) limited access to braille materials; (d)

predominant use of the itinerant service delivery model, (e) inadequate teacher training, and (f) negative attitudes toward braille (Koenig, 1996; Schroeder, 1996).

Educational Historical Perspective

Literacy is associated with a specific language (Rex et al., 1995). Therefore, literacy requires understanding of a language and ability to read and write it as well (Rex et al., 1995). Perhaps written language developed when oral communication was no longer satisfactory for conveying information about society's history and traditions from one generation to the next, or about the current day-to-day activities of that society. The needed information was possibly too complex to be remembered. History indicates that, in many early societies, only the privileged classes were permitted to read and write, and written forms of language were primarily used for religious and commercial purposes. Symbols used to convey language were visual and two-dimensional (Gaur, 1992). The result being that, in every society, people who were blind or visually impaired were excluded from becoming literate (Rex et al., 1995). The inability to see often prompted fear and sympathy towards those individuals who were blind or visually impaired. They were either persecuted or considered useless and kept in hopeless poverty and ignorance, and at times some were destroyed (Rex et al., 1995). Blindness was considered the worst evil that could befall man, and was often seen as a punishment. Literacy for people who were blind or visually impaired was of no concern to those in power (French, 1932).

The 18th century brought with it a change in attitude and the understanding that people who were blind or visually impaired were capable and worthy of being educated (Rex et al., 1995). This change in attitude was the result of the work of Denis Diderot and

Valentin Haüy in the 18th century and Louis Braille in the early 19th century (Hatlen, 2000).

Diderot, a French philosopher and editor of the monumental L' Encydopedie (Letter on the Blind for the Use of Those Who See) published in 1749, expressed his belief about blindness, including his interviews with people who were blind (Kimbrough, 2008). In 1760, Diderot published a subsequent edition of the letter, describing the accomplishments of Melanie de Salignacsh, a woman who was blind and who was taught to read by using cutout letters and to write by pricking letters onto a piece of paper held in place on a frame (Rex et al., 1995). The magnitude of this document was the birthing of the idea that people who were blind had the capacity of being educated, and their intellectual abilities were intact, despite their loss or lack of vision (Farrell, 1956).

In 1771, Valentin Haüy, a Frenchman working as a translator in the Ministry of Foreign Affairs in Paris, observed a group of blind musicians performing a negative parody of themselves (Kimbrough, 2008). Haüy did not find the performance amusing, resolving to do something to help people who were blind (Farrell, 1956; French, 1932). Nine years later in 1780, Haüy met with Austrian baroness Maria Theresa von Paradis, a composer and skilled organist who was blind (Rodenberg, 1955). At their meeting, Paradis convinced Haüy to conduct an experiment and attempt to teach a student who was blind.

In 1784, he conducted the experiment with Francois Lesueur, a young boy who was blind (Hatlen, 2000). The success of Haüy's experiment led to the establishment of L'lnstitute Nationale des Jeunes Aveugles in Paris (Kimbrough, 2008). This was to be the first of many schools for children who were blind or visually impaired founded in Europe

and England in the 18th century (Rex et al., 1995). Haüy worked with raised letters, using them as a reading medium, opening the door to the cultivation of the sense of touch as the means by which people who were blind or visually impaired would become literate (Kimbrough, 2008).

Charles Barbier, a cavalry officer affiliated with the French signal corps, developed a code based on a 12-dot cell, to serve as a means of "night writing" that "would be meaningless" to the enemy because it could be used in darkness, (Farrell, 1956, p. 97). Barbier demonstrated his system at the school for children who were blind or visually impaired, followed by a dismissal by the director (Kimbrough, 2008). At this time in 1829, Louis Braille was a 15-year-old pupil at the school, and he began experimenting with Barbier's system, adapting it into the six-dot cell system we use today (Kimbrough, 2008). Braille and other students at the school used Braille's code informally to communicate with each other and take notes in class. In 1834, having most of the details of the code worked out, Braille published *Method of Writing Words, Music and Plain Songs by Means of Dots, for Use by the Blind and Arranged for Them* (Kimbrough, 2008).

In the United States, it was not until the early 1900s that the braille code was accepted as the medium for reading and writing for people who are blind or visually impaired (Hatlen, 2000). In approximately 1860, the Missouri School for the Blind in St. Louis, Missouri was the first school in the United States to adopt the braille code (Lowenfeld, 1975). Approximately 100 years passed between the development and acceptance of the braille code. Without an effective communication system for reading

and writing, it is doubtful the education of students who were blind or visually impaired would have progressed (Hatlen, 2000).

Preceding numerous educational programs demonstrating the education of students who were blind or visually impaired, the first three privately funded and supported residential schools in the United States were The New England Asylum for the Blind (currently Perkins School for the Blind), established in Boston in 1829; The New York Institution for the Education of the Blind (currently the New York Institute for Special Education), established in New York in 1831; and The Pennsylvania Institution for the Instruction of the Blind (currently Overbrook School for the Blind), established in Philadelphia in 1832 (Hatlen, 2000). Not until 1837 was the first state-funded school established in Ohio. Subsequent residential schools were, for the most part, established by states when they gained statehood. States not establishing residential schools paid tuition to schools in neighboring states for students who needed residential school placement.

In the early 19th century, it was common practice for families who had the financial resources to send their children to boarding schools. Therefore, it was believed that establishing residential schools for children who were blind or visually impaired in the United States was reasonable (Irwin, 1955). The education of African American children who were blind or visually impaired followed the segregation or integration practices of their geographic areas (Hatlen, 2000). There is uncertainty if African American children who were blind or visually impaired were educated in the South, being that education was largely denied to their sighted peers before the Civil War and the Emancipation Proclamation (Hatlen, 2000). Southern residential schools slowly

began opening separate facilities for children who were African American (Hatlen, 2000).

For more than 175 years in the United States, separate facilities in either residential schools or day schools, were the main settings for educating children who were blind or visually impaired (Ajuwon & Oyinlade, 2008). These residential schools were founded on European models and remained a distinctive element of educational programming since 1829, when Samuel Howe founded the Perkins Institution in Massachusetts, the first residential school for children who were blind and visually impaired (Jan, Freeman, & Scott, 1977; Koestler, 1976; Lowenfeld, 1975). Several public and private schools for children who were blind and visually impaired were established in some states prior to 1900 (Roberts, 1986). Children lived in cottages with other students who were blind or visually impaired as well (Ajuwon & Oyinlade, 2008).

The existing philosophy was to provide an education model that was unique; because of the low incidence of these children, there existed highly individualized instruction and generally wide-spread discriminatory practices of the day (Ajuwon & Oyinlade, 2008). Residential schools remained one of the few choices for educating students who were blind or visually impaired throughout the 1800s and the first half of the 1900s, (Ajuwon & Oyinlade, 2008).

In the 1940s and 1950s, with the wide-spread occurrence of retinopathy from prematurity (Bishop, 1996) and the general educational shift toward inclusion (Sacks & Wolffe, 2006), it was believed that neighborhood schools were a more appropriate educational option. This change propelled many residential schools to adapt their roles to provide multidimensional services to students who were blind or visually impaired,

including those with additional disabilities (Erin, 1993; Harley & English, 1989; McMahon, 1994). In 1950, 88.4% of the students who were blind or visually impaired were enrolled in residential schools, and by1988, the same percentage were in public schools (Lowenfeld, 1982).

Many residential schools have taken the role of providing professional development, conducting summer academic and recreational programs, offering resources to local schools, and assessing students' needs (Ajuwon & Oyinlade, 2008). Important to note is that the pioneers of residential schools advocated the establishment of public school classes for children who were blind or visually impaired in large cities, beginning in Chicago in 1900, and later in other Midwestern and eastern cities (Lowenfeld, 1975). Howe had proposed the idea of including children who were blind or visually impaired in neighborhood school programs; however, residential schools remained the only option for educating children who were blind or visually impaired in some states for many decades (Lowenfeld, 1975).

In the new public school programs that emerged after 1900, children who were blind or visually impaired participated in some regular classes, returning to special classes for instruction in various specialized subjects (Hatlen, 2000). The field of blindness was the first to recognize the development of a range of special education options that still exist today (Jan et al., 1977; Hatlen, 2000; Lowenfeld, 1975).

Significant changes in special education services came about with the Education for All Handicapped Children Act (P.L. 94-142), with its amendments (Education of Handicapped Children, 1975-1977). Inclusionary practices have resulted in educational benefits for students who are blind or visually impaired. Legislation has led to a growing

trend toward de-emphasizing the importance of residential education (Ajuwon & Oyinlade, 2008).

As a caution, academic success is not all that these students need if they are to thrive as productive, fulfilled citizens in our society (Sacks & Wolffe, 1992). Students educated solely within the public schools can lead sheltered lives. This is most evident of adolescents who are blind or visually impaired, whose peers are involved in age-appropriate, teenage activities that rely on sight, and who may benefit from exposure to structured activities that can alleviate their social isolation in the mainstream (Sacks, Wolffe, & Tierney, 1998).

Proponents of residential education have noted that many children with disabilities who are attending full-inclusion classes do not receive the special education services that they need in order to be actively learning and gaining full access to the general curriculum (Ajuwon & Oyinlade, 2008). These students are often prevented from meaningful participation in learning because instructional materials are inaccessible to them (Hatlen, 2004; Hoben & Lindstrom, 1980; LaVenture, 2003).

LaVenture called for "a full array of placement options and a full continuum of services" for the education of students who are blind or visually impaired in the United States, echoing the position of the National Association for Parents of Children with Visual Impairments, (2003, p. 517). LaVenture noted that the decision of the instructional setting should be determined by the educational needs of each student, which may vary over time with each child's development and possible changes in vision (2003).

The Individuals with Disabilities Education Act, as amended, and the inclusion movement continue to challenge the prospect of residential schools, questioning if they

truly offer free and appropriate public education and the "least restrictive environment" (LaVenture, 2003). Students with disabilities who are not receiving an appropriate public education are, in effect, being functionally excluded from a meaningful learning experience; that is, an education devoid of meaning for the students (LaVenture, 2003). According to the principle of the least restrictive environment, the preferred location for educational services for a child with a disability is the neighborhood school; hence, the need for the child to be placed in as close proximity as possible to his or her peers without disabilities, which, in the case of children who are blind or visually impaired, are children who are sighted in a regular classroom. When determining what would be the most appropriate educational setting for children who are blind or visually impaired, the concept of a free and appropriate public education is taken into account, and it becomes apparent that specialized schools are the least restrictive environment for some students (LaVenture, 2003).

Ample evidence exists to show that visual impairments influence the way children obtain information about the world in which they live, grow, and function (Fraiberg, 1977; National Information Center for Children and Youth with Disabilities, 2001; Warren, 1994). Children who are blind or visually impaired need to learn blindness-specific skills from trained professionals, in addition to academics (Spungin & Ferrell, 2007). Without a systematic curriculum, many children who are blind or visually impaired will graduate from school without the requisite skills and knowledge for post-secondary education, productive employment, independent living, and community and civic involvement (Spungin & Ferrell, 2007).

Throughout the 19th and 20th centuries, legislation had a profound impact on the educational services for students who were blind or visually impaired (Hatlen, 2000). The year 1918 saw the birth of a nation-wide public school system in the United States, guaranteeing a free public education to all citizens, although children with disabilities and minorities were, for the most part, excluded from this free and public education at that time (Hatlen, 2000).

Congress passed Chapter 186 "An Act to Promote the Education of the Blind" in 1879 (Hatlen, 2000), establishing the American Printing House for the Blind (APH). APH, founded with federal money, was charged with the responsibility to produce textbooks in braille, large type, and recorded form, and to develop or adapt instructional materials for use by students who were blind or visually impaired (Hatlen, 2000).

An amendment to the act in 1956 extended eligibility to all children who were blind or visually impaired enrolled in public day school programs (Nolan, 1983). In 1970, eligibility was extended to include children in nonprofit private institutions (Nolan, 1983). The consequential Brown V. Board of Education ruling in 1954, challenging the public school education system, resulted in The Supreme Court's decision that put a stop to the discrimination regarding non-education of children with disabilities (Hatlen, 2000).

Nevertheless, in the 1960s, only one in five students with disabilities was educated in public schools. More than one million students with disabilities were not receiving a public education, and 23.5 million did not receive appropriate services in the public school system (Kimbrough, 2008).

In 1965, Congress passed the Elementary and Secondary Education Act, addressing specifically the education of children who are blind or visually impaired

(Hatlen, 2000). The amendment of the Elementary and Secondary Education Act allowed for the provision of support for the education of children with disabilities in state-operated and supported schools, including residential schools for children who were blind or visually impaired (Hatlen, 2000). In 1975, Congress passed Public Law 94-142, The Education of All Handicapped Children Act, now known as Individuals with Disabilities Education Act (IDEA, 1997).

States must develop and implement policies that assure a free appropriate public education (FAPE) to all children with disabilities if the state is to receive federal funds. State plans must be consistent with the federal statute, Title 20 United States Code Section 1400. Public Law 94-142, which ensures the provision of appropriate education for the millions of children with disabilities who were not receiving a proper education (University of Michigan, 2014). Special classes, separate schools, or other removal of children from regular educational environments will occur only when the severity of the disability is such that education in regular classes is not appropriate (University of Michigan, 2014). The power of PL 94-142 states in clear language that all children with disabilities are entitled to a free and appropriate public education (Hatlen, 2000).

President Ronald Reagan signed the PL 99-457 Act in 1986, an amendment to PL 94-142, providing state funding for the establishment or expansion of developmental services for infants and toddlers with disabilities (Payne, n.d.). This law was the first federal legislation recognizing the need for intense intervention services for infants and toddlers with disabilities and their families. States implementing this legislation were required to identify a lead agency to oversee this program, which resulted in markedly expanding services to families and children (Nolan, 1983). The Individuals with

Disabilities Education Act (IDEA) was signed into law in 1990 by President George Bush (Payne, n.d.).

IDEA was amended in 1997, strengthening the right of children with disabilities to a free appropriate public education (Hatlen, 2000). Significant provisions were the addition of orientation and mobility as a related service and the support of braille as equal to print for instruction in reading and writing (Payne, n.d.). The most recent amendments were passed by Congress in December 2004, with final regulations published in August 2006 (Part B for school-aged children) and in September 2011 (Part C, for infants and toddlers) (Payne, n.d.).

From the 1980s to date, many states have passed legislation ensuring the teaching of braille to students who are blind or visually impaired, intending to counteract the pervading attitude that the use of braille and instruction in braille is declining (Hatlen, 2000). The Texas legislature passed landmark legislation regarding braille instruction in 1991 (Hatlen, 2000), serving as a model for many other states. With regards to braille instruction, the Texas law includes the following provisions: (a) determination of appropriate learning media through assessment, (b) demonstration of braille proficiency by teachers, (c) requirement that braille must always be given equal consideration to print as a possible reading medium, and (d) textbook publishers must provide electronic files of textbooks, ensuring timely delivery of brailled books to students (Hatlen, 2000).

The education of students who are blind or visually impaired in the United States has traveled a continuum from non-education to institutionalization to residential schools, to self-contained classrooms, and then to inclusion in neighborhood school classrooms settings. This educational historical perspective on the education of children who are

blind or visually impaired is by no means an exhaustive review; however, it provides a backdrop to the review of literature I prepared regarding the literacy of children who are blind or visually impaired.

For the purpose of this review, I addressed scholarly research and data-based information pertaining to the literacy of children who are blind or visually impaired with no additional disabilities and children who are sighted.

Reading

Reading is an essential component of education (Laroche, Boulé, & Wittich 2012). The Institute of Reading Development (IRD) (2017) proposes the following stages of reading for the development of literacy:

Stage 1: Learning to read begins when children are 4 or 5 years old and begin to learn their letters. This stage is completed when children achieve fluency in easy readers' books written with a controlled vocabulary and simple sentences. Students usually achieve the goals of Stage 1 during second grade, although some children complete this stage mid-first grade or mid-third grade.

Most of the central focus in this stage is learning to decode, learning the alphabet and the sounds that letters make, learning to distinguish sounds in speech, and learning to sound out words. In addition, children need to focus on reading connected text. As fluency develops, their attention begins to shift toward meaning, and comprehension of the stories they are reading.

The underlying and supporting activity during this stage is the regular experience of hearing stories read aloud. Children experience the absorption in a story and identify with characters. They will not be able to do this independently until they attain a high

level of fluency, several years later. The development of a strong and positive relationship with books is its own reward, providing the motivation for managing the challenging task of learning to read. Children who are read to extensively in their early years learn to read more quickly and easily. The foundation for a lifelong relationship with books is established before a child can read a single word (Institute of Reading Development, 2017).

Stage 2: Developing Independent Reading Skills begins when children achieve fluency in Easy Readers, usually at some point during second grade. When children enter Stage 2, some have already transitioned from oral to silent reading, and the rest will make that transition in the upcoming year. Stage 2 is completed when children achieve fluency in children's novels, usually in third or fourth grade. Some students complete this stage in second grade or later in fifth grade.

The central focus of this stage is reading many books at the right level of difficulty, progressing from easy readers to chapter books, which are considerably longer and without the controlled vocabulary and simple sentences of easy readers. At this stage, reading practice and skill development are both primarily focused on fluency development. Students learn how to decode long words, such as words of three syllables or more; the percentage of these words jumps from 1% in easy readers up to approximately 5% in children's novels. Oral reading is also practiced, in order to develop oral reading fluency.

Automaticity and focus on meaning in oral reading then transfers to the silent reading process. Fluency describes a functional level of reading process and characterizes the relationship of reader to text; a reader is only fluent in relation to a certain level of

text. Comprehension becomes both an instructional and a developmental focus as fluency continues to develop in this stage, primarily as a result of reading practice. Children achieve fluency in chapter books, and the level of reading skill and the story content are sufficient to support the experience of identification and absorption that until now was only available when being read to (Institute of Reading Development, 2017).

Stage 3: Reading with Absorption begins when children achieve fluency in children's novels, usually in third or fourth grade, although some students begin earlier and others later. The focus in this stage in reading development is a great deal of reading in children's novels, gradually increasing levels of difficulty. This is a process enabling a child to develop the levels of fluency and comprehension necessary to support identification and absorption. Achieving identification and absorption is at the core of the reading process, and at a level of automaticity; the capstone of all of the early stages and substages of reading development, and it is also the foundation of all subsequent reading development.

When reading with identification and absorption, the process is transparent for the author's meaning and naturally pleasant. The process is pleasant because it is an effortless experience of participation with no sense of labor or struggle interfering with the experience. More than providing the foundation for reading for pleasure, the development of high levels of fluency and comprehension is also the basis for all subsequent reading development, including reading for concepts and information. The same skill set of fluency and comprehension, resulting in absorption in literature, enable the relatively automatic and accurate flow of understanding while reading for information in nonfiction as well (Institute of Reading Development, 2017).

Stage 4: Critical Reading, physical, emotional, and cognitive changes beginning in middle school, continuing through high school and into adulthood, bring with them a new cognitive capability that first appears in middle school, continuing to grow throughout the secondary and post-secondary years. Critical consciousness is the ability to stand back and reflect on experience; to think abstractly and analytically. This capability allows students to enter a new stage of reading development in which a new critical dimension of experience is added to the underlying experiences that are already present as a result of previous development. The opportunity for much more effective reading process to develop is present.

Students with strong reading backgrounds who read with solid levels of fluency and comprehension experience a relatively automatic and accurate flow of understanding when reading a novel or a textbook. However, the challenges of reading a textbook are different. A relatively automatic, accurate flow of understanding is not enough. Critical reading based on metacognitive techniques needs to be developed in order to become most useful. The reader learns conscious control of the reading process based on the purpose as a reader and the demands of the text. Students develop the ability to: a) recognize how material is organized, (b) determine and synthesize main ideas, (c) relate details to main ideas, (d) monitor comprehension and adjust reading rate or reread when necessary, (e) take notes, and (f) study notes for a test (Institute of Reading Development, 2017).

In 1997, the federal government commissioned The National Reading Panel (NRP), a panel of researchers, practitioners, and others with the responsibility to examine the effectiveness of a variety of approaches for reading instruction. After completing its

work in 2000, the panel submitted a report (National Institute of Child Health and Human Development, 2000). The panel identified five key components vital to literacy instruction. These components are phonemic awareness, phonics, fluency, vocabulary, and comprehension of text (National Institute of Child Health and Human Development, 2000) and are as important for children who read braille as they are for children who read print.

Phonemic awareness is the understanding that a spoken word is made up of a sequence of sounds, phonics is the linking of letters with their sounds, and fluency is the level of accuracy and automaticity in reading (Pinnell, 2008). Vocabulary refers to the words necessary to communicate effectively, and applies to speaking, listening, reading, and writing (Pinnell, 2008). Comprehension refers to the ability to understand what is read and to relate a text to prior knowledge while constructing new knowledge and understanding (Pinnell, 2008). Content knowledge is an understanding of the five core components of reading instruction (Blankenship, 2008).

Reading instruction is unique because it is supported by considerable research on its content and instructional methodology that is rigorous, systematic, and meets the experimental or quasi-experimental standard required by No Child Left Behind (NCLB) and IDEA, 2004 (Smartt & Reschly, 2007).

Instruction in reading for children who are blind or visually impaired should focus on both the literary braille code and the components of the reading process, including phonemic awareness, phonics, vocabulary, fluency, and comprehension (Emerson, Holbrook, & D'Andrea, 2009; Swenson, 2008). Many people who are blind or visually impaired want to unlock the puzzles of the brailled or printed word; others find ways to

circumvent print or braille and rely mainly on the spoken word (Erin, 2009). Influences such as experience, environment, perception, memory, reasoning, and verbal abilities affect the reading process (Erin, 2009). Learners are usually more motivated to succeed when they plan their own learning and monitor their own progress (Erin, 2009).

Swenson (2013) states that braille differs from print in the following ways for beginning readers:

1. Number of symbols – In addition to the letters of the alphabet, the braille code includes 189 contractions. Braille learners have significantly more symbols to learn than their sighted counterparts. Many braille readers do not master the complete braille code until third grade, so they are still assimilating new symbols long after their sighted peers have learned all their letters and have begun to read fluently. However, contractions can help with decoding because they represent common letter groupings found in words.

2. Similar and reversed characters – Nearly every character in braille is a top-bottom, left-right reversal of one or more other characters. Some reversals are common for beginning braille readers but do not remain a long-term problem for most children.

3. Multiple meanings for individual characters – A braille character often has more than one meaning, depending on its position in the braille cell, in a word, or in a sentence. Additionally, punctuation marks are the same size and shape as letters and contractions, which can be initially confusing to early readers. Many other characters represent multiple symbols in the braille code, and children assimilate these gradually through supported instruction and extensive reading practice.

4. Lack of redundancy – Most print letters include characteristics that help children learn to identify them. In contrast, braille characters include few identifying

characteristics. If one dot in a letter or contraction is missed while reading, the meaning of the character changes.

Poor knowledge of braille contractions may hinder reading and writing fluency, which is necessary for success in school and daily life. Daily instruction ranging from one to two hours is critical for the development of braille literacy skills (Koenig & Holbrook, 2000a; Corn & Koenig, 2002). Consistent, well-designed reading instruction in braille is associated with the development of proficient literacy skills in children who are blind or visually impaired (Emerson, Sitar, Erin, Wormsley, & Herlich, 2009). Students are at risk of advancing in school with poor, fragmented braille skills if they have not had high-quality instruction during their elementary school years, which may hinder their progress in all subjects and future grades (Koenig & Holbrook, 2000c). Instruction must focus on basic reading processes and not just on the braille code, which most students seem to master with relative ease (Emerson, Holbrook, et al., 2009).

It is necessary for TVIs to do more than teach the braille code to beginning readers. It is their responsibility to incorporate reading processes into their instruction, monitor student progress along with the classroom teacher, and be ready to take the lead in seeking further assessments, resources, and interventions if students start to fall behind (Swenson, 2011). Continued intensive instruction in writing and reading from a teacher who knows braille is imperative throughout the elementary school years (Emerson, Holbrook, et al., 2009; Harley et al. 1997; Koenig & Holbrook, 2000a; Swenson, 1999).

Family Support

The impact of blindness or visual impairment on development begins at birth (Council for Exceptional Children, 2003). Blindness or visual impairment has an

immediate and lasting on-going impact on the child and on the family as well. Parents, siblings, and extended family members may experience significant stress at the time of diagnosis of blindness or visual impairment and throughout their lives, unless they receive specialized support needed to meet their unique needs (Council for Exceptional Children, 2003).

Legislation, along with scholarly research, assert the importance of early intervention for young children who are blind or visually impaired as well as early intervention that is family-centered. Empowerment occurs when parents and families experience confidence that they have the information and problem-solving skills that are needed in their personal situations (Harrison, Cooch, & Alsup, 2003). According to the National Agenda for the Education of Children and Youths with Visual Impairments, parental involvement is important and essential in the education of their children (Corn, Hatlen, Huebner, Ryan, & Siller, 1995; Huebner, Merk-Adam, Stryker, & Wolffe, 2004).

The first spoken word at about 10-12 months begins the development of active verbal language skills, culminating in a fast moving stage in which children are able to learn a large number of words with less exposure (Bjorklund, 2000). Semantic over extensions and syntactic errors characterize the earliest stages of speech acquisition. Children quickly realize that objects, events, and psychological states can be represented with words (Klein, 1981).

Bigelow (1990) found similar language-development processes in children who are congenitally blind. Bigelow (1990) examined the relationship between children's cognitive and language abilities. Data indicated that total blindness does not impede the acquisition of early words in children who are blind, although it may delay the

development of the concept of object permanence (Bigelow, 1990). Representations that children who are blind develop may differ from those of children who are sighted because of the different experiences to which the two groups are likely to have been exposed. Visual representations are not available to a child who is blind; therefore, the child must encode information about objects using the representations that he or she has available from other sensory sources and memory (Bigelow, 1990). For example, a child may have no color memory because he or she may never have experienced the visual sensation of color. Instead, children perceive objects through size, texture, etc. As children develop vocabulary when learning to read, semantic representations may vary widely among them, depending on their experiences.

The mutual eye gaze between infants and parents facilitates attachment between them, and this eye gaze stimulates brain development in infants (Schore, 1994). Eye gaze is later used to establish joint reference to objects of interest. Young babies and their caregivers usually spend considerable time gazing and smiling at each other and imitating each other. A challenge concerning attachment and communication between parents and infants exists with blindness or visual impairment (Schore, 1994). Strong attachment between babies and parents is intertwined to developmental outcome; therefore, early intervention that is focused on strengthening attachment between infants and their caregivers and family is recommended (Schore, 1994).

Family-centered intervention is a system of managing and delivering assistance, support, and services to families (Erickson, Hatton, Roy, Fox, & Renne, 2007). These services occur in natural environments characterized by collaboration among professionals and family members (Hatton, McWilliam, & Winton, 2002), respecting

diversity, and viewing the family holistically. Well conducted family-centered programs build upon strengths and improve family functioning through flexible, individualized support (Dunst, 2002; Maroney & Davis, 2001; Trivette & Dunst, 2005). Early intervention for babies who are blind or visually impaired and their families is directed to assist caregivers in interpreting communication cues from their babies, and to help them use suitable communication cues not as dependent on vision. An important role by caregivers is found in language and concept development of young children who are blind or visually impaired (Erickson et al., 2007).

In their 2007 study, Erickson et al. employed a qualitative case-study design to investigate ways in which two different early interventionists supported emergent-literacy development for babies and toddlers who were blind or visually impaired. Three themes were scrutinized by the research: (a) importance of family-centered approach in addressing emergent literacy in early intervention, (b) role played by the early interventionist in language and concept development, and (c) the need to focus on the senses as they relate to literacy. Erickson et al. demonstrated the complex endeavor of supporting emergent literacy for young children who are blind or visually impaired. The interventionist's use of family-centered practices established collaborative relationships with parents who shared responsibility for supporting their child's development of emergent literacy (2007).

Language and concept development was addressed in a variety of tangible ways. Direct efforts observed by the researchers included focus on teaching labels and assigning meaning during interactions. The interventionists balanced the need to provide family-centered practices, driven by family concerns and priorities, with the need to discuss

issues that the parents were willing to discuss. They took advantage of opportunities to notice language and concept development of the child, noting how it can be enabled and developed. They demonstrated how emergent literacy can assist with the development of other important functional outcomes. The findings of this study provide practical insights into the role of the early interventionist in supporting early literacy development (Erickson et al., 2007).

Another look at family involvement is provided by a study of reading performance of nine-year-old readers in Sweden, including some who were sighted and some who were blind or visually impaired, which revealed that the two groups of students were on a more equal environment in school than at home (Fellenius, 1999). Fellenius found the greatest differences between the groups were with the student's interactions with family members at home. This was especially evident for readers who used specific reading media, such as braille and closed-circuit televisions. In addition, readers with severe low vision appeared to have less knowledge about letters and words when they started school and were an at-risk group among young readers with visual impairments. Fellenius concluded that children who are blind or visually impaired have less exposure to incidental reading that leads to reading development than do children who are sighted, especially at home (1999).

Families and school professionals are charged with the important task of increasing opportunities for reading and creating or maintaining interest in reading without too great an effort. Families and teachers are a key component in promoting early literacy opportunities and can influence student attitudes toward reading (Argyropoulos, Sideridis, & Katsoulis, 2008; Brennan, Luze, & Peterson, 2009; Craig, 1996; Craig,

1999). Listening to books plays an important role in literacy development; therefore, reading to children every day is one of the most beneficial ways in which a parent can promote literacy. Children develop understanding of the nature of written language at a very early age by listening to books read aloud; beginning to understand the function of reading and develop a positive attitude towards reading (Dostal & Hanley, 2011).

Erin addressed parent involvement in her 2008 overview of the Alphabetic & Contracted Braille Study (ABC Braille Study) at the Texas Focus conference in Austin, Texas. Parents of the high-achieving students in the ABC study were more likely to know braille, read to their children frequently, and often had their own braille libraries (Erin, 2008).

Craig (1996) investigated family support of the emergent literacy of children who were blind or visually impaired. Craig set forth to investigate the frequency and parental involvement and support for the emergent literacy of 264 children who were blind or visually impaired. Data identified differences in support that were based on the primary literacy medium and the presence of additional disabilities (Craig, 1996). Differences in literacy opportunities at home were observed.

Another area in which differences were observed was in parental expectations of and priorities for their children's literacy development. Research has revealed that parents of children with additional disabilities may not consider literacy a priority for their children, and these parents may be involved less in their children's literacy development and perhaps provide fewer opportunities for their children to engage in literacy activities at home (Light & Smith, 1993; Marvin & Mirenda, 1993).

Marvin and Mirenda (1993) conducted a study seeking to describe the nature and frequency of family support of emergent literacy practices, to investigate the extent of access to literacy-related materials and activities provided to children who were blind or visually impaired at home, and to compare these opportunities with opportunities that were provided to children enrolled in early childhood special education programs. The focus was on parental involvement, such as reading aloud to their children and participating in writing activities, and if it differed from the children enrolled in Head Start and children without disabilities who served as peer models.

Participants were parents of children (newborns to eight year olds who were blind or visually impaired) who were members of two national parent organizations, and they or the primary care providers believed that their children had the ability to eventually learn to read and write in either print or braille. Five hundred parents were randomly selected from 1,500 parents from the database of the National Association for Parents of Children with Visual Impairments (NAPVI), and 300 parents were randomly selected from 1,300 members who were coded as parents in the database of the Parents of Blind Children (POBC), a division of the National Federation of the Blind (NFB). The majority of the children had varying degrees of functional vision, and the majority of the respondents (1231 or 46.6%) indicated their children would be primarily braille readers, and 90 (34.1%) noted their children would be primarily print readers. The print-braille group comprised 44 (16.7%) of the 264 total participants.

Data comprised from questionnaires completed by parents and teachers revealed that the three groups were comparable at home with respect to the access to literacy-related materials. Significant differences were found among the three groups concerning

use of libraries, interactions during shared-reading experiences, and priorities for and expectations of their literacy development (Marvin & Mirenda, 1993). In the early childhood programs involved in the study, 7% of the children were blind or visually impaired. The study did not provide the factors influencing the home literacy experiences of these children. Differences between the print and braille groups were found with the amount of equipment and material in their chosen media available for use at home, and in the opportunities to observe others using these materials at home.

The researchers conducted an analysis to determine the extent to which reading and writing was regarded as a priority in the homes of children who were blind or visually impaired, and a second analysis was conducted with children who were blind or visually impaired with additional disabilities. The data revealed that the highest priority for children who were blind or visually impaired was learning to read and write, followed by learning self-help skills and communicating effectively (Marvin & Mirenda, 1993). The highest priority for the children with additional disabilities was learning self-help skills, followed by communicating effectively and learning to read and write (Marvin & Mirenda, 1993). Concerning parental priorities for and expectations of their children's literacy development, the researchers revealed quantitative and qualitative differences between the groups with and without additional disabilities.

Learning to read and write was identified as the primary goal for children without additional disabilities; this priority was ranked third (last) for children with additional disabilities (Marvin & Mirenda, 1993). Over half of respondents in the additional disabilities group indicated their children would master the media.

Children who are blind or visually impaired are likely to move towards reading instruction with fewer concepts of written language than are their peers who are sighted (Tompkins & McGee, 1986). The findings of this study provide some insight into this phenomenon (Marvin & Mirenda, 1993). There are two reasons why potential braille readers do not begin their literacy instruction on the same footing as their sighted peers: (a) the lack of exposure to braille, and (b) the absence of understanding that reading and writing fulfill specific functions in this society (Marvin & Mirenda, 1993).

Finally, these findings indicate that early special education programs hold the responsibility to provide equipment and material for home use. Additionally, they hold the responsibility to teach parents and caregivers ways they can involve the children systematically in the cultural, functional, and linguistic context of the reading and writing done at home (Marvin & Mirenda, 1993).

The purpose of a notable 2006 research summary published by Kassow was to study and discuss the relationship between parents' and children's shared-book reading and young children's developmental outcomes within the environment of the parent-child relationship (Kassow, 2006). The parent-created literacy environment in the home provides an important role in young children's emerging literacy and social-emotional development (Bus, 2003; Bus, van IJzendoorn, & Pelligrini, 1995; Evans, Shaw, & Bell, 2000; Parlakian, 2004).

One of the most important predictors of various developmental and educational outcomes for children is the home literacy environment. This environment should include children and parents sharing early exposure experiences and participation in literacy activities (Baker, Sonnenschein, & Serpell, 1999; Leseman & de Jong, 1998). According

to Bus et al. (1995), recurring parent-child, shared-book reading experiences can be related to literacy outcomes for young children.

Storybook reading is a component of children's literacy that has possibly received greater attention than others. Within storybook reading, researchers have investigated the facet of parent-child, shared-book reading (Teale, 1987). A family tradition that has become a daily routine in modern families is parent-child, shared-book reading (Bus, 2001). Parent-child, shared-book reading is considered a form of entertainment (Sonnenschein et al., 1997; Sonnenschein, Baker, Serpell, & Schmidt, 2000). Interactions that occur between parents and young children have consequences in multiple areas of development (Leseman & de Jong, 1998; Senechal & LeFevre, 2001; Senechal, LeFevre, Thomas, & Daley, 1998).

Young children's emergent literacy skills are related to the quality of the parent-child relationship (Bergin, 2001). Given the continuous developmental progression of emergent literacy in young children, the role of the home environment and parental involvement in early literacy experiences for children who are blind or visually impaired holds high import because emergent literacy is a construct beginning prior to formal schooling (Sulzby & Teale, 1991; Teale, 1987; Whitehurst & Lonigan, 1998).

Brennan et al. (2009) conducted a survey study exploring emergent literacy experiences that parents provided their children who are blind or visually impaired ranging in ages 1-8. The survey also probed into parent perceptions of the professional support they received to facilitate these activities. The parent survey probed into what emergent literacy activities they share with their preschool children who are blind or visually impaired, and the relationship between parents providing emergent literacy

activities and their understanding of the support they receive from vision service professionals who work with their families on literacy activities (Brennan et al., 2009). Participants were parents with children who received services from TVIs through an Individualized Education Program (IEP) or Individualized Family Service Plan (IFSP).

Survey results indicated that parents and children frequently shared reading, singing, and writing or scribbling activities (Brennan et al., 2009). Additional results indicated that parents believed that they received support from professionals in order to promote literacy activities with their children who were blind or visually impaired (Brennan et al., 2009).

Reading aloud is an activity often enhanced by looking at pictures in books and may be challenging for parents of children who are blind or visually impaired because their child's engagement in this activity may be limited, and in turn may frustrate the parent. On the other hand, parents of a child who is a braille reader may think learning braille is difficult, equating it to learning a foreign language. Parents may not attempt to encourage a child to write with a braillewriter or identify braille letters. The interaction with adults who encourage language and model such things as reading and writing is important (Wolffe & Nevills, 2004). Parents frequently require professional support to promote emergent literacy and to help their children develop skills such as phonemic awareness, phonics, comprehension, vocabulary, and fluency (Morrow, Gambrell, & Pressley, 2003).

Research is clear that children who have been exposed to emergent literacy activities at a young age demonstrate higher rates of achievement in reading in later school years; therefore, literacy begins in the home (Senechal & LeFevre, 2002).

Research is needed to determine ways in which professionals can best provide support and increase learning opportunities for children who are blind or visually impaired.

Using a subset of the Alphabetic and Contracted Braille Study (ABC Study), Kamei-Hannan and Sacks (2012) investigated parents' perspectives on braille literacy. Parents whose children were participants in the ABC Braille Study shared their perspectives about braille literacy. A 30-item questionnaire was created by the ABC Braille research team, and researchers conducted telephone interviews with 31 parents who were the primary caregivers of children participating in the original study. The questions inquired how often parents read to their children, if print or braille books were readily available at home, what their primary goals they held for their children, if they themselves knew braille, and demographic information, which was gathered and analyzed. Parents were separated into two groups based on student achievement, and data on the parents of the high-achieving students were compared with data on the parents of the low-achieving students.

Results of the interviews revealed that parents often read to their children and provided them with some braille books (Kamei-Hannan & Sacks, 2012). Parents' primary goal for their children was that they learn to read and write braille, and they indicated that braille would be the primary medium throughout their children's lives. Some parents knew the braille alphabet (20 of the 31 participants), and 3 of the 31 noted that they knew contracted braille. A slight relationship between parental level of education and children's reading performance was identified. Parents supported literacy at home by reading to their children, learning some braille, and providing their children with books, although compared to the availability of print books, the availability of braille books at home was

limited, and the participants' knowledge of contracted braille was limited (Kamei-Hannan & Sacks, 2012).

Children who are read to from an early age and have access to books experience greater success in learning to read and write (Senechal & LeFevre, 2002), and children who are provided rich literacy opportunities demonstrate high levels of motivation to achieve literacy development (Baker & Wigfield, 1999; Morgan, Fuchs, Compton, Cordray, & Fuchs, 2008). Parents may believe that they lack the access to books and materials or do not have the knowledge or skills needed to provide positive literacy experiences for their children (Light & Smith, 1993; Marvin & Mirenda, 1993). Teachers of students who are blind or visually impaired are the primary support who provide resources for parents of children who are learning braille, including resources for learning braille and braille materials for use at home.

Craig (1996) noted that parents view learning to read and write as a priority for academic success. Murphy, Hatton, and Erickson (2008) found that parents often see their children's literacy skill development as secondary to their children's life skill development. Results from both studies indicate the necessity for continued support by professionals to enhance the literacy experiences of children who are blind or visually impaired. Studies that examined the relationship between family involvement and the successful development of literacy skills by sighted children demonstrated the importance of family support in language and literacy experiences (Bennett, Weigel, & Martin, 2006; Fantuzzo, Tighe, & Childs, 2000).

Emergent Literacy and Early Education

New Zealand researcher Marie Clay introduced the term "emergent literacy" in 1966, to describe the behaviors seen in young children when they use books and writing materials to imitate reading and writing activities, before the children can actually read and write in the conventional sense (Johnson, 1999). The emergent-literacy perspective, borne out of child development and literacy research, dates back to the beginning of the 20th century (Teale, 1987). Emergent literacy is the process of young children's reading and writing development (Strickland & Morrow, 1988). It encompasses the skills, knowledge, and attitudes that are part of the developmental processes that children experience prior to formal reading and writing (Whitehurst & Lonigan, 1998), including the verbal and nonverbal skills that are the foundation for the process of learning to read, write, and the development of other literacy related skills (Dunst, Trivette, Masiello, Roper, & Robyak, 2006).

Emergent literacy is knowing that print is functional, and that all literacy attempts are valid. Pretend reading and inventive spelling are a component of emergent literacy. Emergent literacy and early education come into play during the same period of time as incidental/environmental awareness is playing a role in children's literacy development. It is multi-dimensionally associated with the child's natural surroundings, including the home environment (Lesiak, 1997).

A gradual process, emergent literacy occurs over time from birth until a child can read and write in a conventional sense (Dostal & Hanley, 2011; Koenig, 1992; Stratton, 1996). Much occurs during this period of time between birth and when children learn to read and write in conventional ways through formal schooling (Sulzby & Teale, 1991;

Teale, 1987; Whitehurst & Lonigan, 1998). Literacy is intertwined with all parts of language; speaking, listening, reading, writing, and viewing (Dostal & Hanley, 2011). Learning to read and write begins very early in children's lives as they have contact with many forms of communication right from the beginning.

Reading and writing skills develop at the same time, and many times writing skills develop easier for some children. However, functions of writing often promote the development of reading skills. The need to get something done, or to read so that they can learn, often leads to literacy development (Dostal & Hanley, 2011). Children view literacy processes as a way to achieve goals (Dostal & Hanley, 2011). Literacy skills develop through interactions with books and writing opportunities, reconstructing their knowledge by rereading books and by using invented spelling. Children proceed through the stages of emergent literacy in different ways and at different ages (Dostal & Hanley, 2011). Developmental stages lead to the skill development required for reading and writing.

A growing body of evidence supports the belief that the critical components of emergent and early literacy for children who are blind or visually impaired do not markedly differ from those of their peers who are sighted (Pre-reading of visually impaired children, n.d.). Infants and toddlers who are blind or visually impaired require many interactions and early life experiences (Koenig, & Farrenkopf, 1997) that will support their oral language development, awareness of print or braille, and opportunities to explore writing (Erickson & Hatton, 2007a; Erickson & Hatton, 2007b). Preschool children who are blind or visually impaired are future readers who need to build necessary pre-reading foundations through different early life experiences (Pre-reading of

visually impaired children, n.d.). Emergent literacy is the foundation that will allow children to become competent readers, and it is a solid foundation for independent learning and communication (Pre-reading of visually impaired children, n.d.).

Interest and effort in studying young children's emerging literacy has grown. The term "literacy" indicates that reading and writing develop concurrently and interdependently, and they need to be examined together rather than separately (Teale, 1987; Whitehurst & Lonigan, 1998). At the same time, the term "emergent" signifies something in the process of becoming. Therefore, the term "emergent literacy" describes children's process of becoming readers and writers, emphasizing the sustained nature of literacy development (Teale, 1987; Whitehurst & Lonigan, 1998). It is the foundation upon which children's conventional reading and writing abilities are built (Justice, Chow, Capellini, Flanigan, & Colton, 2003). This developmental stage includes the behaviors, skills, and concepts of young children that develop into conventional literacy (Kaderavek & Sulzby, 1998).

Emergent literacy development includes a broad set of skills and not just letter naming and phonemic awareness. It includes understanding syntax and word choices appropriate to written language. All the competencies believed to be precursors to formal or conventional literacy are components of emergent literacy (Teale & Sulzby, 1986) and the environment supporting the development of literacy (Lonigan, 1994).

Literacy development begins earlier than previously believed. According to the emergent literacy viewpoint, there is no specific time in life when literacy begins. The literacy behaviors and competencies in 6-month, 1-year, 2-year-old children etc., are

natural components of the developmental advancement of literacy (Teale, 1987; Whitehurst & Lonigan, 1998).

Children construct understanding about their environment; they are not simply receivers of knowledge (McGee, 1986). Young children learn about literacy through daily events occurring in their homes and communities (Duke & Purcell-Gates, 2003; Teale, 1986). Opportunities for environment exploration and exposure to real experiences provide the foundation for vocabulary development, learning new concepts, and experiencing books and other forms of literature (McGee, 1986).

Often, not until children who are blind or visually impaired enter a formal education program are they first exposed to braille material (Swenson, 2008), and they do not come to school with the same repertoire of literacy skills as children who are sighted. "More than one in three children experience significant difficulties in learning to read, and there is a strong correlation between the skills with which children enter school and their later academic performance" (Johnston, McDonnell, & Hawken, 2008, p. 210). The gateway to reading and future academic success is founded on early literacy development (Bruns & Pierce, 2007).

Two fundamental skills that have been found to support later literacy success are learning about sound-letter correspondence and basic decoding strategies (International Reading Association, 2004). Repeated book reading and shared book experiences including reading, writing, and arts-related activities such as music and movement, and painting are all avenues for young children to develop literacy skills (Bobys, 2000; Isbell, 2002; Petersen, 2000). Young children develop understanding of letter sounds and

patterns, and this is the foundation for successful reading (Neuman, Copple, & Bredekamp, 1998; Roskos, Christie, & Richgels, 2003).

Studies involving adults who are successfully employed and are blind or visually impaired have emphasized the importance of early exposure to literacy, being read to by family members, and learning to read and write braille, as factors contributing to high levels of literacy (Brennan et al., 2009; Hatton & Erickson, 2005; Ryles, 1996).

In 1996, Stratton presented an overview of the literature pertaining to emergent literacy with a concurrent view of the importance of emergent literacy and the necessity for children who are blind or visually impaired to have rich experiences facilitated by parents and teachers to supplement that which they are not able to experience firsthand due to their visual impairment. A study by Bigelow in 1990 investigated the relationship between the development of object permanence and early words. Participants included three boys ages 1 year 2 months to 1 year 5 months. Two of the boys were totally blind from birth, and one was severely visually impaired. Auditory and tactile tasks comparable to traditional visual tasks were presented to the boys at monthly intervals, and their first 50 words, and the context in which the words were said, were recorded by their mothers and collected monthly. The three boys gained words within the age range for children who are sighted; however, their usage of the words was different (Bigelow, 1990). Bigelow found that the boys who were totally blind exhibited object permanence development delays. These results indicate a relationship between word acquisition and object permanence development, and suggest that the emergence of language is not dependent on a stable understanding of the existence and permanence of objects.

Koenig and Farrenkoph (1997) published a study pertaining to early literacy experiences of young children who are blind or visually impaired. Three basal-literacy series were evaluated, identifying experiences needed by children who are blind or visually impaired in order to fully participate and understand the literature contained in each series. Koenig and Farrenkoph identified a repertoire of 22 global areas of experiences that are essential to young children who are blind or visually impaired in order to support their literacy development (1997).

The ability to relate to peers is necessary for young children's development in a number of areas (Hartup, 1983). An important process resulting in various developmental benefits is the establishment of peer relationships and requires several social skills (Guralnick & Groom, 1987). Social-skill development among young children differs widely, and young children with disabilities often demonstrate deficiencies in this area (Guralnick & Groom, 1985; Imamura, 1965).

Tait (1972) observed the play behaviors of 29 children who were blind or visually impaired and 29 children who were sighted, ages 4-9. Results indicated more attempts were made by the children who were blind or visually impaired to become involved with the adult observer, compared with the children who were sighted (Tait, 1972). A study by Skellenger, Rosenblum, and Jager (1997) investigated play behaviors of 24 preschoolers who were blind or visually impaired in indoor play settings. Results revealed that the children who were blind or visually impaired initiated fewer interactions than expected for 2- to 5-year-olds. Research by Crocker and Orr (1996) inquired about social behaviors of children who were blind or visually impaired in varied preschool settings. Participants included 9 children who were blind or visually impaired and 9 children who were

sighted. The data revealed that the children who were blind or visually impaired were more likely to be the recipients rather than the initiators of interactions.

D'Allura (2002) corroborated the findings from Crocker and Orr (1996). D'Allura conducted a longitudinal observational study that included 13 children in a preschool for children who were blind or visually impaired. The focus of the study was the effects of reverse mainstreaming in combination with cooperative-learning strategy on the social interaction patterns of preschoolers with and without visual impairments. Data revealed that the environment and the learning strategies used affect whether and how children relate to their environment (D'Allura, 2002).

Language delays in preschool children with disabilities and children considered to be at risk are found at a higher widespread rate (Goldstein, 1994; Hart & Risley, 1995). Children who are blind or visually impaired may experience delays and difficulties in language development in areas important for development of reading skills (pre-reading). A correlation exists between early language development and later academic and social success (Culbertson & Willis, 1993), and vocabulary knowledge is correlated and predictive of later reading comprehension (Cunningham & Stanovich, 1997; Scarborough, 1998). Consequently, language intervention is critical for children in early childhood classrooms who enter with language deficiencies (Goldstein, 2004).

Many children from working-class families become competent readers by third grade; nevertheless, they experience problems through seventh grade in reading comprehension due to vocabulary limitations (Chall, Jacobs, & Baldwin, 1990). Cunningham and Stanovich (1997) concluded that children's vocabulary skills in first grade predict more than 30% of reading comprehension in 11th grade, supporting the

theory that young children with disabilities and children considered at risk who experience language delays are at a serious disadvantage.

Assessment of young children often has a vocabulary focus; however, this emphasis is not often reflected in the classroom in the form of direct purposeful instruction. In a study conducted by Rowell (1998), 67 preschool classes were observed. Results indicated that approximately one tenth of the teachers in the 67 preschool classes observed addressed vocabulary in a purposeful manner. Biemiller (2001) and Chall (1996) have proposed the need for systematic and planned curricula for vocabulary teaching.

Educators have traditionally relied on children's life experiences and, as they get older, on their reading knowledge as the primary means for learning new vocabulary. Prior to grade 2, Biemiller recommends a strong vocabulary curriculum that is teacher directed in order to make a significant impact on reading and learning in the later grades (2001). Doyle and Bramwell (2006) utilized a dialogic reading approach, activities in the form of dialogue, to enhance emergent literacy skills in young children.

Parents and caregivers of children who are sighted rely on their children's eye gaze, gestures, and facial expressions to interpret messages from the child (Bates, 1979; Bretherton, 1992; Wetherby & Prizant, 1989), judge engagement, and clarify early expressive signals (Loots, Devise, & Sermijn, 2003; Prizant, Wetherby, & Roberts, 2000). On the other hand, parents and caregivers of children who are blind or visually impaired often miss or ignore vocalizations and body movements of children in their care (Preisler, 1995). This may occur because children who are blind or visually impaired often have limited facial expressions and do not maintain eye contact (Fraiberg, 1977;

Preisler, 1995). They are unable to perceive nonverbal communication such as eye contact, facial expressions, and gestures from their caregivers (Mills, 1988; Preisler, 1995). However, children as young as 2 months of age who are blind or visually impaired do attempt communication through subtle and difficult to interpret movements of their hands (Fraiberg, 1977).

Another hindrance that can influence language and concept development is the decreased opportunity for young children who are blind or visually impaired to explore the world around them (Warren & Hatton, 2002; Wormsley & D'Andrea, 1997) and to incidentally learn from pictures, television, environmental print, or events occurring silently in their environments (Koenig & Farrenkopf, 1997).

A study conducted by Murphy et al. (2008) investigated the practices endorsed by 192 teachers of young children with visual impairments. The teachers completed an online early literacy survey, and data results included: (a) 70% of teachers reported facilitating early attachment, (b) 74% of teachers reported providing early literacy support to families, and (c) 55% of teachers reported providing adaptations to increase accessibility. Data also revealed that few teachers reported (a) use of assistive technology, (b) providing structured instruction in phonological awareness, and (c) providing opportunities for early writing and alphabet experiences.

The research clearly demonstrates that children who are blind or visually impaired experience delays in language and concept development along with social skill development. The importance of these skills for future literacy compels parents, caregivers, and educators to provide the necessary experiences and exposure for language, concept, and social skill development. Most children develop literacy skills and

become successful readers because their education and experience include a variety of activities related to literacy (Erin, 2014). Instruction in phonetic awareness is generally acknowledged as the framework for successful, effective reading; however, other components are necessary to support learning (National Reading Panel, 2000).

Literacy

Blindness or visual impairment does not prohibit literacy development, nor does it necessarily make it more difficult to learn to read and write (Koenig, 1996). Children who are blind or visually impaired learn to read using braille just as children who are sighted learn to read using print (LaRose, 2001a). Children who are blind and sighted are learning the meanings of symbolic representations, print and braille characters, and how those representations form words, sentences, and paragraphs, which when put together, communicate a unique message (LaRose, 2001a). Blindness or visual impairment should not be regarded as a limitation for reading development. However, time and patience are necessary, and learning to read and write is hard work even for good readers (Koenig, 1996). Students who are blind or visually impaired must be afforded the same opportunities as their peers who are sighted, that they may develop their optimal reading ability, and this in turn will allow them to function independently as adults. In order that they may reach this goal, students must perceive reading as meaningful; an incentive for all positive learning (Fellenius, 1999).

When it comes to literacy development, the overall goal for children who are blind or visually impaired is precisely the same as for children who are sighted, including academic success and the joy and excitement when the reader is transported to a different place and time, and the ability to write and communicate with a broad audience on a

diverse range of topics. Therefore, the value of reading through braille is equal to the value of reading through print (Holbrook & Spungin, 2009). Literacy development of children who are blind or visually impaired and who read braille is much like that of children who are sighted (Gillon & Young, 2002; McCall, 1999).

Differences possibly occur in the manner in which students who are sighted and those who are blind or visually impaired interpret the world and develop literacy skills (Argyropoulos, 2002; Cromer, 1973; Koenig & Holbrook, 2000c). When comprehension, decoding, and spelling skill development of children who are blind or visually impaired is compared to those of children who are sighted, differences occur only in decoding (Gompel, van Bon, Schreuder, & Adriaansen, 2002; Pring, 1982; Pring, 1984). Noted authorities in the field of blindness education have expressed concerns regarding the low level of literacy skills among students who read, or should read braille, and about assessment and instructional practices utilized to address braille literacy skills (Foulke, 1996; Mangold, 1997; Mullen, 1990; Rex, 1989; Ryles, 1996; Schroeder, 1989; Schroeder, 1996; Schroeder, 1997; Spungin, 1990; Stephens, 1989).

Spungin (1996) researched issues related to braille illiteracy and the possible causes for them. She and others proposed that the decline in braille usage may be the result of negative attitudes toward blindness and braille and the increased emphasis on the use of residual vision and of technological advances, especially speech output, as a substitute for braille (Miller, 1999; Spungin, 1990; Troughton, 1992). The speech output of a computer is generally faster than its braille output; resulting in the possibility of the development of literacy skills being hindered significantly by the use of audio output instead of braille, resulting in an increase in illiteracy (Sullivan, 1996).

The development of written language skills is still a vital component for successful participation in a literate society. The importance of braille literacy development of children who are blind or visually impaired has been strongly supported in the literature (Johnson, 1989; Wittenstein & Pardee, 1996). A priority for educators who work with children who are blind or visually impaired must be to understand the possible causes that may impede a child's braille literacy development, and work to resolve these difficulties (Wittenstein & Pardee, 1996).

Results of a landmark study by Ryles (1997) evidence that students who were visually impaired receiving braille literacy instruction four to five times per week possessed higher levels of literacy skills than students who received instruction in print or received infrequent instruction in braille. A Delphi study conducted by Koenig and Holbrook in 2000 (2000a) aimed to reach a consensus of 40 professionals in the field of blindness education regarding appropriate levels of instructional services in order to best meet the needs of students who are blind or visually impaired. The focus of this study was on 12 areas of braille literacy skills. Findings of the study resulted in recommendations and general guidelines for educational teams when designing braille literacy programs geared to meet the individual needs of each student. Koenig and Holbrook determined that the level of braille literacy instruction will vary in frequency and intensity, depending on the skill area being addressed for each student. Young children who receive initial braille literacy instruction require daily, lengthy instructional time for several school years. This time will vary based on the specific skill being taught as students progress through school (Koenig & Holbrook, 2000a).

The ABC Braille Study was a longitudinal qualitative study of young braille readers initiated in 2002 and continuing until 2007. The driving force for the study came from a debate among professionals in the field over the introduction of braille contractions during early reading instruction (Swenson, 2011). The primary focus of the study was to explore whether children are better readers when they are initially taught to read contracted braille as compared to initially being taught uncontracted braille. There has been an ongoing debate in the field of blindness education pertaining to the effects of early use of contractions, which has received recent attention due to several studies and observations suggesting advantages to the later introduction of contractions to young readers (Erin, 2008). Researchers followed the literacy development progress of approximately 40 children over three to five years as they learned to read braille. They sought to determine if there were differences in reading rates and comprehension, vocabulary, fluency, word recognition, and reading achievement levels of children who are initially taught contracted braille, as opposed to those students who are initially taught uncontracted braille.

Participants were in preschool or entering kindergarten; braille readers who were functionally blind with no additional disabilities. Approximately half of the 40 students read in contracted braille, and the other half read uncontracted braille. Results showed there was no correlation between the number of contractions taught and the reading speed measured on *BRI*.

The researchers sought to determine if differences exist in writing, vocabulary, and spelling abilities of children who are initially taught contracted braille as opposed to those who are initially taught uncontracted braille. Based on writing samples from both

groups, a determination was made that most spelling errors were unrelated to braille (Erin, 2008). The children in the uncontracted braille group had more spelling errors; however, the errors of the contracted braille readers were often related to the braille code, not spelling. Students using the most contractions wrote longer passages than students using the least contractions.

The researchers sought to determine if differences occur in the quantity and quality of literacy and interactive experiences in general education classrooms, the home environment, and in the community of children who are initially taught contracted braille as opposed to those children who are initially taught uncontracted braille. The data showed the most socially interactive students were contracted readers when compared to the uncontracted group (Erin, 2008). No differences were identified in the classroom setting between the two groups. Parents of the high achieving students were more likely to know braille, read to their children more often, and more likely to have their own braille libraries (Erin, 2008).

The researchers also sought to determine if any differences exists in attitudes toward reading and writing in children who are initially taught contracted braille as opposed to those children who are initially taught uncontracted braille. Both groups expressed positive and negative comments about their braille experiences.

Additional findings unrelated to the introduction of contractions pertained to hand movements and social interactions (Erin, 2008). Students who learned to read braille using a one-handed reading method continued to use a one-handed reading method throughout the study. Students who learned to read braille using the parallel two-handed method progressed into other patterns such as split and scissor techniques.

Regarding social interactions, most interactions in the classroom (95) were mutual interactions, closely followed by helping interactions (89) and adult-assigned interactions (46). Data analysis continued with articles on the study findings submitted for publication during 2008 and 2009 (Erin, 2008).

The ABC Braille Study (2002-2007) was the first longitudinal study that followed young children's development of braille literacy skills (Emerson, Holbrook, et al., 2009). Traditionally, many teachers use fully contracted materials from the beginning of braille instruction, teaching contractions as they appeared in students' reading texts. Other teachers have argued that teaching children uncontracted braille first and gradually introducing contractions is more effective (Swenson, 2011). The teachers participating in the study included a balance between those choosing to begin their students with uncontracted braille and those preferring contracted braille. It is important to note that many teachers who initially opted for the uncontracted approach began to teach contractions within the first year of the study (Swenson, 2011).

Regardless of whether children's initial instruction was in contracted or uncontracted braille, most kindergarten and first grade braille readers demonstrated age-appropriate skills in phonemic awareness and phonics (Swenson, 2011). Nevertheless, the higher-level decoding skills assessed on the second-grade Texas Primary Reading Inventory (TPRI) were challenging for a number of students from both groups. More than 80% of the participants were at or above grade level in spelling at the end of the study. The best spellers were children who had learned many contractions early in their instruction. A correlation was found between oral reading fluency rates and the number of contractions taught. Faster or slower reading was not affected by how many

contractions children knew, although as a group, the braille readers read slower than their peers who were sighted. As they read aloud, the children made very few miscues related to the braille code such as reversals. Just as children who are sighted, they did make reading errors (Swenson, 2011). The conclusion drawn by the researchers was that the use of braille does not increase the number of miscues experienced by readers (Emerson, Holbrook, et al., 2009).

Only about half of the students were at or above grade level in vocabulary by the last year of the study. Noted by the researchers is that vocabulary appears to be a challenging area for braille readers (Emerson, Holbrook, et al., 2009). Below grade-level score percentages in reading comprehension increased as children moved through the grades (Swenson, 2011). Approximately half of the third- and fourth-grade participants were reading below grade level. Reading comprehension, along with vocabulary, appeared to be a significant area of need for young braille readers (Swenson, 2011). Higher scores in vocabulary, decoding, and comprehension were demonstrated by students who learned more contractions earlier in instruction than those students who started with uncontracted braille and learned contractions more slowly. Significant factors may have been that students who knew many contractions possessed more aptitude for learning them, or the difference was in the timing and pace at which teachers introduced contracted words. Based on the data, it was not possible to establish a direct cause and effect relationship, even though there was a correlation between greater mastery of contractions and higher reading achievement (Emerson, Holbrook, et al., 2009).

The ABC Braille Study results propose a correlation between stronger reading skills and early introduction of contractions for students without additional disabilities (Emerson, Holbrook, et al., 2009). More important is the data indicating the failure of many elementary-aged braille readers to achieve grade-level expectations in reading vocabulary and comprehension (Swenson, 2011). Instruction must focus on basic reading processes and not just on the braille code, which most study participants seemed to master with relative ease (Emerson, Holbrook, et al., 2009). It is necessary for TVIs to do more than teach the braille code to beginning readers. It is also their responsibility to incorporate reading processes into their instruction, monitor student progress along with the classroom teacher, and be ready to take the lead in seeking further assessments, resources, and interventions if students start to fall behind (Swenson, 2011).

Sacks, Hannan, and Erin, (2011) used a subset of the ABC Braille study to investigate children's perceptions of learning braille. The researchers contend that previous studies have not investigated the perceptions of braille readers about their experience of learning to read and write braille. It appears that motivation is important to the success of children who are blind or visually impaired in developing strong literacy skills, just as it is for peers who are sighted. Research has established that students who are less engaged in reading demonstrate difficulties when learning to read (Morgan et al., 2008), exhibiting less motivation and interest in reading. Negative attitudes toward reading are pervasive because learning to read is slow and tedious (Hersh, Stone, & Ford, 1996). A defining factor in the failure to read may be lack of motivation (Sideridis, Morgan, Botsas, Padeliadu, & Fuchs, 2006).

Participants were administered a 10-item questionnaire during each year of this longitudinal study conducted from 2002-2007. Using the same questionnaire each year of the study, the questions asked: who taught the students braille, what they liked and disliked about braille, their favorite books, who read to them and in what medium, and the interest in and reactions to braille from friends and teachers. Researchers read the interview questions to the students, the students responded orally, and their responses were recorded literally (Sacks et al., 2011).

The high achievement group of students yielded 27 interviews, and the low achievement group yielded 28 interviews over the course of the study. Student responses were consistent over the five years of the study, naming the same people responsible for teaching them braille, the same titles of books, and the same individuals who read to them (Sacks et al., 2011). Over the course of the study, students' likes and dislikes about braille remained the same. Responses were examined by the students' rankings of the order in which they learned contractions, and conclusions were not drawn on the basis of the level of contractedness.

Overall, students who had favorable attitudes about braille remained positive about braille, and those who disliked braille continued to dislike braille (Sacks et al., 2011). When asked what they liked about learning to read and write braille, overall, students in the high-achievement group expressed more positive responses than the students in the low-achievement group. Four students in the low-achievement group stated there was nothing about reading and writing braille they liked, and four students stated they did not know what they liked about braille or gave no answer. Among the high-achievement group, there were no questionnaires that included negative responses.

Students in the high-achievement group replied they liked to read and write more often than did students in the low-achievement group.

When asked what they didn't like about reading and writing braille, the two groups showed clear differences in their responses. Within the high-achievement group, 11 of 27 questionnaires revealed there was nothing the students disliked about reading and writing braille. Three others indicated they disliked having to stop reading for some reason such as going home, students talking when they were reading, and being told to slow down when reading. Other responses included not liking the loud noise of the braille writer, using a Perkins brailler, doing too much work, and using numbers. Only three students stated that they did not like reading braille.

Responses from the high-achievement group involved time constraints and unrelated factors, not about disliking reading and writing braille. Students in the low-achievement group expressed many comments about specific aspects of braille and reading. Eight questionnaires expressed comments regarding general difficulties or dislike of the braille code, physical discomfort, fingers hurting, doing too much work, or just not enjoying reading. Specific comments from seven students were related to aspects of the code that were difficult, including contractions, confusion with the letters i and e, mixing up letters, spelling and sounding out words, and difficulty remembering letters. Another comment was that reading braille is slower than reading print, and two students stated reading was not fun.

Overall, students in the low-achievement group identified more difficulties with the reading process, reflecting a more negative attitude of braille literacy than did the students in the high-achievement group (Sacks et al., 2011). Responses from both groups

were similar in all categories except reading to self, when asked who reads books to them. Six students in the high-achievement group stated they read to themselves, compared to only two students in the low-achievement group. Most frequently mentioned was family as the group that reads books to the student, followed by the classroom teacher and TVI. The students named their family members as more likely to read to them, and the TVIs as more likely to teach braille. Similarities were found in the two groups with regard to reading at home. In the high-achievement group, 22 of 26 students, and 23 of 27 students in the low-achievement group reported they read at home. Students were asked if the books read to them were in braille, print, or both. Of the high-achievement group, 11 students reported print, 12 students reported print and braille, three students reported braille, and one student did not know. In the low-achievement group 16 students reported print, seven students reported print and braille, and three students reported braille. In both groups, most of the students mentioned a favorite book or books. During the course of the study, student responses to this question did not change. No notable differences between the two groups were identified in book preferences.

Similarities were identified in the responses of the two groups regarding their friends' interest in braille. More interest in writing than reading was reported and more often by the students in the high-achievement group than those in the low-achievement group. Eighteen positive replies came from students in the high-achievement group about general reading and writing, compared with 12 similar replies from the low-achievement group. A few students reported that their friends asked about specific topics, the alphabet, how they did braille and why they liked it, and how the dots worked. Overall, ten

children who were in the low-achievement group said that their friends were not interested or they did not know, compared with five children in the high-achievement group. Slightly more students in the high-achievement group than in the low-achievement group reported some interaction with peers around braille. More students in the low-achievement group than in the high-achievement group reported writing with friends, and more students in the high-achievement group than in the low-achievement group reported playing or exploring with friends. Eleven responses from the low-achievement group and six from the high-achievement group revealed that students did not interact with peers with regard to braille.

When asked what their teachers said about learning to read and write braille, responses were also similar for the two groups. They reported that teachers encouraged students with positive comments. Comments included responses focused on work habits and general comments about reading and writing. Results of this study did not empirically demonstrate that a relationship exists between student perceptions and success in learning to read and write braille (Sacks et al., 2011). A need exists to expand the research efforts to examine the relationship between students' success with literacy and motivation to read and write in braille (Sacks et al., 2011).

Student participation in improving interest in reading is the focus of a study by Patillo, Heller, and Smith (2004). Through the use of a repeated reading process using optical character recognition software, five students in Patillo's resource room worked to improve their reading speed, accuracy, and comprehension (Patillo et al., 2004). Results indicated that four out of five students improved some aspects of their reading and expressed more positive attitudes about reading as they made progress (Patillo et al.,

2004). Student participation in the research may have been one powerful feature of the students' improvement. Each student set a criterion for their individual reading sessions and was aware of their progress during the interventions.

Similar changes were experienced by a student whose spelling improved through computer instruction (Mioduser, Lahav, & Machmias, 2000). As her skill improved in her ability to operate the instructional program, she wanted to do additional work to increase her progress (Mioduser et al., 2000). Motivation impels a learner to continue a difficult task, and mastering the task results in an increased drive to improve. Motivation increases performance, which in turn increases motivation (Erin, 2009).

Emerson, Holbrook, et al. (2009) presented the overall results of the ABC Braille Study. The researchers identified no definite differences in reading rate, comprehension, vocabulary word recognition, and reading achievement levels when children were initially taught contracted braille, compared with children who were initially taught uncontracted braille. The purpose of the study was to learn about the literacy experiences of young children who initially learn to read and write using either alphabetic or contracted braille (Emerson, Holbrook, et al. 2009). The study included 38 children from 15 of the United States and one Canadian province (Emerson, Sitar, et al., 2009) and was the first longitudinal study of children who are braille learners. Reading and writing skills of young braille reading students were analyzed.

Results revealed that students who were introduced to more contractions earlier in instruction performed better on reading measures, such as vocabulary, decoding, and comprehension. Nevertheless, all students did well in spelling. The participants experienced a gradual loss in reading speed compared to their peers who were sighted,

and researchers concluded that perhaps this was due to reading fluency not being targeted in these students' literacy programs. (Emerson, Holbrook, et al. 2009).

Emerson, Holbrook, et al. (2009) propose that literacy instruction should primarily focus on basic reading skills. Students in this study appeared to successfully develop foundational skills from kindergarten to approximately second grade, when they began to show deficiencies in developing higher-level decoding skills. Perhaps the greater amount of connected reading at this level increased stress on the braille readers. Also, lack of instruction or insufficient reading practice may have resulted in poorer scores. The researchers believe the cause may also be with the reading-writing connection (Emerson, Holbrook, et al. 2009).

Nevertheless, the data showed that students who were introduced to few contractions exhibited poorer scores as they moved to more demanding literacy tasks. Exposure to contractions was not linked to reading rate; vocabulary and spelling performance were related to students having early exposure to more contractions. A minor link between the number of contractions to which students were exposed and general reading levels was observed in this study. The researchers determined that students who are blind or visually impaired are falling behind their peers who are sighted and not developing reading skills at the rate they should, regardless of whether their initial braille instruction was with contracted or uncontracted braille (Emerson, Holbrook, et al., 2009).

Data analyzed indicates that for any young student who is blind or visually impaired, the focus of literacy instruction needs to be reading processes, regardless of the specifics of how the braille is introduced. Additionally, the data revealed that the

introduction of contractions early in a student's reading process is associated with higher literacy performance later in the student's academic career (Emerson, Holbrook, et al, 2009).

The initial introduction of contracted or uncontracted braille early or late is held up by theoretical viewpoints; Hong and Erin (2004) conducted a mixed methods study in which they compared the reading and spelling skills of students who were initially taught to read contracted braille compared to students who were initially taught to read uncontracted braille. Study findings identified no definite differences between the initial instruction in the two methods of teaching braille.

Another subset of the ABC Braille Study was a mixed-methods qualitative and quantitative study, probing into the social experiences of beginning braille readers who were initially taught contracted or uncontracted braille in literacy activities (Sacks, Kamei-Hannan, Erin, Barclay, & Sitar, 2009). The purpose of the study was to answer questions related to differences in the quality and quantity of literacy and interactive experiences in general education classrooms, the home environment, and the community of children who are initially taught contracted braille as opposed to those initially taught uncontracted braille.

Balancing successful academic achievement with mastery of a unique set of skills that promote independence and social competence is a challenge in the education of students who are blind or visually impaired, at the same time holding them responsible to the same high academic standards as their peers who are sighted (Sacks et al., 2009). They must demonstrate the ability to engage with classmates and adults, successfully

travel a school campus, and complete classroom assignments and activities in a timely manner.

During the period of time the study was conducted (2002-2007), the researchers identified no significant differences in the quality or quantity of social experiences between the two groups (Sacks et al., 2009). One or the other method of introducing contractions within braille instruction did not influence the quality and quantity of social interactions between students who were blind or visually impaired and their classmates in literacy activities (Sacks et al., 2009).

The findings do have significant implications regarding strategies that may promote friendships and positive social interactions between students who are blind or visually impaired and classmates who are sighted. Some unmeasured factors that may have affected student interactions include teaching styles and classroom design (Sacks et al., 2009). Some teaching styles were more collaborative than others, encouraging and facilitating small-group activities. Other styles followed a more traditional lecture-style classroom, where students were not encouraged to interact during literacy activities. Of notable interest is that interactions seemed to increase with grade level, perhaps because as students got older, they engaged in more cooperative learning or group activities, while younger students received more traditional instruction.

Another influencing factor during social interactions in literacy activities may have been the classroom design. Often students who were blind or visually impaired sat at a table where he or she had access to materials and equipment, but did not have easy access to his or her classmates or the class in general. Another noteworthy finding is that, as a group, the high-achieving students initiated interactions with peers more often than

did the low-achieving students, perhaps because the high-achieving students were more adept in interacting with peers due to their use of vocabulary or general knowledge of the world around them developed through reading or other literacy experiences (Sacks et al., 2009).

Research suggests that braille contractions do not have a negative impact on reading progress for children who are blind or visually impaired with no additional disabilities (Swenson, 2013). The results of the ABC Braille Study supports the early introduction of contractions as rapidly as students can master them (Emerson, Holbrook et al., 2009).

One of the greatest limitations of this study is the lack of uniformity of the data collection. The financial and personnel constraints prevented the collection of the required data by just a few researchers, and the data being collected was substantially subjective (Sacks et al., 2009). Additionally, a possible limitation of the ABC study was that the intelligence of participants or the existence of learning disabilities was not considered. Some of the participants seemed to have some learning disabilities, and if this would have been considered, the researchers could have accounted for some of the results that had nothing to do with contracted or uncontracted braille (Pogrund, R. personal communication, March 13, 2017).

Troughton (1992) introduced One Is Fun, a pilot study documenting the impact of teaching uncontracted braille to Canadian beginning braille readers. Initial research revealed that students who received braille instruction using uncontracted braille in the first three grades in school were later able to read more fluently, to spell words with greater accuracy, and achieved higher levels of academic success in general education

classes. However, the study's results cannot be generalized because of the study's small sample, flaws in the methodology, and results that apply only to that study (Troughton, 1992).

Using a data set from the ABC Braille Study, Emerson, Sitar, et al. (2009) probed into the effects of consistent structured reading instruction on high- and low-literacy development in young children who are blind or visually impaired. They reported that no differences occurred with regard to high and low achievers in the development of literacy skills, in areas such as age, etiology of visual impairment, family attitudes and behaviors regarding literacy activities, class size, and time spent with a TVI (Emerson, Sitar, et al., 2009). Differences between the groups in the area of social interactions, the introduction of contractions, and time spent with paraeducators were identified. They reported the greater difference was with the provision of consistent, structured reading instruction (Emerson, Sitar, et al., 2009).

The decline in scores observed within the data set of the ABC Study for the administration of the TPRI in Grade 2 may have been driven by the lower scores of the low-achieving students. Data showed the high-achieving students continued to do as well on the Grade 2 assessment as they did on the kindergarten and Grade 1 assessments. The researchers surmise that these students performed differently because the high-achieving students were able to internalize the mechanics of decoding reading more effectively than did the low-achieving students (Emerson, Sitar, et al., 2009).

Another possible explanation as to why the two groups began to differ at Grade 2 is that, until the Grade 2 TPRI, the administration of the test was mostly verbal. When the reading increased in the administration of the assessment, students began to have

difficulty, demonstrating the difference between the two groups. The Grade 2 TPRI assesses the act of reading during the assessment and not just the component skills that contribute to the act of reading. Data indicates that many students were able to acquire the component skills, but it was the high-achieving students who were able to put these skills to use and more fully develop the act of reading (Emerson, Sitar, et al., 2009).

The high- and low-achieving students may have differed because of differences in the development of orthographic (a conventional spelling system) decoding skills. When the required skills became more orthographically focused, the low-achieving students began to show poorer performance on the TPRI. It was the low-achieving students who demonstrated poor spelling skills. The low-achieving students were able to compose and transcribe their ideas as well as the high-achieving students; however, they had more spelling and punctuation errors. The general literature on reading proficiency agrees with this delayed performance by the low-achieving students on advanced skills related to phonemic awareness (Emerson, Sitar, et al., 2009). Students in the high-achieving group spent more time with paraeducators than with TVIs, and their braille instruction was through the Patterns program.

It appears children who are blind or visually impaired can be successful in developing effective literacy skills if literacy instruction is part of a consistent, organized plan of instruction (Emerson, Sitar, et al., 2009). Readily available materials or devices do not make up for the lack of pedagogical rigor. The educational environment is more predictive of students' success than are the characteristics of students and families. Additionally, the collaboration between classroom and teachers of the visually impaired

is paramount in the development and maintenance of a successful reading program for students (Emerson, Sitar, et al., 2009).

The purpose of a case study conducted by Tallon and Herzberg (2013) was to increase a participant's knowledge and use of the 14 final-letter braille contractions, including the ability to identify the dot placement of the contractions, verbalize the letters that each contraction represented, identify the sound each contraction made, use contractions consistently in writing, and fluently decode words containing these contractions. The participant was a 9-year-old girl with no additional disabilities in the third grade whose primary literacy media was braille. The assessment process showed that she did not know any of the 14 final-letter contractions (Tallon & Herzberg, 2013).

At the end of six weeks of targeted instruction, the student was able to decode and write seven of the final-letter contractions, accurately identify the dot placement, verbalize the letters, and the whole sound of the targeted contractions. These results support the finding that direct-explicit instruction may be an effective model for teaching braille literacy skills (Tallon & Herzberg, 2013).

This case study also supports research findings that students who are learning braille need continued intensive braille instruction from a TVI throughout the primary years (Emerson, Holbrook, et al., 2009; Harley et al., 1997; Koenig & Holbrook, 2000a; Swenson, 1999). The use of contractions in reading and writing requires specific, direct ongoing instruction. Students' braille skills need to be continually monitored to ensure the early detection of, and intervention for deficits before they affect other areas of learning (Tallon & Herzberg, 2013). Contractions cannot be introduced and not be monitored.

A limitation of this case study was that a pre-assessment was not administered, and the student's progress in reading fluency was not monitored (Tallon & Herzberg, 2013). At the end of the intervention, the student read an average of 70 words per minute on grade-level materials, and her instructional reading level had increased to a beginning fourth-grade level. She began using other contractions more consistently in her writing, such as alphabet whole-word signs that she knew in isolation but was not using consistently before the intervention, and became a more active participant in her learning.

Research on reading instruction concerning young children has shown characteristics associated with higher and lower reading achievement. Research indicates, for the most part, that skilled readers have positive attitudes about reading, although all readers become less positive as they progress through elementary school (McKenna, Kear, & Ellsworth, 1995). According to Anderson, Wilson, and Fielding (1988), proficient readers read more, spending time in independent reading, predicting reading proficiency. External factors such as socioeconomic level and maternal educational level are strongly associated with reading and academic achievement (Broughman, Bien, & Shaughnessy, 1985; Roscigno, 2000). Teacher high performance on academic competence tests is another indicator of higher academic achievement of students (Wayne & Youngs, 2003). Research supports the contention that early reading instruction contributes to long-term reading competence (Hanson & Farrell, 1995).

Literature regarding the writing skills of students who are blind propose wide variations among school-aged students who read braille, with possible areas of difficulty in the use of vocabulary, the structure of the composition, and cohesiveness for some students (Erin & Wright, 2011). However, the limited research, differences in research

designs, and the absence of research involving writing at the early elementary levels, provide incomplete information regarding the development of braille writing skills by young children. There is a growing body of research on the development of literacy in young braille readers; however, limited attention has been paid to the mechanical and conceptual process of how young children who are blind learn to write (Erin & Wright, 2011).

Writing is generally taught to braille reading students using a braillewriter, and occasionally the skill is introduced through the use of a slate and stylus or an electronic braille device. Each of these tools requires different patterns of coordination than writing in print, which raises questions about how the differences in physical production influence the quantity and quality of writing (Erin & Wright, 2011). Children who are blind or visually impaired have distinctive experiences with conceptual learning; therefore, perhaps variations in the content of written products may exist (Erin & Wright, 2011). There is little published research regarding how children who are blind learn to write, particularly during the early elementary years when children first learn the form and meaning of writing.

Evaluating writing samples is difficult because writing involves both physical transcription and the creation of meaning through words (Erin & Wright, 2011). Some researchers have emphasized measures that assess the process of transcription, such as copying words and sentences; others have analyzed production through such measures as correct punctuation, sentences, words written, and words correctly spelled (Coker & Ritchey, 2010). Another challenge to conducting reliable analyses is the limited vocabulary and varied writing proficiency of young writers (Erin & Wright, 2011).

Reliable writing assessments of young children pose an even greater concern when children are blind or visually impaired, given the distinctive factors related to writing and the absence of research (Erin & Wright, 2011).

Research has primarily focused on students who were in mid-elementary school grades or older. Kreuzer (2007) analyzed writing samples of fourth- and fifth-grade students who were blind or visually impaired and students who were sighted. She gathered two writing samples from 15 students who were blind, 15 from students who were visually impaired, and 15 from students who were sighted. Data related to the number of words and the percentage of abstract nouns and adjectives were analyzed (Kreuzer, 2007). The students who were blind and those who were visually impaired used more concrete and fewer abstract nouns in their imaginative samples than did the students who were sighted, and the students who were blind used fewer adjectives (Kreuzer, 2007). In the writing samples that were based on the students' experiences, the holistic writing scores were significantly lower for the students who were blind or who were visually impaired. In the imaginative and experiential writing, the students who were visually impaired wrote significantly shorter samples than did the students who were sighted (Kreuzer, 2007). Many students in this study chose to use electronic notetakers to produce their samples, and no student who was visually impaired chose to write using a computer or any adaptive device (Kreuzer, 2007).

Several studies have involved the writing production of high school students. Koenig (1987) analyzed the writing samples of 84 students who were blind and were 9 years of age. He analyzed writing samples of the same students again at age 13 and 17, comparing the samples to those of students who were sighted, according to protocols

developed for the National Assessment of Educational Progress (1981). Rhetorical effect, cohesiveness, syntax, spelling, and types of errors were analyzed (Koenig, 1987). The students in the 9- and 13-year-old age groups performed similarly to their peers who were sighted, and in areas such as spelling and rhetorical effect, they outperformed them. The writing samples of the 17-year-old students were similar to their peers who were sighted; however, their samples showed weakness in rhetorical effect, cohesiveness, and spelling (Koenig, 1987).

Ryles' investigated the literacy skills of students with visual impairments who learned braille early with those of students who learned braille later or not at all (Ryles 1997). When English teachers analyzed the writing samples of these three groups, as well as writing samples of students who were sighted, the samples of the early readers of braille were rated as high as or higher than those of the sighted students, unlike the samples of the later readers of braille and the students who were visually impaired who did not read braille (Ryles, 1997).

Erin and Wright (2011) reported the results of data from 114 writing samples of 39 braille readers who participated in the ABC Braille Study between 2002 and 2007. Writing characteristics, miscues, and composition characteristics were analyzed. The ABC Braille study provided a preliminary longitudinal investigation of the writing samples of a process that can focus on features that affect the quality of writing of children who read braille (Erin & Wright, 2011). Erin and Wright reported the findings from the data on writing that addressed the following questions:

1. Does a relationship between words per passage (WPP) or words per sentence (WPS) and students' knowledge of contractions exist?

2. Did students' knowledge of contractions relate to the quality of compositions?
3. What types and frequency of miscues occurred in the writing samples?
4. What mechanical characteristics of braille writing were demonstrated by the students?
5. Were there differences in the scores of composition and the frequency of miscues of students who were the highest and lowest achievers?
6. What patterns of writing development were evident in the individual students?

Wide variability in writing features such as the length of passages, the length of sentences, and the frequency of miscues were found in the analysis of 114 writing samples from young braille readers (Erin & Wright, 2011). The overall number of words per passage was related to the students' knowledge of contractions; nonetheless, the number of words per sentence and the holistic content of their compositions were not associated with their knowledge of contractions (Erin & Wright, 2011). Perhaps the relationship between words per passage and knowledge of contractions and using contractions may reduce the effort necessary to produce more material, although the significance was modest (Erin & Wright, 2011). Thirteen percent of the miscues were related to the braille code, even among the youngest students; 81% were attempts to use phonetic rules in spelling (Erin & Wright, 2011).

This finding contrasts with the belief that the early use of contractions causes poor spelling (Erin & Wright, 2011). Overall findings of the ABC Braille study revealed that students in the group spelled better than did their peers (Emerson, Holbrook, et al., 2009). In addition, it supports the conclusions that the literacy difficulties of students who were blind were not mainly due to the braille code but were the same problems experienced by

all young readers who are working to resolve the rules and irregularities of a complex written language (Erin and Wright, 2011).

The purpose of a 2006 preliminary study conducted in two special schools in Greece and in Cyprus, focused on the way in which students who were blind and teachers from special schools in both countries cope with issues such as reading and writing braille, the use of assistive technology, and perspectives with respect to the braille code (Argyropoulos, Katsoulis, & Eliadou, 2006). Two schools participated in this study, one was a special school for students with visual impairments in Greece, and the other was the St. Barnabas School for the Blind in Cyprus. Twenty-one students and eighteen teachers took part in this study. The Greek students ranged in age from 9 years to 19 years, and the Cyprus students' age range was 8 years to 22 years. All students were braille readers and, according to their records, had no additional disabilities (Argyropoulos et al., 2006).

Semi-structured interviews lasting approximately an hour were conducted with students and teachers from both schools. Student interviews consisted of three sets of questions regarding their personal details, their preferences in writing and reading, and their attitude towards braille. The teacher interviews consisted of three sets of questions as well, pertinent to their personal details, their methods in teaching their students who are blind, and their attitude towards braille.

This study was a preliminary study and as such, describes a set of data without firm conclusions. Preliminary results indicate that technological advances should be conducive to student development, and that assistive technology should be viewed as an educational tool, not as an educational end. However, limited qualitative research has

been conducted documenting the parameters of the impact that computers and speech output software have on students writing skills or in general literacy (Argyropoulos et al., 2005). In addition, the need for professional training to support teachers in the use of braille and in new technologies exists (Argyropoulos et al., 2006). Better comprehension regarding the role that braille plays in students' everyday life is needed, linking it not only to schooling but to culture, societal norms, and employment (Spungin, 1996).

Hand Mechanics

Historically, it has been understood that an important facet related to efficient braille reading is the hand mechanics technique used by the reader, (Davidson, Wiles-Kettenmann, Haber, & Apelle, 1980; Gray & Todd, 1968; Kusajima, 1974; Mangold, 1978; Millar, 1997; Wormsley, 1979). Hand mechanics are essential to the recognition, reading, and comprehension of braille. Like print, English braille is read from left to right, top to bottom, and it is important to establish this technique as early as possible (Statewide Vision Resource Centre, 2013).

Braille readers experience a three-pronged challenge: (a) to decode braille as patterns of texture under the moving fingerpad or fingerpads, (b) to gain the linguistic meaning of the braille code, and (c) to coordinate movements of reading fingers with perceptual and linguistic processing (Hughes, 2011). Braille reading is a complex perceptual-cognitive-motor skill, predominantly serial, not parallel with braille cells seen one at a time, continuous reading not stop and start, and words are not jumped over or skipped, exhaustive, not selective (Hughes, 2011).

A stationery finger cannot read braille (Statewide Vision Resource Centre, 2013). Efficient, comprehensive braille readers use two hands and many fingers, unless there is a

physical limitation. The fingers on the right hand are the "reading fingers" and the fingers of the left hand are "checking fingers," ensuring that fingers do not go backwards over the braille to re-read a word or phrase (Statewide Vision Resource Centre, 2013). A comfortable position in relation to the braille with arms and hands in a relaxed position with the reader directly facing the lines of braille is important to efficient reading because off-centered braille in relation to the reader may be perceived incorrectly (Statewide Vision Resource Centre, 2013).

A student's reading speed in braille can be influenced by the reading technique used by the student. The majority of efficient and fast braille readers adopt a two-handed scissor pattern (Laroche et al., 2012). In a two-handed scissor pattern, both hands read together to the middle of the line. When they reach the middle of the line, the right hand continues to the end of the line while the left hand drops to the next line and begins to read independently of the right. Research concerning hand mechanics and reading success is limited; however, existing research appears to indicate a correlation between certain hand movement patterns and faster braille-reading ability, suggesting that some patterns may be more efficient than others (Bertelson, Mousty, & D'Alimonte, 1985; Davidson, Appelle, & Haber, 1992; Gray & Todd, 1968; Kusajima, 1974; Mangold, 1978; Millar, 1997; Mousty & Bertelson, 1985).

Using a data subset from the ABC Braille Study, Wright, Wormsley, and Kamei-Hannan (2009) investigated the correlation between hand mechanics and braille reading efficiency. The researchers analyzed patterns and characteristics of hand movements as predictors of reading performance. Statistically significant differences were found between one- and two-handed readers, and differences between patterns of hand

movements and reading rates (Wright et al., 2009). Of the study participants, 41% of the fastest readers used a scissor pattern, and of the fastest readers, 37% were two-handed readers and 15% were one-handed readers. This data suggests the participants who used a two-handed reading technique increased their reading speed at a greater rate than did participants who used a one-handed reading technique, supporting the current theory that two-handed reading is more effective than one-handed reading (Wright et al., 2009).

The ABC Longitudinal Study results indicate students who began reading braille with one hand were less likely to incorporate a second hand in reading, while students who began reading with a two-handed technique such as the parallel pattern, were more likely to transition into a more efficient two-handed technique such as the split or scissor pattern. These techniques were significantly statistically correlated with increased reading speeds (Wright et al., 2009).

Williams (1971) compared 100 students ranging in age 15-18 years old. Within the 100 study participants, 50 were fast readers, reading more than 130 words per minute and 50 slow readers, reading fewer than 70 words per minute (Williams, 1971). Data revealed within the fast reading group, 72% read with both hands, and 64% used both hands independently. In the slow reading group, 60% used both hands, and only 2% used both hands independently. Mousty and Bertelson (1985) investigated reading rates among 24 adults. They found that two-handed readers had higher reading speeds than one-handed readers.

Supporting research results by Hislop (1984) showed that, among adult braille readers, one-handed readers read negligibly slower than two-handed readers. Additional research supports the advantage of two-handed reading (Davidson et al., 1992). Readers

utilizing both hands read almost twice the number of braille cells as did those reading using one hand. In a reading-rate study of 22 young braille readers, the four fastest readers used either the split or scissor technique or a combination of the two (Wormsley, 1996). Of the four slowest readers, one read with only the left hand, one alternated between the left hand only and parallel patterns, one used the parallel pattern, and one alternated between the parallel and the split patterns. Other research indicates that these characteristics likewise had significant effects on braille reading speeds (Davidson et al., 1980).

The implication for best practices is that initial braille instruction needs to be with a two-handed technique (Wright et al., 2009). No statistical indication that readers who used contracted braille had more difficulty recognizing characters, evidenced by scrubbing, or context, confirmed by regressions were reported in the ABC Braille Study (Wright et al., 2009).

Spelling and Phonological Awareness

Precise spelling is the foundational component of literacy. It is a skill expected of literate persons and should be a core component of the academic curriculum (Larsen, Hammill, & Moats, 1999; Wanzek et al., 2006). Reading, writing, and spelling are intertwined, complex, language-based processes requiring the ability to recognize sound patterns and letters representing them (Bailet, 2001). The same language skills are required for reading and spelling; possessing a strong correlation to each other (Ehri, 2000; Moats, 2005), and supporting the development of each other (Snow, Griffin, & Burns, 2005). Reading and spelling are intricately connected, more similar than different, and reading requires the ability to detect misspelled words (Ehri, 2000).

The foremost goal in learning to read and spell is to become sufficiently acquainted with the spelling of words, and information about their letters is memorized, enabling them to be read or spelled easily (Ehri, 2000). Mastery of language skills permits students to become sufficiently familiar with the spelling of words.

Data resulting from several studies shows a high correlation between reading and spelling skills; these results also indicate that the same basic language skills are required for both reading and spelling (Ehri & Wilce, 1982; Greenberg, Ehri, & Perin, 1997; Griffith, 1991; Jorm, 1981; Juel, Griffith, & Gough, 1986). Language is the means by which literacy is learned, refined, and mastered (Clark-Bischke & Stoner, 2009).

One of the foremost goals of education for all students, including those with disabilities, is literacy development, which includes writing and spelling (Clark-Bischke, & Stoner, 2009). Spelling is an inherent component of literacy, and learning to spell enhances phonological awareness, word recognition, vocabulary, and writing fluency (Moats, 2008). The foundation of reading and the greatest ornament of writing is spelling (Venezky, 1980). Spelling is a correlating process between comprehension and the correspondence between letters and sounds (Argyropoulos & Martos, 2006; Beers, 2003; Frith, 1981; Templeton, 2002). It is a developmental process consisting of stages that are compatible with students' understanding of letter-sound relationships (Beers, 2003; Templeton, 2002). As student understanding increases, these letter-sound relationships become more meaningful. Spelling improvement indicates improvement of word recognition, and in turn, assists students with decoding processes, and therefore, comprehension.

Spelling is a component of literacy, playing an important role in students' learning and understanding (Beers, 2003). Students progress at different paces through the five stages of spelling (Beers, 2003). Researchers have proposed that preliteracy skills are dependent on phonological awareness, which includes phonemic awareness and segmentation of words into syllables, the recall and sequencing of what is being read, and comprehension (Frith, 1981; Frith & Frith, 1983; Torgenson, Wagner, & Rashotte, 1994). A consistent relationship between the degree of phonological awareness and beginning stages of reading and spelling exists (Lombardino, Bedford, Fortier, Carter, & Brandi, 1997). Development of these preliteracy skills is dependent on a child's hearing. Reading and spelling are independent processes occurring during the early stages of literacy development (Frith, 1981; Frith & Frith, 1983). As children begin to spell, "invented spelling" usually occurs (Lombardino et al., 1997, p. 334) using their knowledge of letter names, sounds, and print conventions to invent spellings. Researchers have concluded spelling is a strong predictor of word reading in the beginning stages of literacy development (Ehri & Wilce, 1987; Lombardino et al., 1997; Morris & Perney, 1984; Richgels, 1995).

Two primary factors contribute to spelling errors. First, is the lack of phonemic awareness skills. A second type of spelling error is caused by the lack of orthographic knowledge (Clark & Stoner, 2008). Ehri and Wilce (1987) propose that with increased exposure to mental graphic representations, spelling becomes more accurate and automatic. Students who are blind or visually impaired make a slow start with spelling, resulting in difficulties in developing mental patterns of words (Arter, 1997; Arter & Mason, 1994). Students who are blind or visually impaired learn to read and write signs,

abbreviations, and contractions, and must memorize the full spelling of words so that they may be able to reproduce them, making spelling a challenging task for students who are blind or visually impaired (Arter, 1997).

Research concerning spelling indicates that children who are blind or visually impaired are likely to have difficulty achieving levels of accuracy in spelling compared to their peers who are sighted (McCall, 1999). A contributing cause to this difficulty may be found in the research relating to incidental/environmental print, and early literacy. Children who are sighted are exposed to a wide variety of stimulating, colorfully illustrated books, newspapers, magazines, advertising on billboards, television, buses, and products in stores; whereas children who are blind or visually impaired generally do not have these experiences (McCall, 1999). Arter supports this premise when he notes that many students who are blind or visually impaired experience difficulty learning to spell correctly due to a number of factors, such as the lack of incidental exposure to the written word from an early age (Arter, 1997). Children who are sighted are exposed to images of many words that become imprinted on their memories. A consequence of this early exposure is that children who are sighted are able to achieve higher levels of accuracy in spelling compared with their peers who are blind or visually impaired (Argyropoulos & Martos, 2006).

Argyropoulos and Martos (2006) conducted a mixed-methods study analyzing the braille spelling errors of 16 Greek students who were blind or visually impaired. They explored the different kinds of spelling errors, student attitudes toward spelling, and the relationship between spelling and reading strategies, and classified the spelling errors. The classification system Argyropoulos and Martos utilized categorized errors into

phonological and nonphonological groups that met the unique characteristics of the Greek language. The Greek braille code requires most words to be spelled out in their entirety, not having many abbreviations or contractions as does contracted English braille. Seven diphthongs (combinations of two vowels) are the only contracted types that appear in Greek braille. Contractions do not have any bearing on spelling in Greek braille because there are no contractions (Argyropoulos & Martos, 2006).

This research aimed to compare the spelling performance of students at the three levels of education (elementary school, high school, and lyceum). The four elementary school students in the study chose to read their homework in braille, rather than listening to prerecorded study materials. The high school and lyceum students had a significant increase in the use of audio tapes. They indicated that even though braille helps them comprehend and remember better than listening from a tape, braille takes more time than a tape, and they usually don't have much time to read all their homework in braille, acknowledging that test demands forced them to use prerecorded study materials in conjunction with braille. High school students noted the issue of verbalism or parroting (speaking without understanding) when they study from tapes. All students believe reading braille is a form of communication with the paper and hence, with the writer, and this assisted them to conceptualize the content of the subject they were studying.

When students were asked what the term "spelling" meant to them, their responses were varied, including: (a) "Spelling is when you don't make mistakes, and people do not laugh at you," (b) "Spelling is when words are written as they are," (c) "Spelling is when words are written as part of everyday life, not as a task," (d) "Spelling is a set of specific rules such as math, two times three always equals six," (e) "Spelling is

letters and grammar," and (f) "Spelling is the correct order of letters in words" (Argyropoulos & Martos, 2006, p. 680). The researchers believe these statements provided information regarding the approach that students at this specific school used in dealing with spelling. The students considered spelling to be the correct order of letters in words, but gave its meaning social and emotional dimensions; social dimensions, by differentiating between spelling in school and spelling in everyday life, and emotional dimensions because they thought that spelling made them feel secure and acceptable in a school environment. Few students had a precise concept of spelling within phonological or nonphonological context.

Most students agreed that spelling is important, but their reasons differed. The lyceum students and half of the high school students understood the importance of spelling when they indicated that knowing how to write is necessary for finding a job. The elementary school students mentioned the acceptance usually received by a school environment in regard to spelling. An external factor perhaps impacting the lyceum students' performances is that braille textbooks were not available for all subjects. Student performance was highly accurate with few PT errors (errors that change the acoustical image of the word), indicating that they did not have specific learning difficulties (Tindal & Marston, 1990) or specific issues in transferring what they heard from the researcher dictation to the paper.

The most important finding of the data analysis was that the lyceum students made more phonological-type (PT) errors and nonphonological-type (HT) errors than did the high school students (Argyropoulos & Martos, 2006). HT spelling is based on the evolution of language, and students need to memorize the structure of words as they

appear in textbooks. Semistructured interviews revealed that the lyceum students read orally more than with braille due to their heavy workload and schedules, resulting in images of the words and with the most common spelling rule knowledge beginning to fade (Argyropoulos & Martos, 2006).

Information learned by tactile exploration when reading braille is more stimulating than information obtained by aural reading (Argyropoulos & Martos, 2006). This data reveals the important role that haptic stimulation plays in braille reading and writing. The receptors and cerebral areas work in a way to converge to create tactile perception. In turn, the parameters of tactile perception form a multidimensional system leading to a cognitive outcome (Millar, 1997). Haptic stimulation consolidates word images, which lead to the formulation of haptic memory (memory by touch) (Argyropoulos & Martos, 2006). These memories encompass intellectual structures (schemata) (Wadsworth, 1989). Therefore, increased aural reading by students who are blind or visually impaired may minimize the degree of consolidation of the schemata (Argyropoulos & Martos, 2006).

The findings of this study support the findings of Sullivan (1996) and the findings of researchers who have studied the decline in the use of braille, such as Miller (1999), Spungin, (1990 & 1996), Sullivan (1996), and Troughton (1992). Tactile characters are relatively complicated to decode, necessitating further research in this area (Pring, 1984). In addition, further research is needed to determine the impact of students' written efficiency when using or not using any type of accent in languages other than English, perhaps falling in the general area of the complexity of braille (Greaney & Reason, 2000).

All students in the study considered spelling to be important in their everyday lives, including employment. With such little data, it is impossible to draw definite conclusions. Nevertheless, programs linking the importance of developing braille literacy skills with employment and with independence and happiness need to be promoted (Argyropoulos & Martos, 2006). The categorization of spelling errors may direct the need to change curriculum, adapting it to fit the needs of students who are blind or visually impaired rather than follow a rigid instructional form. Further research is also needed concerning patterns of spelling errors and inconsistencies in student errors in different stages of their schooling, in conjunction with the decline in the use of braille and the increase in braille illiteracy (Argyropoulos & Martos, 2006). Finally, a need exists for studies that will provide better understanding of the role of social and cultural contexts on the perceptions of children who are blind and visually impaired of such issues as braille, literacy skills, and employment.

A comparative study by Clark and Stoner (2008) investigated the spelling skills of students who are braille readers to a normative sample. They aimed to fill the gap in the research and to determine how the spelling skills of braille readers compare to readers of conventional print. Participants included 23 students who were blind or visually impaired at various grade levels, to whom the Test of Written Spelling was administered to determine their spelling ability. The data resulted in no significant differences in spelling ability (Clark & Stoner, 2008). Few studies have focused on the spelling skills of braille readers, and of those, none has compared the spelling skills of students who are sighted and students who are blind or visually impaired who are braille readers (Clark & Stoner, 2008).

Most researchers have acknowledged that a key predictor of the development and growth of reading is phonological awareness (Lonigan, Anthony, Phillips, Purpura, Wilson, & McQueen, 2009; Lonigan & Shanahan, 2008; National Reading Panel, 2000; Senechal, LeFevre, Smith-Chant, & Colton, 2001). Phonological awareness is the ability to detect, manipulate, and analyze the sounds in oral language. Additionally, phonological awareness includes the ability to distinguish, segment, and blend syllables, rimes, and phonemes (Lonigan & Shanahan, 2008). Children eventually associate the sounds of oral language with the letters that represent the sounds in braille or print. Perhaps, this explains why children with good phonological awareness skills learn to read earlier than do children with less advanced skills, even when intelligence, vocabulary, memory, and socioeconomic factors are considered (Lonigan et al., 2009). Research shows that systematic instruction in phonological awareness promotes reading skills for kindergartners (Adams, 1990; Brady, Fowler, Stone, & Winbury, 1994) and preschoolers (Byrne & Fielding-Barnsley, 1993. Phonological awareness and knowledge of the names of letters appear to be highly correlated (Lonigan et al., 2009).

Many children who are blind or visually impaired may not be exposed to braille or print until they reach preschool or kindergarten (Hatton, Erickson, & Lee, 2010). By the time that most children who are sighted begin school, they can recognize approximately 15 print letters (Treiman & Rodriguez, 1999). In contrast, most preschool children who are blind or visually impaired know none (Barlow-Brown & Connelly, 2002). Because of its association with phonological awareness, the ability to recognize letters is critical.

Research regarding children who are sighted has suggested that phonological awareness develops along a continuum from awareness of large and concrete sound units to awareness of small and abstract sound units (Lonigan et al., 2009). Additionally, research has indicated that the phonological awareness development of children who are blind or visually impaired is similar to that of children who are sighted (Barlow-Brown & Connelly, 2002; Gillon & Young, 2002). The ability to name letters appears to be a prerequisite to phonological awareness in both groups.

In a 2010 study by Hatton et al., their purpose was to describe the phonological awareness skills of a sample of young children who were blind or visually impaired. Participants included 22 children (14 girls and 8 boys) who were blind or visually impaired, 4 to 7 years of age, with no additional disabilities, and who appeared to be developmentally functioning at their chronological age levels. They came from large metropolitan areas in two western states, a midsize city in a rural area in a southern state, and a large metropolitan area in a Midwestern state. None of the participants were able to read.

A limitation of the study was the small sample. The findings reported here provide a snapshot of phonological awareness in one small sample and may not be generalizable to the entire population of children who are blind or visually impaired (Hatton et al., 2010). Another limitation of the study is the difficulty in adequately assessing the functional vision and literacy media in young children with visual impairments (Hatton et al., 2010).

The findings of this study suggest that potential braille or dual-media readers had better syllable-segmentation, sound-isolation, and sound-segmentation skills than

potential readers of print (Hatton et al., 2010). Potential readers of print seemed to have slightly better letter-identification and letter-sound identification skills than potential readers of braille or dual media (Hatton et al., 2010). These findings are consistent with the results of studies of older children with visual impairments (Barlow-Brown & Connelly, 2002; Dodd & Conn, 2000; Gillon & Young, 2002).

It appears that children who are blind or visually impaired and who may be more attuned to auditory stimuli can sound out syllables without knowing letters (Hatton et al., 2010). Although the phonological awareness skills of students who are blind or visually impaired may be commensurate with those of students who are sighted, research has suggested that the reading rates, fluency, and comprehension of students who use large print and braille lag behind those of students who are sighted (Douglas, Grimley, Hill, Long, & Tobin, 2002; Greaney & Reason, 1999; Emerson, Holbrook, et al., 2009; Emerson, Sitar, et al., 2009).

Braille contractions represent morphological concepts and perhaps facilitate the acquisition of orthographic knowledge (Hatton et al., 2010). Orthographic knowledge may then be evident when writing contracted braille and not in uncontracted braille. The development of spelling skills is dependent significantly on memory. It is a language skill requiring the activation of memory (Larsen et al., 1999). For children who are sighted, the spelling process is connected to phonological awareness and closely related to reading development (Clark & Stoner, 2008). The importance of auditory skills and the ability to segment and recognize the phonemes in words, skills that are connected to auditory, not visual skills, have been the primary focus of research. Furthermore, little research has

investigated the motor component of writing as a factor in either aiding or hindering spelling ability (Hatton et al., 2010).

In a study by Clark and Stoner (2008), one participant was rated as a superior speller; three participants were found to be above-average spellers; 13 were found to be average spellers; and six participants were found to be below-average spellers (Clark & Stoner, 2008). Five students used uncontracted braille, and their spelling assessments were comparable to those of the 18 students who used contracted braille. Based on this small sample of five students, a determination could not be made if spelling errors varied because of the use of uncontracted braille. All 23 students who read braille had typical TWS-4 scores (Test of Written Spelling, 4th ed.) when spelling individual words, compared to the population who were sighted (Clark-Bischke & Stoner, 2009). Further investigation is warranted in this area. Clark and Stoner's findings support previous research by Hoehn (1966), Grenier and Giroux (1997), Dodd and Conn (2000), and Argyropoulos and Martos (2006). Given the research indicating spelling is largely dependent on phonemic awareness, children who are blind or visually impaired should not be at a disadvantage (Clark & Stoner, 2008).

In 2009, Clark-Bischke and Stoner examined the spelling skills in the written compositions of 20 students who read braille, offering further evidence that the skills of these students are similar to those of students who read print. The assessment of writing samples focus was on the number of words spelled correctly using an error analysis to describe patterns of spelling errors. The study investigated spelling in typical writing samples of the study participants. Although assessment of individual word spelling offers valuable insights into spelling skills, the ability to spell in compositions is a more useful

measure of spelling competence (Clark-Bischke & Stoner, 2009). The writing samples results revealed 18 of the 20 students spelled 70% or more words correctly, one at 100%, 11 at 90-99%, two at 80-89%, and four at 70-79% (Clark-Bischke & Stoner, 2009). Given the age range of the sample, data comparing students who are sighted with students who are blind or visually impaired does not exist. Nevertheless, the findings of this study appear to indicate that the results of the TWS-4, which found that the participants ranged from excellent to above-average spellers, hold true in writing (Clark-Bischke & Stoner, 2009).

Dodd and Conn (2000) conducted a study investigating the effect of braille orthography on the phonological awareness of students in the United Kingdom. Participants included 15 braille readers who were administered several literacy assessments, including an adapted version of the Schonell Graded Spelling Test. Results indicated that, with the exception of two participants, the spelling skills of the braille readers were within normal limits (Dodd & Conn, 2000). Gillon and Young (2002) assessed the braille reading and phonological awareness skills of 19 students who were blind or visually impaired. Finding a strong relationship between phonological awareness and braille reading accuracy and reading comprehension, they concluded the mutual interaction of phonological awareness and reading acquisition reported for children who were sighted also appears to be in evidence in braille reading.

Research regarding spelling skills has focused on print readers, and only a few studies have investigated the spelling skills of braille readers (Bailet, 2001; Blischak, Shah, Lombardino, & Chiarella, 2004; Moats, 2001; Richgels, 1995). Results from the few studies focused on spelling competence of braille readers indicate that these students'

spelling skills are similar to those of print readers when spelling individual words (Clark & Stoner, 2008; Dodd & Conn, 2000; Gillon & Young, 2002; Grenier & Giroux, 1997). Assessment of individual word spelling has a natural relevance deficiency because, outside of elementary school, persons are rarely asked to spell individual words in isolation; nevertheless, these assessments do hold some value (Tindal & Marston, 1990). Spelling individual words requires less cognitive involvement than when spelling in written compositions (Moats, 2001).

The relationship between phonological awareness and reading has received much attention (Laing & Hulme, 1999; Sodoro, Allinder, & Rankin-Erickson, 2002; Wagner & Torgesen, 1987). Phonology is the component of spoken language, particularly important in early reading development for alphabetic languages. Reading difficulties are strongly related with poor phonological awareness and may be the cause of some children's inability to read (Vellutino et al., 1996). It involves tasks enabling students to identify sounds in words, understand phonological similarities between words, and segment words into their individual sounds. Combining these skills with the ability to keep phonological information in working memory and to efficiently gain access to phonological information allows children to decode print.

Braille is based on alphabetic principles, and these same phonological awareness skills should allow children to decode braille, especially in the early stages of learning to read braille. Important for children who are braille readers is the understanding of skills that improve decoding because these children may not use a whole word reading strategy when reading, which young children who are sighted use (Pring, 1994). Contracted braille may also be enhanced by phonological awareness. Connected text using braille

contractions comprises many uncontracted braille components and, in a multi-syllabic word, part of the word may be decoded alphabetically with only part of the word using a contraction. Success in decoding regular components perhaps allows children the process ability needed to focus on braille contractions, and increases their speed and fluency when reading (Gillon & Young, 2002).

The relationship between phonological awareness and literacy exists in all alphabetic languages that have been examined (Anthony & Francis, 2005). Powerfully related to literacy is phonological awareness, the ability to determine the structure of oral language (Anthony & Francis, 2005). Contracted braille may pose a problem for students who are blind or visually impaired and use braille as their reading medium because braille is a combination of both an alphabetic and logographic system (Millar, 1997).

Monson and Bowen (2008) published a review of research concerning the development of phonological awareness by braille users. They determined that the relationship between phonological awareness and braille is uncertain due to the lack of commonality among the studies, the extent of contradictory findings, and the small sample of studies involving beginning braille readers. No single common theme among the 11 studies reviewed by Monson and Bowen was found. Several studies used the same assessments and examined similar aspects of braille and phonological awareness, such as Dodd and Conn (2000), Gillon and Young (2002), and Greaney and Reason (1999). Others used unique assessments to measure a single aspect of phonological awareness such as Pick, Thomas, and Pick (1966) and Wakefield, Homewood, and Taylor (2006).

Gillon and Young (2002) researched the phonological awareness skills of 19 New Zealand braille readers. They compared them to students of a reading-age and matched

control group of children who were print readers and three years younger. Children who experienced difficulty in reading braille were delayed in phonological awareness development and demonstrated strengths and weaknesses similar to those of the younger children who were sighted (Gillon & Young, 2002). At the time of the study, 23 school-aged children in New Zealand were blind and used only braille as their reading medium. Nineteen of the 23 children participated in the study, 11 boys and 8 girls, ranging in age from 7-15 years. Data results found a strong relationship between phonological awareness, braille reading accuracy, and reading comprehension (Gillon & Young, 2002). Those children reading well below their age level demonstrated delays in the ability to understand sound structure of spoken language at the phonemic level and to use phonological knowledge in the reading process. Additional data results at the group level indicated that participants showed a pattern of strength and weakness in their development of phonological awareness that can be predicted from developmental patterns of children who are sighted (Gillon & Young, 2002). The 12 children identified as poor readers demonstrated similar levels of phoneme awareness as children who were sighted, and were on average three years younger and demonstrated the same level of word-recognition ability.

Competence in naming braille words may later make possible the development of skills such as phoneme segmentation and phoneme manipulation (Gillin & Young, 2002). The good braille readers demonstrated standard scores within or above the average range for their ages on complex phonological tasks when compared to those of the children who were sighted. Results of this study indicate that the difficulties experienced by some children who are blind or visually impaired developing braille literacy is perhaps not

solely attributed to a sensory loss or learning environment (Gillon & Young, 2002). The poor readers in the study were younger and had less experience in mastering braille contractions. Perhaps a high level of automaticity in the use of braille contractions is necessary before positive influences from braille reading to the development of phonological awareness at the phoneme level can be sustained.

Instruction to strengthen young braille readers' phonological-awareness skills may significantly enhance these children's development of braille reading. In a case study, Young and Gillon (1998) demonstrated that an adapted version of a phonological-awareness program that had shown to be successful in enhancing word-recognition skills of poor readers who were sighted was also beneficial for an 11-year-child who was blind. Implementation of the training simultaneously occurred with the rapid development of the child's phonological-processing abilities and his braille reading. The significant gains were unexpected because, before the training, the student had severe phonological-processing deficits and an on-going difficulty in learning to read using braille. These findings support Adams' (1990) findings that children who are blind or visually impaired demonstrate proficiency in rime and syllable-awareness tasks and have difficulty with complex phoneme-analysis tasks. Adams (1990) proposes that there is a hierarchy of difficulties with phonological-awareness tasks. At a basic level, children are able to recognize rime patterns in words, followed by an awareness that words can be subdivided into smaller parts, such as syllables. Complex skills requiring conscious knowledge that words can be analyzed as a series of phonemes, and the ability to manipulate phonemes in words such as adding or deleting sounds in words, develop later.

Young and Gillon 's (1998) results support Pring's (1982) findings that the main information-processing tasks in reading are essentially the same, regardless of whether the input stimulus is visual or tactile. Pring determined that braille reading is influenced to some extent by the reader's ability to create a phonological representation of words from the tactile input. A level of phonological awareness may occur between the child feeling the braille cells and determining the meaning of the word. It has been determined that phonological-awareness skills assist in the phonological-determination process in children who are sighted; therefore, phonological awareness can assist children who are braille readers develop understanding of the connection between the tactile input for a word and its spoken representation. The interactive component between phonological awareness and reading development for children who are sighted appears to exist in braille reading (Bentin & Leshem, 1993).

Longitudinal and intervention studies concerning the development of phonological-awareness skills in children who are blind or visually impaired are needed to investigate the correlation between phonological awareness and braille reading. A comprehensive assessment of children's spoken language abilities, specifically phonological awareness, is necessary to ensure children who are blind or visually impaired have the needed awareness of spoken language on which to build knowledge of a written language system (Gillon & Young, 2002). Dodd and Conn's (2000) findings suggest that the use of braille contractions may influence the ability to segment words into phonemes. Little is known concerning the relationship between the development of spoken and written language among children who are blind or visually impaired (Gillon & Young, 2002). Dodd and Conn (2000) and Fellenius (1996) have called attention to the

need for investigation of linguistic factors that may be contributing factors to reading competence for children who are blind or visually impaired.

A linguistic basis may exist with students who have a severe visual impairment and struggle with reading for their lack of reading progress, along with any obstacles they may have to gaining access to print, posed by their visual impairment or blindness. Gillon and Young investigated this possibility in their 2002 study concerning the development of braille literacy. A historical perspective exists espousing that specific reading disabilities are associated with visual perceptual difficulties. Nonetheless, reading disorder is now defined as a language-based disorder, and the contribution of spoken language competencies to the reading process has been well documented (Vellutino, 1977; Wagner & Torgesen, 1987).

The close relationship between spoken and written language difficulties also holds for children with severe visual impairments (Fellenius, 1996). In Fellenius' study, two thirds of the 25 Swedish participants who were blind or visually impaired had poor or underdeveloped reading skills for their age. Data showed that their performance on verbal-cognitive tasks and motivation to read were more closely related to reading performance than to visual acuity, reading media, optical aids, or reading distance (Fellenius, 1996).

Pring (1994) worked with a five-year-old girl who was congenitally blind with no other physical, cognitive, or sensory disabilities. This study investigated measured rime, syllable and phoneme segmentation, phoneme identity, and nonword repetition. Data indicated that, for her age, she performed well on early developing phonological-awareness tasks such as rime production and syllable segmentation, as well as developing

knowledge at the phoneme level. However, she had difficulty with rime recognition. She was successful in learning to read and spell in braille, and her literacy skills were similar to those of children who are sighted at age seven.

In their 2000 study, Dodd and Conn compared 15 British children who were blind or visually impaired, ranging in age 7-12, with 15 chronologically age-matched children who were sighted on phonological awareness, reading, and spelling tasks. The children who were blind or visually impaired performed at a level below the children who were sighted on reading measures and had difficulty with complex phoneme-awareness and phonological-use tasks. Nevertheless, they performed at an age-appropriate level on a phoneme-deletion task and were competent spellers of real words. Both studies, Dodd and Conn (2000) and Pring (1994) revealed interesting structures in the phonological-awareness development in the children who were blind or visually impaired. There is a need for further research in the area of phonological-awareness skills of children who are blind or visually impaired and to gain better understanding of the relationship between their phonological-awareness and reading abilities (Gillon & Young, 2002).

Speed, Fluency, and Comprehension

Fluency encompasses the speed, accuracy and prosody (expression) utilized by readers when reading a text (Brummitt-Yale, 2014). Reading fluency is the ability to read phrases and sentences smoothly and quickly, understanding them as complete ideas (Logsdon, 2014). The reading process is automatic, with recognition of the overwhelming majority of words by sight with very little conscious decoding (Institute of Reading Development, 2017). A fluent reader reads smoothly, linking words together into meaningful phrases rather than reading word by word, focusing on the meaning of the

text, not the decoding processes. Pre-fluent or disfluent readers engage much of their conscious attention and cognitive ability to decode, and as a result, they have less available energy to focus on meaning (Institute of Reading Development, 2017). Usually measured through oral reading, fluency is not always considered important to silent, independent reading, and therefore is the most overlooked piece of the five essential components of reading. Nevertheless, fluency is an important part in a reader's ability to comprehend texts.

Multifaceted, fluency involves a reader's ability to use multiple skills simultaneously (Brummitt-Yale, 2014). It is important that readers are able to effectively decode, comprehend the individual words, and complete phrases and sentences being read. Decoding is the process in which a reader consciously uses phonics and other related skills to figure out the pronunciation of a word (Institute of Reading Development, 2017). When it is necessary for a reader to stop at every word, spending time trying to pronounce it or determine its meaning, the reader is not able to develop an overall understanding of the text. Prosody includes the emotion represented in reading, as well as the phrasing and reader's interpretation (Brummitt-Yale, 2014). Text loses much of its meaning when not read with expression. Prosody is very important to reading comprehension. Without really understanding what the words mean, a reader may be able to efficiently decode them; however, no engagement with the text on an emotional and personal level is occurring (Brummitt-Yale, 2014). Comprehension will follow when the reader can engage a text with appropriate expression, recognizing and replicating the writer's phrasing. Expression allows the reader to make the complex cognitive connections necessary for true reading comprehension.

Fluency is a precondition for comprehension (Institute of Reading Development 2017). Comprehension is not only a matter of connecting meaning to individual words and phrases. However, a skilled reader with strong comprehension skills engages in a number of cognitive processes that have been developed as a result of substantial independent reading along with instruction (Institute of Reading Development, 2017). These cognitive processes include: (a) following an action or thought sequence, (b) anticipation of outcomes, (c) visualization, (d) recognizing and synthesizing main events, and (e) distinguishing main ideas from supporting details (Institute of Reading Development, 2017).

Assessment designed to determine fluency needs to focus on all three components: speed, accuracy, and prosody (Brummitt-Yale, 2014). The most common measure for determining fluency is one that primarily assesses speed and accuracy. Without question, fluency is tied to decoding and reading comprehension, providing a bridge between decoding and comprehension (Brummitt-Yale, 2014). Fluency indicates a reader's ability to decode the words in a text. If the reader is able to quickly and accurately move through the words on the page, decoding skills are automatic, meaning that the reader should be able to accurately comprehend the text. Given that fluency is intertwined with decoding abilities, it fluctuates depending on the difficulty and complexity of the text being read (Brummitt-Yale, 2014).

In the elementary years, focus on fluency is important for development of reading skills of young children (Brummitt-Yale, 2014). When fluency is included in the reading education program, children in grades kindergarten through fourth grade show the greatest gains in fluency. Fluency provides the greatest impact on reading comprehension

(Brummitt-Yale, 2014). Children with high fluency rates tend to read more, remembering more of what they read because they are able to expend less cognitive energy on decoding individual words and integrating new information into their previous knowledge. In addition, fluency has positive effects on word-recognition skills as well. Inordinately slow, disfluent reading will lead to less reading, a major concern for all teachers. A slow reading rate, lacking flow or fluency indicates inefficient reading.

The component of a reading evaluation most easily measured conducted using braille is reading speed, often recorded in words per minute (wpm) (Laroche et al., 2012). Previous research indicates that the age at which braille is learned may affect the speed at which braille is processed (Mousty & Bertelson, 1985). Children taught braille before age 10 generally become faster readers. Slow readers read fewer words than readers who read at more customary rates, and are required to invest substantially more time and energy in their reading in order to keep up with classmates in the amount of reading needed in school. Research indicates that a relationship exists between reading rate, fluency, and self-selected reading in and out of school (Pinnell et al., 1995).

Fluency is one of the five components recognized by the National Reading Panel (2000). A fluent reader has: (a) automaticity, (b) speed — approximately 100 words per minute, (b) accuracy — approximately 95% and (d) prosody — the ability to express with feeling what is being read. Teachers recognize fluency when children read accurately at a normal rate of speed, observe punctuation marks, and use expression appropriate to the meaning of the text (Swenson, 2013). A disfluent reader (a) reads slowly, (b) cannot decode individual words, (c) cannot look at syllables, and (d) points at words while reading. Possible causes for a student to be a disfluent reader include a lack

of reading practice, often reading books that are too difficult or too easy, and teachers not allowing students to realize they have miss-pronounced words before correcting them.

A vital component of fluent reading is comprehension because without understanding, fluent sounding reading is word calling. The braille code adds an extra layer of complexity to the reading process; therefore, some braille readers may take longer to achieve fluency than their sighted peers who read print (Swenson, 2013). Results from the ABC Braille Study indicate that this lag is temporary, and most children who read braille master the code with relative ease, given appropriate instruction (Emerson, Holbrook, et al., 2009).

A correlation exists between fluency and comprehension for typically sighted children who read print (Marcell, 2011-12). All beginning readers initially read with their attention divided between decoding words and reading for meaning simultaneously (Clay, 1991). Students who are print readers often begin making the transition from phonetic decoding (sounding out most words) to automatic recognition of many whole words during their first-grade year (Steinman, LeJeune, & Kimbrough, 2006; Wormsley, 2006). By second grade, many students are able to read print fluently at their instructional level and devote the majority of their attention to the meaning of the text.

Beginning braille readers also read with their attention divided, but their thinking is divided in more ways than that of print readers (Swenson, 2013). They need to decode and read for comprehension, paying attention to the intricacies of the braille code when decoding, and think about their hand and finger movements as they track across lines of text. Children who are learning braille lack access to picture clues and may have limited background knowledge and concepts to aid in comprehension (Swenson, 2013). Because

of the increased cognitive load for beginning braille readers, the automatic recognition of words needed for fluency may occur somewhat later than for print readers. This is certainly not true for all young children who use braille.

The key to developing fluency is making sure children read and reread, until the symbols and rules of the braille code become automatic. Motivation and practice will lead not only to fluency, but to the more important goals of understanding and enjoyment. Fluency-building activities should be included in instruction for young braille readers from the very beginning, and maintaining high expectations for their progress in reading is of great importance (Swenson, 2013).

Fluent readers tend to be self-motivated, whereas less fluent readers are less likely to read in class or out of school. Fluency and reading quantity are cause and consequence of one another. Research has not empirically established the causal nature of this relationship, yet it is reasonable to assume that fluency in reading leads to greater reading, and greater reading leads to gains in fluency. Slow, disfluent reading is linked with poor comprehension and poor overall reading efficiency.

Research suggests that faster readers often have better comprehension over what is read and are more successful readers (Carver, 1990; Pinnell et al., 1995), and excessively slow reading leads to reading frustration. At the classroom instruction level, slow reading has negative consequences. One out of eight children professes never or hardly ever to read for fun (Pinnell et al., 1995). Without reading practice, their progress in reading will continue to decline.

Another consideration is that cognitive resources that could have been used for comprehension must be reallocated to word recognition, resulting in poor comprehension

(LaBerge & Samuels, 1974). Lack of attention to meaningful phrasing and syntax may also cause slow, disfluent reading. Phrasing and syntax are the ways words are organized in sentences within a passage, helping the reader construct the meaning of text (Schreiber, 1980). Development of word-recognition efficiency and assisting readers to develop awareness of the syntactic nature of the text will result in more efficient reading and improve reading rate and fluency.

The premise that braille reading speed can improve with specific instruction is research sound (Crandell & Wallace, 1974; Lorimer, 1990; McBride, 1974; Olson, 1977). A good braille reader is capable of reading 250 words per minute, and a proficient braille reader is able to read 400 words per minute (Ferguson, 2001). Although a certain level of reading speed is needed to perform specific tasks, research offers evidence indicating that faster braille reading by itself is not associated with increased comprehension or pleasure in reading (Trent & Truan, 1997).

Rasinski's 2000 study of children who are print readers indicates that comprehension, enjoyment, and success are impacted by speed. Children of all ages who struggle to progress in literacy development attend a university diagnostic reading clinic where Rasinski is the director. Students attend for the purpose of identification of the cause for the reading conflict, and recommendations and implementation of instructional interventions for improvement. The children who attend the clinic often possess exceptional strengths such as excellent vocabularies and knowledge of word meaning. Few errors in word recognition, high levels of comprehension, even with a large number of uncorrected word recognition errors during oral reading is often observed in children's reading. Slow, disfluent, inefficient reading is a frequent indication of reading problems.

In some instances, sufficient comprehension of a passage may occur; nevertheless, reading is often characterized by slow, labored, inexpressive, and unenthusiastic reading of the same passage.

Children are initially asked to read a passage at their assigned grade level and one below. Reading rate can be a tool for assessing students' performance (Rasinski, 2000). Often, data results of the informal reading inventory may indicate student comprehension and word recognition are, on average, at their frustration level and are near the cusp for instructional-level reading (Rasinski, 2000). The significance of this finding is that, while comprehension and word recognition were poor, little improvement was needed to move their performance to an instructional level. In spite of this, the data indicated problems with reading rate. Students identified by teachers as struggling readers read passages at their grade level, reading at a rate that was approximately 60% of their instructional-level reading rate. When reading a passage below their grade level, the rate was 50% (Rasinski, 1999), indicating that reading rate or speed was a significant factor in classroom teachers' perceptions of their students' proficiency or lack of proficiency in reading.

A study conducted by Laroche et al. (2012) involving French braille readers was designed to address three hypotheses:

1. The reading speed of French braille readers and French print readers will be faster when reading silently. This gain in speed will be larger for print readers.
2. Individuals who were taught braille before age 10 will display faster reading speeds with lower error rates than will those who were taught braille after age 10.

3. Braille readers who use a two-handed scissor pattern will demonstrate faster reading rates than those who do not, when reading silently.

Participants were older than 15 years old, French speaking, used braille as the primary method of reading for at least three years without print materials, and had completed or were attending a postsecondary educational institution or a high school. A control group participated in the study, consisting of 30 braille readers and 10 print readers, stratified to match on age, gender, and level of education. The braille readers were 15 men and 15 women, ranging in age from 18 to 67. The print readers were 5 men and 5 women ranging in age from 22 to 57. The educational levels were high school (6 braille readers and 2 print readers), college (8 braille readers and 3 print readers), and university (16 braille readers and 5 print readers).

Results indicated that, among the French braille-reading participants, the development of braille before age 10 facilitated faster reading speeds. Readers who used the scissor pattern to read braille were generally able to read faster (Laroche et al., 2012). The instruction of braille, whether in French or in any other language, may best be served by focusing on teaching young readers and writers the most efficient techniques while instilling a desire for reading. Braille should continuously be seen as a written form of communication that needs to be cultivated, even though it takes time and effort (Laroche et al., 2012).

A predictor often used for overall literacy achievement is reading fluency (Hasbrouck & Tindal, 2006; Wormsley, 1996), including reading rate, accuracy, and prosody. Fluency has been shown to have an entwined relationship with comprehension (Hasbrouck & Tindal, 2006; Pikulski & Chard, 2005).

Savaiano and Hatton (2013) conducted a study investigating the effect of repeated reading on reading speed and comprehension. The researchers sought to determine whether children who were blind or visually impaired and who receive repeated reading instruction demonstrated an increase in their oral reading rate and comprehension, and a decrease in oral reading error rates. They employed a single-subject, changing-criterion design with three participants to demonstrate the association between a repeated reading intervention and the oral reading rate, comprehension, and error rate. Data results indicated a functional relationship between repeated reading and oral reading rate for two participants, and a functional relationship between repeated reading and comprehension for all participants (Savaiano & Hatton, 2013). A functional relationship between repeated oral reading and error rate was not identified. Based on these results, repeated reading appears to be an effective practice for the development of oral reading rate and comprehension for some students who are blind or visually impaired (Savaiano & Hatton, 2013).

In their 1999 study, Carreiras and Álvarez explored the comprehension processes involved in reading braille, finding some processes are similar to that of reading printed text. The researchers aimed to determine whether the type of evidence of on-line processing found with visual material could also be obtained with braille to estimate the cognitive load associated with word-level, sentence-level, and text-level processes in braille word-reading times. Participants included 26 students ranging in age from14-18 who were congenitally blind with no additional disabilities, and teachers of the Luis Braille High School of Seville Spain who had been braille readers for at least seven years. The researchers concluded that participants in the study did not demonstrate awareness to

sublexical variables or to most variables assumed to be related to integration processes (Carreiras & Álvarez, 1999). Data resulting from the study suggest that braille readers are, to some extent, aware of differences in the cognitive demands imposed by different linguistic structures in reading comprehension (Carreiras & Álvarez, 1999), appearing to adapt processing strategies to meet the cognitive demands of a situation, as happens in print reading (Calvo & Carreiras, 1993; Haberlandt & Graesser, 1985; Just & Carpenter, 1980; de Vega, Carreiras, Gutierrez, & Alonso, 1990).

Word-level predictor variables, such as word length, frequency, repetition, and polysemia, (several meanings) had reliable effects on word-reading times. The impact of these relevant variables on reading times indicates that long, infrequent words are harder to read. The more meanings a word has and the more times it appears in the text, the less time it takes to recognize and read the word. These results indicate print and braille reading are similar at the level of word processing (Carreiras & Álvarez, 1999). An important difference in regard to sublexical processes does exist. Graphemic frequency was not reliable, and it is too early to draw clear conclusion from this result, but the role of sublexical units (syllables, morphemes, and neighbors) in braille reading should be investigated. When designing strategies and methods of learning to read braille, it is important to know whether sublexical units are relevant for braille reading. At the sentence level, the data results indicate that words at the beginning and end of a clause both, had a moderate impact on reading times, with some integration of information occurring at the end and beginning of clauses (Carreiras & Álvarez, 1999). Results of this study indicate that there are both similarities and important differences between braille

reading and print reading that future research should explore in more detail (Carreiras & Álvarez, 1999).

Complex cognitive activities are involved when reading braille or print (Carreiras & Álvarez 1999). Braille is the primary medium of written communication for people who are blind or visually impaired; nevertheless, little focus has been devoted to the cognitive processes involved in reading braille. When comparing braille to print, braille comprises a number of unique and important features. One notable difference between braille and print reading is the timing of the input, having a more serial character than does print reading (Carreiras & Álvarez, 1999). Print reading simultaneously affords available a window of text with each successive view, and this is not the case for braille reading. Important to consider is whether the serial character of the braille input has any differential consequences for processing compared to print reading. Braille reading imposes some specific constraints on higher levels of processing. When readers read print, they use information from different levels of text in order to form cognitive representations of the major ideas and relationships expressed by the text, encoding words, interpreting groups of words, integrating new information with previous information, and deriving some abstract meaning of the entire text (Carreiras & Álvarez, 1999).

Summary

Daily instruction ranging from one to two hours is critical for the development of braille literacy skills (Koenig & Holbrook, 2000a; Corn & Koenig, 2002). Consistent, well-designed reading instruction in braille is associated with the development of proficient literacy skills in children who are blind or visually impaired (Emerson, Sitar, et

al., 2009). Children who are blind or visually impaired are a low-incidence population representing a small group within the population of children with disabilities, and have diverse and unique needs resulting from challenges in accessing the visual environment (Council for Exceptional Children, 2003).

Diligent and sustained research is needed to provide an empirical base for the understanding of the components of literacy for children who are blind or visually impaired (Koenig, 1996). Data driven research pertaining to reading rates and achievement is needed to make effective instructional decisions. In 2012, estimates from the Bureau of Labor Statistics' national labor force data indicate that fewer than one million people who are blind or visually impaired were employed, compared to more than 142 million people without visual impairment who were employed (McDonnall, O'Mally, & Crudden, 2014). The researchers were unavailable to explain how many individuals were of working age. However, this statistic is noteworthy in regards to future employment. Further research is needed regarding possible correlation between employment and braille literacy.

There is something magical about how marks on a page can become such a source of pleasure and delight (Institute of Reading Development, 2017).

CHAPTER III
METHODOLOGY

Introduction

What is research? Research is a systematic investigation into and study of data and sources with the purpose of establishing facts and reaching new conclusions. Gay, Mills, and Airasian (2009) define educational research as the formal and systematic application of the scientific method to the study of educational phenomena. What are data? Data are the facts and statistics that are collected for reference or analysis. Gay et al. (2009) define data as pieces of information. Data is valid information that assists a researcher in answering his or her questions. It comes from many different sources such as notes, observations, interviews, newspaper clippings, journals, and surveys/ questionnaires (O'Connor & Gibbson, 2003). I have not found evidence of parallel studies examining the commonalities among fluent braille readers who possess comprehensive braille literacy skills in grades 10-11 in a Southwestern state in the United States.

Research Question

The purpose of this dissertation study was to identify and compare commonalities among four students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills. I sought to determine what academic factors, personal and/or family dynamics, and environmental or social components influence the learning of braille for a student who is blind or visually impaired. By means of qualitative data collection and analysis, I identified the common factors in the braille literacy education of the four students.

Strategy and Rationale

Early designs of research emerged in the natural sciences such as biology, chemistry, physics, and geology. Researchers sought to observe and measure to gain understanding (University of Surrey, n.d.). Quantitative research focuses on objective observations and measurements that can be repeated by other researchers. With the development of social sciences such as psychology, sociology, anthropology, etc., researchers were interested in the study of human behavior and the social world. The social sciences found difficulty measuring human behavior using quantitative methods; hence, qualitative research methods were developed, focusing on the why of a given phenomenon, attempting further understanding and deeper insight into the social world (University of Surrey, n.d.).

Qualitative research explores the quality of things through the use of words, images, and descriptions (Berg, 2009), attempting to answer questions based on the perceptions of personal experiences, referring to meaning, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. Qualitative research seeks to examine the why, how, and where that a given phenomenon occurs or evolves. Qualitative methods are concerned with meaning (Oconnor & Gibbson, 2003). This methodology (a) is concerned with opinions, feelings and experiences; (b) describes social phenomena occurring naturally, seeking to understand and describe; (c) utilizes a holistic approach rather than looking at a set of variables; (d) utilizes rich data to help develop concepts and theories that aid in the understanding of the social world, which is an inductive approach to the development of theory, rather than a deductive approach;

and (e) utilizes data collected through direct encounters, by means of interviews or observations, and can be time consuming (University of Surrey, n.d.).

A wide range of techniques and philosophies fall under this methodology, allowing the researcher to probe a person's individual experiences in detail using a specific set of research techniques such as in-depth interviews, focus group discussions, observation, content analysis, visual methods, and life histories or biographies (Hennink, Hutter, & Bailey, 2011). A wide range of approaches is linked to varying beliefs about what there is to know about the social world and how to find out about it (Snape & Spencer, 2003). Qualitative research seeks to gain a better understanding of people and their life situations through first-hand experience, truthful reporting, and authentic conversations (Saint-Germain, 1998). This method focuses on the development of explanations of social phenomena in the world in which we live, why things are the way they are, looking into social aspects of our world (University of Surrey, n.d.). Qualitative research strives to answer questions about why people behave the way they do, delving into opinions and how attitudes are formed.

Researchers observe how people are affected by events occurring around them, how and why cultures have developed, and differences between social groups (University of Surrey, n.d.). This methodology is not concerned with treatments, manipulation of variables, or imposing the researcher's operational definitions of variables on the participants (Saint-Germain, 1998). Allowing the emergence of meaning from participants, the flexibility and adjustment to specific settings, concepts, data-collection tools, and data-collection methods may be adjusted as the research progresses (Saint-Germain, 1998).

A distinctive feature of qualitative research is an interpretive approach, providing the opportunity to view and experience issues from the personal perspective of study participants and to understand meanings and interpretations that they give to experience, events, or objects (Saint-Germain, 1998). Qualitative research seeks to embrace and understand contextual influences on the issues being researched involving an interpretive naturalistic approach to the world (Denzin & Lincoln, 2008). This research methodology is interested in analyzing personal meaning or social issues, events, or practices by collecting non-standardized data and analyzing texts and images rather than numbers and statistics (Flick, 2009). Behaviors often taken for granted can be investigated through qualitative research, opening the way to new possibilities (Silverman, 2007).

Qualitative research places the researcher in the world, using a set of interpretive practices, making the world visible, turning the world into a series of representations including field notes, interviews, conversations, photographs, recordings, and memos to the self (Snape & Spencer, 2003). At this level, qualitative research involves interpretive, naturalistic approaches to the world. Researchers study situations in a natural environment attempting to make sense of, or interpret, the situation in terms of the meanings that persons bring to them (Denzin & Lincoln, 2000).

Definitions of qualitative research may vary; nevertheless, the purpose of qualitative research is generally directed toward providing an extensive and interpreted understanding of the social world, achieved by learning about a person's social and material circumstances, their experiences, perspectives, and histories (Snape & Spencer, 2003). A consensus exists that qualitative research is a natural, interpretative approach concerned with understanding the meanings that people attach to circumstances within

their social worlds. A person's understanding and interpretation of his or her social reality is one of the central designs of qualitative research (Bryman, 1988).

Key features of qualitative research include (a) overall research view and importance of the participants' perspective, (b) flexibility of research design, (c) volume and richness of the qualitative data, (d) distinctive approaches to analysis and interpretation, and (e) types of outputs gained from qualitative research (Snape & Spencer, 2003). Certain data-collection methodologies have been identified with qualitative research such as observational methods, in-depth interviewing, group discussions, narratives, and the analysis of documentary evidence. A qualitative approach was best suited for this study, allowing me to draw conclusions gained from the perspectives of four students in grades 10-11 in a Southwestern state in the United States, who are blind or visually impaired, regarding the why and how they have developed comprehensive braille literacy skills. This qualitative study was student-participant oriented; quantitative methods were not employed in the data analysis (Glaser, 1992). However, words per minute were reported as part of comprehensive literacy confirmation. The nature of qualitative research involves the perceptions and interpretations of participants, providing me with rich data found in the perceptions and interpretations of the four students regarding their braille literacy skills. I am a TVI who is blind and have a background in braille literacy, and I continuously monitored my reactions in order to not influence student-participant responses (Wilson, 1977).

Grounded theory was employed to conduct the data analysis for this study because it allows variation and gave me the flexibility to modify the analyses as data collection progressed or as situations changed. This methodology was developed by

American sociologists Glaser and Strauss in 1967, when they were researching the Awareness of Dying. Hence, grounded theory has its conception in sociology (Offredy & Vickers, 2010). Glaser and Strauss adopted an investigative research method with no preconceived hypothesis, continually comparing data and analysis, resulting in theory truly grounded in the data (Ke & Wenglensky, 2010). The combination of rigor and flexibility in this approach resulted in the development of a new qualitative methodology (Hutchinson, 1986). The driving force behind the new methodology grew from dissatisfaction with existing sociological theories and research practice (Hutchinson, 1986). Grand theories were generated from purposeless speculation, not from data, and researchers who generated grand theories were not interested enough in research to test them (Glaser & Strauss, 1967). The existing sociological research focused on testing and retesting these theories; however, middle-range or substantive theories that explained a specific area of empirical inquiry would be more useful (Glaser & Strauss, 1967). This approach allows variation, provides flexibility to the researcher, and, as the data is collected, allows for modification of analysis (Hutchinson, 1986).

The philosophical foundation of grounded theory is found in the work of George Herbert Mead, an American pragmatist. Its sociological foundation is found in the work of Herbert Blumer and symbolic interactionism (Lewis & Smith, 1980). Symbolic interactionists believe people interact with each other through meaningful symbols, and meanings evolve over time from social interactions; whereas, positivists view the world as available for study in a more or less static form. Symbolic interactionists propose that humans are not waiting for scientific study; it is socially and symbolically constructed,

emerging, and relative to other facts of social life (Lewis & Smith, 1980). The symbolic interactionists' philosophy is reflected in each step of grounded-theory.

According to Creswell (2008), grounded theory is "a qualitative strategy of inquiry in which the researcher derives a general, abstract theory of process, action, or interaction grounded in the views of participants in a study" (pp. 13 & 229). A grounded-theory approach involves multiple stages of data collection, refinement, and interrelationships of categories of information (Charmaz, 2006; Strauss and Corbin, 1998). Another definition of grounded theory is "a systematic qualitative research methodology in the social sciences emphasizing generation of theory from data in the process of conducting research" (Martin et al., 1986, p. 141). This approach is a qualitative research method using a systematic set of steps to develop an inductively derived theory about a phenomenon (Strauss and Corbin, 1998). Grounded-theory methodology has been a significant component to the development of qualitative research as an approach, an alternative to other forms of social research, providing several tools for conducting qualitative research analysis (Flick, 2009). This qualitative method is often used in educational and social research (Glaser & Strauss, 1967).

The purpose of a grounded-theory approach is to develop or discover a theory inductively derived from the study of the phenomena (Offredy & Vickers, 2010). The theory is discovered, developed, and provisionally verified through systematic data collection and analysis pertaining to that situation (Offredy & Vickers, 2010). This approach is utilized to develop theoretical ideas beginning with data collection and a specific highly-developed, rigorous set of procedures used to produce formal meaningful theory of social phenomena (Schwandt, 2001).

Grounded theory is grounded in the data, allowing the analysis of qualitative data, simultaneously employing techniques of induction, deduction, and verification so that theory may be developed, generating insights and hypotheses (Schwandt, 2001). Questions are formed and pursued through further data development. This process requires concept-indicator analysis, resulting in constant comparison (Schwandt, 2001). Concepts of a grounded-theory approach include categories, codes, and codings (Offredy & Vickers, 2010).

Miles and Huberman (1994) propose that coding is analysis. In qualitative inquiry, a code is most often a word or short phrase that symbolically assigns a summative notable essence, capturing a portion of language-based or visual data, (Saldana, 2009). During the first cycle of coding, data can range from a word to a complete sentence to an entire page of text, (Saldana, 2009). The second cycle of coding may produce the same units, longer passages of text, or a reconfiguration of existing codes. A code can summarize or condense data, not just reduce it. Coding is not an exact science but primarily an instinctive act (Saldana, 2009).

The research basis of grounded theory is neither inductive nor deductive. Instead, it combines both, leading to research practice where data sampling, data analysis, and theory development are not seen as distinct and separate stages, but as different steps to be repeated until it is possible to describe and explain the phenomenon being researched (Offredy & Vickers, 2010). Evidence from data such as actions and observed events, recorded, or described in documents in the words of participants, are compared, looking for similarities and differences (Schwandt, 2001). Identification of underlying consistencies in indicators produce coded categories or concepts. Concepts are compared

with verifiable indicators and with each other to clarify the definition of the concept and to define its components (Schwandt, 2001).

Theory develops from possible relationships among concepts and sets of concepts, and tentative theories or theoretical propositions are developed by exploring additional data. Therefore, theoretical sampling guides the testing of the emergent theory. Theoretical sampling is the sampling of additional incidents, events, activities, and populations that are directed by the evolving theoretical constructs (Schwandt, 2001). Comparison between the theoretical constructs and additional empirical indicators continue until theoretical saturation is reached. Saturation is the forming of concepts, comparing incidents yielding different components of the pattern, until no new components of the pattern emerge (Glaser, 2001).

Hood's (2007) key components of grounded-theory methodology include (a) a spiral of cycles including data collection, coding, analysis, writing, design, theoretical categorization, and data collection; (b) constant relative analysis of cases with each other and to theoretical categories throughout each cycle; (c) a sampling process based on categories that are developed from ongoing data analysis; (d) sample size determined by saturation of categories, not by the need for demographic representation or lack of new information from new cases; (e) resulting theory that is data driven and reached inductively, although the developing theory is continuously refined and checked by data; (f) codes developed from data not by priority; and (g) the substantive final theory presented in the final results takes into account all variations in the data and conditions associated with these variations. Grounded-theory research strives to cut across set models, breaking with tradition, going beyond existing theories and preconceived

conceptual frameworks in search of new understandings of social processes in natural settings (Stern, Allen, & Moxley 1982).

Fundamental to a grounded-theory approach is the initial discovery of the world through the perspective of participants and the basic social processes or structures that organize that world (Hutchinson, 1986). The resulting theory allows the researcher to understand the social situations from which the theory was developed. Essential to grounded-theory methodology in qualitative research are a focus on context, lived experience, patterns of experience, and judging or appraising (Sherman, Webb, & Andrews, 1984). Grounded-theory studies evolve from questions asked by researchers about people in specific situations (Hutchinson, 1986). Grounded theory allows variation with flexibility and modification of analyses as data is collected or as conditions change. This flexibility will be necessary when working with four students in grades 10-11 in a Southwestern state in the United States.

Grounded theory is comprised of four components: fit, work, relevance, and modifiability (Denzin & Lincoln 2003; Glaser, 1992). The fit between initial research interest and emerging data is evaluated (Charmaz, 2006). Fit refers to how the foundational category, as well as its categories and dimensions, have sufficiently conveyed the pattern in the data (Birks & Mills, 2011). Preconceived ideas and theories are not forced upon the data. Leads generated from the data are followed, or another form of collecting data is designed to pursue initial interests (Charmaz, 2006). Insufficient attention to data-collection methods may result in the forcing of data in unwanted directions and possible repetition (Charmaz, 2006).

Relevance is established when grounded theory fits and works. The criterion of modifiability is met if it can change as new data or new categories emerge (Glaser, 1992). Therefore, this methodology within qualitative research allowed me to tentatively generate theory regarding the identification and comparison of commonalities among the participants.

Strengths and Limitations of Qualitative Research and Grounded Theory

Qualitative research affords the opportunity to add new pieces to the research or produce entirely new questions while gathering data, even late in the analysis (Birks & Mills, 2011). The flexibility of qualitative research allows the researcher to follow emerging leads. Additionally, a benefit of qualitative approach is the richness and depth of information, providing insight into the phenomenon being studied (University of Surrey, n.d.).

The flexibility afforded through qualitative-research methodology is increased through grounded-theory methods, simultaneously allowing for greater focus than many other methods allow (Birks & Mills, 2011). A strength of grounded theory is that this methodology presents a single, unified, systematic method of analysis (Denzin & Lincoln, 2000). There is a limited possibility of researcher bias. Researcher bias is less likely to affect the outcome of this study because theory is developed after gathering data (Boyd, n.d.). When researchers begin a study with a preconceived hypothesis, they may unintentionally try to fit the data or change the outcome of a study (Boyd, n.d.).

Another strength of a grounded-theory approach is the possibility of richer, more diverse results than can be achieved through other research methodology, and more likeliness to highlight the various elements coming into play (Boyd, n.d.). A clear focus

on what is occurring in the data is quickened through grounded theory without sacrificing detail. Children who are blind or visually impaired are a low-incidence population; and therefore, studies concerning their education historically include small samples. Small samples do not pose problems with this approach because the goal of this methodology is to develop concept categories, driving data collection to focus on components of a category and relationships between categories (Birks & Mills, 2011). This methodology has the advantage of yielding precise guidelines, directing the researcher in how to proceed (Charmaz, 2006). The characteristic of logic with the potential to reach across substantive areas into the domain of formal theory, generating abstract concepts and specifying relationships between them to understand problems in multiple substantive areas is another advantage of grounded theory (Charmaz, 2006).

Additionally, learning about gaps within data from the earliest stages of research will allow the researcher to locate sources of needed data and gather them is another benefit of grounded-theory methodology (Charmaz, 2006). Charmaz (2006) states that careful coding will assist the researcher to refrain from imputing personal motives, fears, or unresolved personal issues into the data. The grounded-theory categories provide a focus for the readers on the study topic, directing them through the analysis, and allowing the researcher to convey results, foreshadowing content, and emphasizing the logic of the piece, involving readers much more than findings or analysis of data (Birks & Mills, 2011). Ke & Wenglensky (2010) share the following as strengths of Grounded-Theory: it is an effective approach to build new theories and understand new phenomena; the high quality of the emergent theory; emergent research design reflects the particular nature of the study; results and methods are always refined and negotiated; this methodology

requires detailed and systematic steps for data collection analysis and theorizing; a resulting theory and hypotheses help generate future research into the phenomenon; the researcher must be open minded, and able to look at the data in different ways; data collection occurs over time, at many levels, ensuring meaningful results. Grounded-theory methodology has been well documented and used systematically by researchers since the 1960s (Strauss & Corbin, 1998).

A limitation of a grounded-theory approach is that data can be broken down into finite patterns comprising labels within labels, causing the data to lose validity or substance (Charmaz, 2006). The researcher is not certain what the resulting theory will comprise; therefore, it is necessary to gather a range of information. Sorting through data and analysis may be time consuming (Boyd, n.d.).

This dynamic framework provided me with greater advantages over more rigid approaches when investigating the unique literacy needs of students who are blind or visually impaired concerning their development of comprehensive braille literacy skills (Birks & Mills, 2011).

Context of the Study

The purpose of this study was to identify and compare commonalities among four students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills. This study was conducted using an e-mail inclusion criterion questionnaire, semi-structured interviews, and direct observations. Due to the difficulty in obtaining entry into public and residential schools, the interviews, literacy evaluations, and direct observations were conducted at student homes with parental consent, a public library, and an Educational Service Center in the Southwestern region

of the United States. Avoiding an academic setting, I hoped to put students at ease allowing them to speak freely concerning their literacy experiences. The Service Center, as well as student homes and the public library, provided a neutral environment where students felt secure to speak freely. I hoped that the participants thoughtfully considered the questions I asked regarding their braille literacy experiences and provided thoughtful answers to the questions posed to them.

Data Sources

Purposive sampling is used by researchers to ensure that individuals who participate in a study possess certain characteristics pertinent to the study, resulting in information-rich data (Berg, 1995; Orcher, 2005). This study included four students in grades 10-11 in a Southwestern state in the United States. Participation in this study was delimited to students who (a) were in grades 9-12 in a Southwestern state in the United States, (b) possessed comprehensive braille literacy skills as measured by the Academic Section of *The Assessment of Braille Literacy Skills (ABLS*) (Koenig & Farrenkopf, 2004) and *The John's Basic Reading Inventory (BRI)* (Johns, 2008), (c) were English language braille users, and (d) had no additional disabilities other than blindness or visual impairment. The *ABLS* measures emergent literacy, academic literacy, and functional literacy. For the purpose of this study, the Academic Literacy section was utilized. Additionally, the grade-appropriate comprehension sections of the *BRI* were utilized.

A strength of the *ABLS* is the design and the transferability from grade to grade. An additional strength is the year-to-year measurement of braille literacy skills in independent participation in school work, personal use, and daily living skills. For the purpose of this study, cumulative information was not used. Its weakness is the lack of

background information available to me. The *BRI* is an informal reading inventory utilized by educators to determine student instructional, independent, and frustration reading levels and listening levels based on speed, accuracy, and comprehension. Data gained is a piece of the assessment process to determine the most effective literacy modalities for students with visual impairments (Cushman, 2015). The strength of this assessment tool is the wide range of information it can provide. For the purpose of this study, the comprehension section was used. A weakness of this instrument is that it is not specifically designed for braille readers.

Children who are blind or visually impaired are a low-incidence population representing a small group of children with disabilities. Therefore, studies concerning their education historically include small samples. Bigelow (1987) investigated the relationship between the development of object permanence and early words with 3 participants. Troughton (1992) conducted a pilot study documenting the impact of teaching uncontracted braille to beginning braille readers identified as a small sample. Pring (1994) worked with a 5-year-old girl who was congenitally blind with no other physical, cognitive, or sensory disabilities, investigating measured rime, syllable, and phoneme segmentation, phoneme identity, and non-word repetition. Crocker and Orr (1996) inquired into social behaviors of children who were blind or visually impaired in different preschool settings (9 participants who were blind, and 9 who were sighted). A case study by Young and Gillon (1998) demonstrated that an adapted version of a phonological-awareness program that had been successful in enhancing word-recognition skills of poor readers who were sighted was also beneficial for an 11-year-child who was blind. Dodd and Conn (2000) conducted a study with 15 participants, investigating the

effect of braille orthography on phonological awareness. Gillon and Young (2002) researched the phonological-awareness skills of 19 New Zealand braille readers. Savaiano and Hatton (2013) employed a single-subject, changing-criterion design with three participants, investigating the effect of repeated reading on reading speed and comprehension.

Participants and gatekeepers were recruited for this study by way of the Association for Education and Rehabilitation of the Blind and Visually Impaired (AER) list serve and from an Education Service Center's visual impairment consultant's e-mail lists from the Southwestern region of the United States.

Data Collection

In order to increase trustworthiness and allow triangulation, four data-collection strategies were employed (Glesne, 1999): an inclusion criterion questionnaire, literacy evaluations, semi-structured interviews, and direct observations.

The first data collection tool was an e-mail inclusion criterion questionnaire. This tool was used as a screening instrument as well as a data source in the format of a questionnaire. A questionnaire is a research tool that allows a researcher to look at a clearly defined situation and gather data concerned with specific information from a number of participants (Wedding, 1997). Careful analysis and interpretation of the data is made by the researcher to identify and report the findings (Best & Kahn, 1989). This data-collection method is an easy, quick, and inexpensive way of gathering initial data in a short period of time.

Strengths and Limitations in the Use of Questionnaires

A researcher embarking on a qualitative study may find the use of questionnaires practical, as large amounts of data can be collected from a large number of people in a relatively short period of time and at a relatively cost-effective manner (University of Surrey, n.d.). A questionnaire can be administered by the researcher or by any number of people, causing minimal affect to validity and reliability (University of Surrey, n.d.). Questionnaire results can be quickly and easily analyzed by either a researcher or through the use of a software package. These results can be analyzed more objectively than other forms of research (University of Surrey, n.d.).

A limitation of questionnaires found by researchers embarking on a qualitative study may be found in the belief that questionnaires are inadequate when attempting to understand some data, such as changes of emotions, behavior, feelings, etc. (University of Surrey, n.d.). Another limitation is the limited amount of information obtained without explanation. A researcher cannot be certain how truthful a respondent is when answering a questionnaire or how much thought was put into the response. A respondent may be forgetful or not be thinking within the full context of the situation (University of Surrey, n.d.). Different respondents may read questions differently and reply based on their own interpretation of the question. Therefore, a level of subjectivity that is not acknowledged may exist (University of Surrey, n.d.).

When developing the questionnaire, the researcher makes decisions and assumptions regarding what is and is not important, possibly missing something that may be important, resulting in research imposition. The researcher must plan each question with great care. Questions need to be appropriate, avoiding such questions that may be

subjective and thus creating problems with validity. When analyzing data gathered from questionnaires, the researcher should be aware that questionnaires do not provide direct answers to research questions (Alreck & Settle, 1995). Therefore, continued research is necessary to answer the research questions.

The inclusion criterion questionnaire was completed by gatekeepers answering questions pertaining to the students they had identified to meet my criteria. This questionnaire provided information such as grade, date of birth, and literacy skills. When composing questions, I developed precise questions focused on basic student demographics and literacy. These questions were brief and to the point, as long questions might have been difficult to understand, and therefore, might not have yielded the desired information. Vocabulary familiar to the gatekeepers was employed, with simple sentences and short phrases in an attempt to reduce possible confusion (Alreck & Settle, 1995).

Semi-structured Interviews

Participants were asked to take part in semi-structured interviews. Qualitative interviews should be fairly informal, allowing the participants to feel that they are taking part in a conversation or discussion rather than in a formal question and answer session (University of Surrey, n.d.). Interviews are conversations with a purpose (Berg, 1995).

Semi-structured interviews, sometimes known as focused interviews, involve a series of open-ended questions based on the areas the researcher wants to address (University of Surrey, n.d.). The researcher asks a series of broad questions and may have some prompts to assist the interviewee. Defining the experience under investigation is the nature of the open-ended questions, simultaneously providing opportunities for both

interviewer and interviewee to discuss some aspects of the topic in more detail (University of Surrey, n.d.). A semi-structured interview allows the researcher to prompt or encourage the participant when probing for more information or when the participant offers interesting information, giving the researcher the flexibility to probe for more elaborate information or to follow a new line of inquiry introduced by what the participant has said (University of Surrey, n.d.). A semi-structured interview works best when the researcher has a number of areas that need to be addressed. In this study, I sought answers to the research question, with flexibility for additional inquiry.

The purpose of the semi-structured interviews conducted as part of the data collection was to discover with detail the commonalities among four students in grades 10-11 in a Southwestern state in the United States who possess comprehensive braille literacy skills. I developed a set of predetermined questions prior to the interview that I asked all participants. I had the flexibility to digress or explore in-depth if something of value to the study had arisen within the answers of the participants. These predetermined questions were formulated using vocabulary familiar to the participants, and at an appropriate grade level, allowing them to answer with ease and with little clarification from me.

When comprising interview questions, Berg (1998) recommends that the researcher begin with topics believed to be important to the study. Following this, specific questions related to each topic are developed. In order to insure validity and reliability, the researcher needs to clearly communicate what is being asked through the questions (University of Surrey, n.d.). Therefore, the order, vocabulary, and style of the questions must be clearly designed for the participants. When composing questions,

words that will elicit a strong and definitive answer should be used. Social issues such as cultural differences, which may have an impact on the importance of literacy, should also be considered by the researcher when formulating questions (University of Surrey, n.d.). Berg (1998) advises that it is important not to ask complex questions because questions that are too long may not be heard in their entirety, resulting in a less than desirable response. In order to be concise, the researcher should not ask questions that will elicit answers to more than one topic at a time (University of Surrey, n.d.). Berg, (1995), Orcher, (2005), and Glesne (1999) all agree that researchers need to be flexible and be prepared to correct mistakes. The researcher should be prepared to ask more probing questions, to throw out questions, or to reword questions.

Prior to the interviews, I had a TVI (who was not involved with the study) review each question, and any necessary adjustments were made. Interviews were audio taped for future data collection and analysis, affording me the opportunity to maintain accuracy during and after the interview, being able to concentrate on what was being said, and allowing further probing into the thoughts and feelings of the participants (Orcher, 2005). The audio tapes were transcribed by me and reviewed by someone not connected with the study to ensure reliability.

I asked essential and probing questions that were designed to answer the research question. Essential questions are those questions that are exclusive to the central focus of the study (Berg, 1998). Berg also describes probing questions, or probes, as those questions that provide interviewers with a way to draw out more complete answers from participants. Often these probes ask participants for elaboration on something they have already answered.

Ensuring validity and reliability by collecting unbiased data, I took precautions to ensure that my reactions to the participant responses did not influence them. Participant responses guided most of the interview, allowing me the opportunity to digress or delve into a specific answer with greater depth (Berg, 1995).

Strengths and Limitations of Semi-structured Interviews

One main advantage of semi-structured interviews is the flexibility of working with individuals, allowing the researcher to work within his or her own availability and that of the participants (University of Surrey, n.d.). Individual interviews have the potential to provide detailed information pertaining to each student's development of comprehensive braille literacy skills. In comparison to focus-group interviews, the range of questions discussed during the semi-structured interview may have a wider range (University of Surrey, n.d.).

A limitation of semi-structured interviews is that they are time intensive and costly (University of Surrey, n.d.). The process of transcribing interview material can be extensive and time intensive. Transcribing the audio tapes adds additional time to the data collection and analysis process.

Direct Observation

Qualitative research utilizes direct observation as a data-collection method. This methodology is useful when generating in-depth descriptions of events (Saint-Germain, 1998). Researchers gather firsthand data regarding programs, processes, or behaviors being studied through observation techniques, giving researchers the opportunity to collect data on a wide range of behaviors, to capture a great variety of interactions, and to openly explore the situation being studied (Mahoney, 1997). Through the direct

observation of activities, the researcher can develop a holistic perspective and understanding of the situation (Saint-Germain, 1998). Direct observation also allows the researcher to learn about processes of which the participants or educators may not be aware or that they do not share in an interview.

Direct observation differs from participant observation in several ways (Trochim, 2006). A direct observer does not attempt to become a participant; instead, the direct observer strives to be as unobtrusive as possible, not wanting to bias the observation's interpretation (Trochim, 2006). Secondly, direct observation is a more detached perspective, allowing the researcher to watch rather than take part and allowing the observer to make notes for future use (Trochim, 2006). Finally, direct observation tends to not be as time intensive as participant observation (Trochim, 2006).

Direct observation is a rudimentary form of learning about the world around us (Harvey, 2017). Through our senses, human beings are very capable of absorbing detailed information about our environment. However, as a data-collection method for qualitative research, direct observation is more than looking or listening and must in some way be selective. As a result of constant amounts of sensory information, people are capable of selectively attending to what they perceive to be most useful (Harvey, 2017).

The origination of direct observation as a research methodology occurred simultaneously with the early development of science (Harvey, 2017). Early progress was made in the natural sciences, primarily through careful, systematic observation and the recording of descriptions of phenomena in the natural world (Harvey, 2017). In

contemporary educational and social research, observation deals with highly complex social phenomena.

Rich qualitative data can be developed through direct observation, described as thick description (Geertz, 1973). The researcher does not conduct an observation with pre-determined categories or questions in mind (Harvey, 2017). Observation in qualitative research is often referred to as unstructured (Harvey, 2017).

During direct observations, the researcher is more a part of the background and is as unobtrusive as possible (Rajeev, 2011). Direct observations tend to be focused because the researcher is only observing specific occurrences and not the whole behavior (Rajeev, 2011). I employed direct-observation techniques to provide additional data regarding students' comprehensive braille literacy skills. The observations consisted of students reading grade-appropriate passages and the *ABLS*. I video recorded these observations for further data collection and analysis regarding student skills.

I obtained Institutional Review Board approval through the expedited review process from a university in the Southwestern region of the United States. Studies involving human subjects in educational settings cannot take place without the researcher gaining entrance. Public and residential schools are reluctant to grant entry; therefore, this study was conducted via e-mail inclusion criterion questionnaires, semi-structured interviews, literacy evaluations, and direct observations that were conducted at student homes, a public library, and an Education Service Center in the Southwestern region of the United States.

I sent e-mail recruitment information via the AER and Education Service Center list serves. By utilizing these two list serves, I established an initial participant pool,

narrowing the sample after the initial e-mail inclusion criterion form was completed. Data collection began spring of 2015 and continued through the summer of 2015.

Following the initial recruitment process, gatekeepers completed an e-mail inclusion criterion questionnaire. This questionnaire consisted of open-ended and exploratory questions concerning student literacy. These open-ended, exploratory questions allowed for additional analysis in preparation for the succeeding step. Gatekeepers identified students who met the criteria I set forth, eliminated student names, assigned each student a numerical code, and sent the information to me via e-mail. I generated memos based on the commonalities I found in the student information reported by gatekeepers. These memos allowed me to begin interpreting data. Through this process, I was able to delve deeper into the preliminary data (Denzin & Lincoln, 2003). This process allowed me to begin building the interview protocol.

The next step for the gatekeepers was to send recruitment information provided by me to the parents of the selected participants. This recruitment information included my contact information. I initiated contact via a phone call with parents of identified students who responded to my recruitment letter. My conversation with the parent consisted of the following: (a) an explanation of the study; (b) the expected time frame for the interview, literacy evaluation, and observation; and (c) the interview, literacy evaluation, and direct observation process. We agreed on a date, time, and location for my meeting with their child. I ensured confidentiality by assigning all participants alias names.

I e-mailed or postal mailed a consent and an assent agreement form to the participants and their parents. The consent and assent forms stipulated agreement to

participate in the study and the option to withdraw from the study, and the use of audio- and video-recording equipment. Additionally, a hard copy of the consent and assent forms were mailed via postal mail to parents and students. A braille copy of these forms were also mailed to the participants. I required that the consent and assent forms be signed and returned via e-mail or postal mail to me prior to the scheduled interview, literacy evaluation, and direct observation. I will keep the signed consent and assent agreements on file for future reference. Once I received the signed consent and assent forms, I followed up with a phone call to once again confirm participation and to thank the parents for their prompt return of the forms. I called once more two days prior to the scheduled meeting. Interviews, literacy evaluations, and direct observations were conducted spring of 2015 and continued through the summer 2015, at student homes, a public library, and an Education Service Center in the Southwestern region of the United States. These locations were selected for convenience to the students. Participants received a $30.00 gift certificate for the National Braille Press at my expense. Parents did not receive any form of compensation for their participation. Gatekeepers were placed in a $50.00 gift card drawing at my expense.

My research assistant was present during the interviews, literacy evaluation, and direct observations. The assistant's role was to set up the room and video record the session. The assistant dealt with any unforeseen interruptions that occurred during the meeting.

Prior to commencing with the work at hand, I introduced myself and my assistant. I explained the role of my assistant and asked the student to share anything he/she was comfortable sharing with me at that point. I reminded the student of the purpose and

procedures of the study. The first part of our work was the *ABLS*, followed by the *BRI*. My direct observation was conducted simultaneously with these evaluations. We then proceeded with the interview. Interview questions that were developed prior to the interview were short and open-ended. However, I did ask additional or follow-up questions during the interview session (Glesne, 1999). The first question was specific to each student regarding his or her visual impairment, allowing us to become comfortable with each other and the setting. As the interview progressed, the questions continued with more specificity regarding their development of braille literacy skills. The next set of questions were concerning the student's present situation and how comprehensive braille literacy skills impact his or her current situation.

Data Analysis

While data analysis can be difficult, it is also the most ingenious part of the study (Berg, 1995). Once the inclusion criterion questionnaires were completed by the gatekeepers, data analysis began. When the semi-structured interviews, literacy evaluations, and direct observations were completed, the audio recorded interviews were transcribed. The *ABLS* results were evaluated, *BRI* responses were scored, and coding of recorded information (video & audio) commenced. The information gathered from the *ABLS* and the *BRI* served the purpose of ensuring existing literacy skills. This data was not coded. An overall content analysis was the first step in the data-analysis process. I looked for themes in the transcription of interviews.

The next step, coding the data, started with open coding, allowing me to analyze the transcript data. Strauss and Corbin (1998) define open coding as the process of coding words or phrases found in a transcript or text. This analysis may be accomplished in three

different ways: (a) line-by-line analysis, which may be time intensive but may generate the most amount of codes; (b) whole-sentence and whole-paragraph analysis, which will gather major ideas; and (c) whole-document analysis (Glaser, 1992; Strauss & Corbin, 1998). In order to preserve the integrity of the data, line-by-line analysis was employed, giving me the opportunity to analyze the data in detail and allow for the flexibility of adding themes if necessary. Additionally, using line-by-line analysis ensured that my biases were not imposed. While creating codes and themes, the research question provided the foundational focus. In order to find commonalities and differences and to identify additional codes and subthemes, I reviewed and re-visited the codes.

Berg (1995) recommends four guidelines when coding data: (a) ask the data-specific consistent set of questions; (b) analyze the data minutely; (c) often interrupt the coding to write a memo; and (d) do not assume analytical relevance of traditional variables such as age or social class. Following these four guidelines afforded me the opportunity to identify themes and create a theory grounded in the data. I was cautious not to over label data as this may have resulted in little relevance and time lost. When analyzing the data, it is the researcher's responsibility to look for patterns that will result in the creation of different codes. A disadvantage of open-coding analysis is that it may be difficult to interpret participants' true intended meaning. Once the open coding is completed, the next step is axial coding (Berg, 1995).

The purpose of axial coding is to relate the categories formed during open coding to each other in themes of properties or dimensions. Axial coding sorts the codes identified in open coding, creating themes or categories by grouping codes or labels given to words and phrases (Strauss & Corbin, 1998). The axial-coding process encompasses

(a) the listing of category properties, which begins in open coding; (b) identifying conditions, actions, interactions, and consequences associated with a category; (c) stating the relationship between subcategories and categories; and (d) looking for ways that categories relate to one another. At this time, the researcher may begin to notice several categories that can be grouped together, and subcategories may be formed. Subcategories can also be formed when categories work together to explain another code. Often it is the subcategories that answer who, what, when, where, and how questions of a category (Strauss & Corbin, 1998).

Selective coding is the last step before refining a theory. One central category will be selected for the main theory, after relationships and various properties of the data are maximized. Several characteristics are the basis for the selection of a core category. All categories should relate to the core category, and this core category must appear frequently throughout the data; it cannot be forced from the data. The core category may be taken from one of the categories that was developed during analysis, or a new more abstract category may be chosen as an umbrella name for several categories (Strauss & Corbin, 1998).

During data analysis, I created memos and comprised analytic files, which assisted in tracking thoughts and reflecting on ideas and themes within the data. Memos are a running catalog of the researcher's analytic sessions. When reviewing memos, I was able to see the data with a fresh look. When essential data is separated from the non-essential data, the researcher can analyze and elaborate on the data (Denzin & Lincoln, 2003; Strauss & Corbin, 1998). Strong comparisons to other memos can be made as patterns form. In order to identify themes and concepts while creating analytic files, the

researcher can begin to form essential coding schemes (Denzin, & Lincoln, 2003). Microsoft, HIMS and HumanWare software were used to store and code data.

Constant-comparison methodology was used to analyze the data (Denzin & Lincoln, 2003; Glesne, 1999). This process involved comparison of participants to one another, data from one participant to another, different categories, and different incidents. I used the constant-comparison method until concepts emerged, at which time I began to compare concepts and processes. Glaser (1992) recommends at this point that researchers should begin to analyze each process, determining the concept under which it falls. While coding, the researcher will note theories that begin to emerge in the data.

I chose this data-analysis process because it is cost effective, allows flexibility, and data can be analyzed over an extended period of time and is helpful in descriptive studies (Berg, 1995). Two limitations of content analysis are (a) it is time intensive, and (b) if the researcher is not careful and allows the categories and concepts to emerge from the data, it may make it easy to force the data into categories if the process is too rigid.

Data-Management Plan

I anticipated it would take approximately two months to recruit gatekeepers and participants that met my criteria. The semi-structured interviews, literacy evaluations, and direct observations were completed over a three-month period, beginning in spring 2015 and continuing through the summer 2015. Transcription of interviews was completed fall 2015. Data analysis was conducted over an extended period of time.

Computers with specialized software such as screen readers, braille transcription programs, and scanners were utilized to store and analyze data. A Braille Sense Notetaker was utilized to maintain transferable data. HumanWare technology and a video camera

were utilized to record meetings with students. In addition, basic computer software such as Microsoft Word was used to transcribe data and find key words within transcriptions. E-mail, postal mail, and phone calls were used to communicate with gatekeepers, participants, and parents. All original Microsoft, Humanware, and HIMS documents have been stored on several SD cards. Copies of these documents will be stored in my home computer, a lap top computer, and a Braille Sense Notetaker.

Trustworthiness

Due to the nature of my background in braille literacy, any possible researcher biases have been stated. A conscientious effort has been made to be aware of these biases throughout the study process in order to produce trustworthy results. I have insured trustworthiness by making certain that questions asked of the participants have been kept confidential from one another. The answers given to questions by a participant were not shared with the gatekeeper or parent of the student. The questions asked of the participants were asked in the same manner and format to each participant. Given that auditory cues are vital to the communication with persons who are blind or visually impaired, I made a conscious effort to maintain a neutral voice pattern when conducting interviews. It was important that I not interrupt participants or redirect their thoughts when they answered questions during interviews (Seidman, 2006).

Triangulation

Triangulation is a "cross validation when two or more distinct methods are found to be congruent and yield comparable data" (Jick, 1979, p. 602), providing a deeper view of the data. Triangulation was attained in this study by using three methods of data collection, an e-mail inclusion criteria questionnaire, semi-structured interviews, and

direct observations. Additionally, I used three analytical methods when analyzing the data: coding of data, my research journal, and my thirty-year experience as a veteran TVI. I am able to provide a strong presentation of my study results by utilizing various types of data-collection methods and analyses. When information is cross referenced, reliability and validity can be increased. A holistic view of the study is created, affording the researcher the opportunity to view the data from multiple points of view. It is recommended that someone not related to the study review interpretations to have an interpretation other than the researcher's (Lincoln & Cuba, 1985). The role of this additional unbiased perspective is to ask questions pertaining to method, content, and/or interpretations of the study. For me, this role was taken on by my dissertation coach and committee.

Summary

Data, whether qualitative or quantitative, fulfills four basic functions: (a) initiation of new theory, (b) reformulation of new theory, (c) refocus, and (d) clarification of existing theory (Denzin, 1970). Qualitative research explores the quality of things using words, images, and descriptions (Berg, 2009), attempting to answer questions based on the perceptions of personal experiences, referring to meaning, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. Qualitative research seeks to examine the why, how, and where a given phenomenon occurs or evolves. Grounded-theory methodology has been a significant component to the development of qualitative research as an approach, an alternative to other forms of social research providing several tools for conducting qualitative research (Flick, 2009). A grounded-theory approach

allowed me to develop a theory regarding the development of comprehensive braille literacy skills of the four participants (Boyd, n.d.).

This study included four students in grades 10-11 in a Southwestern state in the United States. Participation was delimited to students who (a) were in grades 9-12 in a Southwestern state in the United States, (b) possessed comprehensive braille literacy skills as measured by the Academic Section of the *ABLS,* and the Comprehension section of the *BRI*, (c) were English Language braille users, and (d) had no additional disabilities other than blindness or visual impairment. Characteristics of participant literacy skills important to this study were fluency, comprehension, and transferability of skills. Participants and gatekeepers were recruited for this study by way of the AER list serve and from Education Service Centers in the Southwestern region of the United States list serve.

CHAPTER IV
RESULTS

Introduction

The purpose of this chapter is to analyze the data collected in order to answer the research question: "what academic factors, personal and or family dynamics, and environmental or social components influence the learning of braille for a student who is blind or visually impaired? The question also served as a guide to develop five a-priori themes through which the participant's learning experiences, expectations and future plans were explored.

The data analysis was structured in the following sequence:

1. A detailed description of each participant
2. Qualitative analysis of the interview data
3. Triangulation with field notes and researcher observations.

Researcher Disclosure

I am a certified TVI with a robust interest in braille literacy. For the past thirty years, I have taught children who are blind or visually impaired in residential and public schools in Texas and Colorado. My interest in braille literacy has evolved from my beliefs and my professional and personal experiences. As an infant, I was diagnosed with a progressive eye condition, and I was taught both braille and print when I entered first grade. I was educated in a self-contained classroom at a centrally located K-8 school in a large city in West Texas. Children who were blind or visually impaired were mainstreamed into general education classes as our braille literacy and other blind specific skills developed. I was privileged to have had one TVI in grades 1-4 and another in grades 5-8. These two women taught me the importance of self-determination, self-

empowerment, and the value of self-advocacy. Their love of braille and no-nonsense attitude toward blindness were the foundation of my education. I came to love braille literacy, and in the process, developed a tenacity that has served me well throughout my life. My high school education found me in my home school with no TVI services, with general education teachers who did not know the first thing about blindness. However, my first eight years in my education journey anchored me, and I graduated high school. I continued my education, receiving my bachelor's and master's degrees. My university degrees are accomplishments of which I am proud.

I am a wife, a mother, an educator, and much more. Millions of women all over the world have achieved the same goals as I have; however, my struggles as a woman who is blind living and working in a sighted world have helped to forge the person I am today.

There has been much discussion, scholarly research, and writing regarding the decrease in the value of braille literacy instruction. Most individuals in the field of vision have their own opinions, some based on scholarly research, some based on speculation, and others based on personal opinion. Some believe the cause of this devaluation may be due, to a large extent, to changes in service delivery models, advances in blind specific technology, and the lack of qualified teachers. While there are some benefits to the changes in service delivery models and advances in technology, they can be drawbacks to the instruction of braille literacy. Our children are entitled to a free, appropriate public education, which should include braille literacy instruction when appropriate.

There are extensive barriers for individuals who are blind or visually impaired to obtain a quality education and subsequent employment. Without appropriate literacy

skills, opportunities for education and employment are limited. In my personal experience, my successes and my achievements would not have been possible if I had not been proficient in braille. It is my expectation that this dissertation study, where I compared the commonalities among students who are blind or visually impaired, will add value to current scholarly research and provide educators with some food for thought and ideas for future research.

Analytical Approach

The research question was conceptualized and defined according to existing literature and my personal and professional experiences to determine what influential components are essential for successful development of braille literacy. The identified components guided the research question and served as a set of a-priori themes that were used to analyze the data. Beyond the a-priori themes, I left myself open to identify any unanticipated themes that would emerge from the analysis. The data that aligned with the a-priori themes were examined to determine their influence on each study participant's educational experiences, expectations, and future plans in the context of braille literacy development. The a-priori codes are the following: academic, personal, family, environmental, and social.

The academic component was examined in terms of instruction and the interactions of the student with the TVI and the classroom teacher. Further, the academic component was examined in regard to its influence on the participant's braille literacy development.

The personal component was examined to understand how the student's personal attitudes, dispositions, and perceptions influenced the student's braille literacy

development. Personal attitudes, dispositions, and perceptions are important, considering their influence on academic success and future employability.

The family component was specifically examined to determine how the family support influenced braille literacy development for each participant. Family support and interaction with the learning process is paramount to the success in the development of braille literacy skills.

The environmental component was examined to understand how the school and home environments influenced the development of braille literacy skills. The environmental characteristics were examined in terms of available resources within the school and home. Specifically, accessible online libraries, accessible libraries, materials, and books at school and home, and assistive technology.

The social component was examined to understand influences from the student's social life; specifically, interactions between the student and peers.

Data analysis

Participant One - Demographic Information

David is a seventeen-year-old male starting his senior year of high school in the fall after our interview date. David's blindness resulted from severe Retinopathy of Prematurity, Bilateral Aphakia, and Phithisical (his left eye has shrunk). David shared with me that he has been blind most of his life, with no vision or light perception. David has definite plans for his future, including wanting to "learn how to live independently, top of the list to do." Additionally, he wants to continue his education but "not a four-year college," and he wants to work with computers, possibly technical support (Q31-P2).

The Inclusion Criterion Questionnaire provided by David's gatekeeper stated that David is a fluent contracted braille reader who is reading on or above grade level. David's fluency was confirmed by his results on the academic section of the *ABLS* and the grade-appropriate reading comprehension sections and Word recognition sections of the *BRI* that I administered at our meeting (See Appendices K and L). David's reading speeds ranged from 45-54 words per minute. His comprehension ranged from independent to independent/instructional. The gatekeeper evaluated David's literacy proficiency based on his English grades and the results of his state-mandated assessments. She utilized the graded reading passages from the *BRI* or his most recent Learning Media Assessment (LMA).

David walked in to our meeting with his dad guiding him. During my initial conversation with his mother, she stated that David very much wanted to participate. David's father was friendly and enthusiastic about David participating when they came to our meeting. When I introduced myself and my Research Assistant, David said "I am ready for this." Throughout our meeting, David was ready to read with his hands in place. At first David seemed reserved; however, once our conversation got underway he seemed more relaxed.

When I asked David how he felt about braille, his response was genuine as he stated, "It has its place. I use a standalone braille display with my computer and phone. I don't read braille as much, because I get stuff in audio. I am glad that I can read braille" (Q19-P2). David shared that knowing braille means that "(he) can read" (Q20-P2). In the future, David foresees using a braille display with his computer (Q25-P2).

David suggested that TVIs should assist their students to develop their braille literacy skills. His specific recommendations include: "Try out all your options. Use braille, speech, braille display, notetaker. If you try these, you will be able to try out what works best" (Q28-P2). Additionally, David stated "I think that braille is a tool that can be used, and if you can use it, great" (AC). When we concluded our session, David shared that he was hopeful that his answers had been helpful to my study.

David's data revealed that academic, environmental, personal, family, and social components influenced his braille literacy development.

Academic Influences

The most prevalent theme that was observed from the analysis of David's interview was academic influences. He received TVI support during his academic career via an itinerant model. David began receiving braille instruction when he started attending school at three years or four years of age (Q3-P2). The TVI utilized a Perkins Braille Writer in David's initial instruction, transitioning to a notetaker, which he used from first grade through tenth grade (Q5-P2; Q23-P2). He used the Perkins for math in grade nine through ten (Q22-P2). David currently uses a Mac computer, which he occasionally connects to a braille display (Q25-P2). David received daily academic support through direct instruction from a TVI during his elementary education (Q7-P2). In middle school, David received TVI support on a daily basis for the subjects of math and science (Q7-P2a). By the time he was in high school, the academic support from a TVI had decreased to assistance with a few mechanical processes as David expressed that the TVI helped in "science and math for help with graphics" (Q7-P2b). David expressed that he had mastered all of the braille contractions early in his education "in third or

fourth grade" (Q10-P2). This finding is significant in that it reveals that the academic support David received may be deemed to be adequate as his learning was on par with his developmental level.

Academic components were found to be lacking in the area of support from the classroom teachers. This was evident in particular when David was asked about the degree of assistance he received from his classroom teacher. His response was "Did not help, did not know braille" (Q16-2). Often, this is the case. My field notes and observations indicated that classroom teachers consistently delegated all braille instruction to the TVI. Additionally, David revealed that while he received academic materials in a timely manner from the braillist; when he didn't, it was because the teacher had failed to submit the material (Q22-2).

Environmental Influences

David expressed that when he first started to learn braille, he had books at home. These books came from the school, the state library, and several that were purchased by his parents. Additionally, his educational environment included assistive technology. Some of the assistive technology was provided by the school, for example, a Perkins Braille Writer and notetaker, while others were purchased by the parents, for example, a Mac computer and a Victor Reader stream. Having these resources at home and at school seemed to influence David's braille literacy skills. His *ABLS* and *BRI* scores were found to be at the expected level. However, these environmental factors may not have been influential enough to strengthen his appreciation for the value for braille literacy as he did not express a keenness for pursuing consistent braille use in the future. Where referring to

using braille David said: “it’s doable, I find that I am slower. I can comprehend things if it is in audio. It works; I just prefer to use speech” (Q26-2).

Another environmental school component that was conducive to David’s braille literacy development was the availability of classroom and school resources such as braille books. David expressed that his classroom was equipped with textbooks and that the library had books in braille for him to read (Q17-2). The significance of this finding should not be undermined as my experience is that, in most cases, children did not have books in braille available to them in school other than textbooks. David is a member of Bookshare and National Library Service (NLS) (Q15-P2). Bookshare is an online library, and the NLS offers online or hard copy books to its members. These memberships are provided through the public schools. David will be able to continue his memberships after he graduates from high school.

Additionally, David had technology that was conducive to learning braille rather than detracting from learning this skill. When asked “what do you feel helped you the most to make you a good braille reader?” David answered “Having the Braille Note for about 10 years helped a huge amount, because I would keep the speech off and just use the braille (display)” (Q27-2). While this statement suggests personal influential factors, it also demonstrates that schools that have the proper resources are more prepared to provide the necessary academic support that students require.

Personal Influence

The personal components emerged repeatedly when examining David’s interview data. In his early experience, it is evident that David resisted learning braille. In fact, he expressed a hatred towards learning braille (Q9-P2). It appears that this hatred toward

learning braille stems from his perceived inability to be like his peers. When asked "how did you feel when learning braille?" David said, "Probably ties into being blind, I used to hate it, because I wasn't like my peers" (Q9-P2). As David continued to develop his braille literacy skills, these feelings dissuaded as he admitted, "it's gone away, I still don't like it, but I have to deal with it, so let's just do it" (Q9-P2). By his unenthusiastic tone, these responses revealed a lack of interest. There should be concern about this nonchalant attitude toward braille literacy skills as they are related to independent living and future employment. David expressed an interest in pursuing independent living and working in a technical related field (Q31-P2). We know that independent living and work is often enhanced by braille literacy. Vital to a successful educational experience, career, and quality of life in today's world is the ability to read and write. Being literate means participating effectively at home and in society (American Foundation for the Blind, 2017a). David's last personal comment about having braille literacy skills was: "I think that braille is a tool that can be used, and if you can use it, great!" (AC-1)

Family Influences

David shared how his family influenced his braille literacy development. The first indicator of a family influence that David noted suggests that his family did not help him learn braille. To the question: "Did your parents/family help teach you braille?" David responded with a simple "no" (Q11-2). Often children may perceive that their families are not supportive when, in fact, they may be very involved in their learning.

David did reveal several family efforts that may have been conducive to his learning. For example, David stated, "Mom tried to learn it, classes or something online, classes from Hadley" (Q12-P2). My experience indicates that many parents do not make

an attempt to learn braille. "We attended American Council of the Blind (ACB) conferences" (Q12-P2). My experience indicates that families who are involved with their children will make the effort to attend conferences such as ACB, where self-empowerment, self-advocacy, and self-worth are promoted and attendees are exposed to educational and independent living resources. Another example of family influence was that his parents purchased some technology and books. As important as family influences are in the development of children who are blind or visually impaired, I was concerned that this theme emerged minimally throughout the interview.

Social Influences

A most concerning finding in the analysis of the interview data may be the lack of social components that influenced David's development of braille literacy skills. In fact, the social component, as revealed by David, was a minimal piece in his literacy skills development. David shared that not being like his peers deterred him from learning braille, "I used to hate it because I wasn't like my peers" (Q9-2). David revealed that he was not currently involved in any extra-curricular or social ongoing activities in or outside of school. However, he did share that he attends summer camp for students who are blind and visually impaired. This once-a-year event may not be enough to reap the benefits of social development. My field observations suggest that David is a shy, reserved young man but with a legitimate willingness to collaborate and feel helpful. He would benefit immensely from further social interactions.

Summary

These five influencing factors were found to be instrumental on David's braille literacy skill development. David recognized that his dislike for braille stemmed from his

perception that it would make him different from his peers. As he overcame this emotion, he also admitted to engaging more freely with the process of learning braille. Overcoming this personal barrier was instrumental for David to develop his braille literacy skills. Several factors did influence his development of braille literacy skills in a positive manner. Most importantly, the academic supports that David received were foundational in his learning. David expressed that the TVI provided daily direct instruction when he first started to learn braille. The presence of the TVI may have also encouraged David's self-determination to challenge himself in the learning process. For example, when he transitioned from a Perkins to a notetaker, David shared that he turned off the speech function and used only the braille display (Q25-P2). Another positive aspect in his development was the availability of technology, braille books, and learning materials. These learning materials were available to him in the school and home environments. The data analysis suggests that there is a high degree of interrelations amongst the factors that influenced David's development of braille literacy skills.

Subthemes

The subthemes that emerged from the analysis of David's interview data were tenacity, self-empowerment intertwined with self-advocacy, commitment, enthusiasm, and engagement.

Tenacity. The subtheme of tenacity was evident throughout David's interview. David's clear dislike of braille did not deter him from moving forward and developing braille literacy skills. He learned to deal with his adverse feelings toward learning braille "I still don't like it, but I have to deal with it, so let's just do it" (Q9-P2). David

challenged himself to hone his braille literacy skills by turning off the speech on his notetaker, using only the braille display (Q27-P2).

My experience indicates that relying on the braille display exclusively will foster good braille skills. This is achieved when students rely solely on the braille display without the speech output, enabling the student to develop literacy specific skills. Nonprint readers and writers produce most written materials in braille or with other assistive technology such as electronic notetakers, computers with speech and braille output via a braille display, or screen-enlargement programs (Wolffe, 2000). Used efficiently, technology provides access to an immense amount of information, which is essential for achieving success in school and in life (Kapperman & Sticken, 2000). Students who are blind or visually impaired benefit greatly from ready access to information afforded by technology. Braille readers can access text on a computer screen via a refreshable braille display (Kapperman & Sticken, 2000).

Advantages of refreshable displays include: (a) the design features such as good buttons and strong dots; (b) portability, (c) the cursor routing functionality for improving computing efficiency, (d) good controls, ergonomically design, and connectivity; (e) privacy when presenting or taking part in a meeting while listening (this feature is important for students in general education classes); (f) the ability to read silently, either for privacy or to avoid disturbing other people; (g) synthetic speech as used by screen readers can sound monotonous or be stressful; (h) immediate, active access to text rather than relying on someone else's interpretation; (i) greater access to detail than what is possible with audio; when proofreading in particular; (j) the ability to get a sense of

context, layout, and spatial aspects of the text; (k) access to information that would otherwise not be available in braille (Cryer & Home, 2011).

Disadvantages of refreshable displays include: (a) digital braille is slower and less relaxing to read than hard-copy braille; (b) difficulty in understanding context and layout, and sometimes lacking the necessary input of a transcriber to interpret the text; (c) displays could be better designed ergonomically, and the single line display can be a limitation; (d) cost, reliability, and ease of use; (e) braille displays can be temperamental with certain programs, and older devices are not able to keep pace with new technology to which they are paired; (f) reading braille on a braille display can be slower than reading hard-copy braille for many reasons including start up time, the reading surface, the need to constantly refresh the braille display, and the limitation of only having one line at a time on a braille display; (g) hard-copy braille has usually been transcribed, and so is likely to be well formatted and adapted if necessary to explain diagrams, etc. to people who are nonprint readers (this is not the case on a braille display); (h) refreshable braille is difficult to use while travelling, difficult to read more than one document at a time, and the worry that the technology may fail (Cryer & Home, 2011).

As evidenced in my field notes, David also demonstrated his tenacity when he taught himself how to use a Mac computer and several other technical devices. My field notes also corroborate David's tenacity in that they show that he was an eager, proactive study participant intent on helping. At the end of our interview, he demonstrated a positive attitude toward the study by expressing his hope that he had been able to help.

Goal setting. A subtheme that emerged from the tenacity subtheme was goal setting. David has decisive future plans evidenced by his statement "I want to learn how

to live independently, top of the list to do. I want to do something with computers, (possibly) technical support." He also stated that he has plans to attend school "school, not a four year school" (Q31-P2). My field notes indicate his determination and absolute confidence in his future plans.

Self-empowerment. Another subtheme that emerged from the data analysis of David's interview was self-empowerment intertwined with self-advocacy. David challenged himself by turning off the speech function on his notetaker "… I would keep the speech off and just use the braille" (Q27-P2). Students may be tempted to leave the speech function on as reinforcement for the braille, rather than depending on their own braille skills. David self-advocated and took the initiative to develop alternative methods that he could use to enhance his braille literacy skills. For example, David shared that he downloads books from NLS and Bookshare and plays them on his electronic devices (Q15-P2). He also pairs a braille display with his computer and phone, and established a system of taking notes in class with a Mac computer (Q19-P2). These self-empowering decisions that David has made can be considered influential to his braille literacy development given that individuals who challenge themselves and take on initiatives for self-improvement are often more successful academically. David self-advocated by making these decisions and developing systems that would best meet his needs, empowering himself to succeed.

Commitment. A fourth subtheme that emerged from the data analysis was commitment.

David. Evidence for commitment to learning was provided by David, his family, and David's TVI. Despite David's early resistance to learning braille, he made up his

mind to develop his braille literacy skills. When I asked him at what age or grade level he believed he had mastered all the braille contractions, his response was "In third or fourth grade" (Q10-P2). This accomplishment demonstrates his commitment to learn, and his success placed him on an even footing with his peers. David engages in literacy activities by downloading books from NLS and Bookshare and playing them on his electronic devices (Q15-P2). This finding is significant, as in my experience, many students David's age would rather spend their time on social media or on other pastimes avoiding literacy activities. David demonstrated his commitment to his braille literacy development when he shared that he uses braille in "science and math classes at school" (Q21-P2). My field notes and experience note that these two core subjects contain a great deal of visual material. David's use of braille in these subjects clearly demonstrates his commitment to his education. David shared with me that he will continue to use braille via a braille display paired with his computer (Q25-P2). The fact that David plans to continue using braille in his future is another indication of his commitment to use braille.

Parents. The data showed evidence that supports that David's family was committed and engaged in his braille literacy development. When I asked him if his parents or family had learned braille he responded "Mom tried to learn it, classes or something online. Classes from Hadley" (Q12-P2). David's response speaks to his parent's commitment. My experience speaks to the fact that not all parents make an attempt to learn braille. Also, further evidence of his parent's commitment was seen when David expressed that he had attended ACB conferences (Q12-P2). Attending such conferences is a concrete example of his parent's commitment to David's braille literacy development. Through my experience, I've come to learn that families who attend

conferences such as ACB where self-empowerment, self-advocacy, and self-worth are promoted and where attendees are exposed to educational and independent living resources, show commitment to their child's braille literacy development and preparation for the future. Additionally, when David was learning braille, his parents purchased books for him from Seedlings (Q13-P2). This financial investment also indicates commitment on the part of his parents. Another financial investment was evidenced by David's Mac computer, which David pairs with a braille display to facilitate his braille literacy.

TVI. Although David had three TVIs throughout his academic journey to this point, it is apparent that each of those teachers demonstrated commitment to his braille literacy development and his overall education, as evidenced by his service delivery. David shared with me that "in elementary school, the teacher came daily" (Q7-P2). "In middle school, every day for science and math, (and) she stayed in class" (Q7-P2a). "In high school, science and math for help with graphics" (Q7-P2b). While the data suggest that the frequency of service delivery diminished over time, it was not necessarily detrimental to David's braille literacy development. Another example of the TVI commitment was revealed when David shared that his TVI used the "Same books as other children" when I asked what books or materials were used to help teach him braille (Q8-P2). This statement is of great relevance as it indicates that the TVI went an extra step by using the same curriculum as David's peers, rather than using a braille ready curriculum. This decision on the part of the TVI may have helped to dissuade his negative feelings about being different from his peers. David's membership with Bookshare and NLS are also examples of the TVI's initiative (Q15-P2). When asked if he

had braille books other than textbooks in the classroom when he was learning braille, David shared that he had library books in the library (Q17-P2). While David does not specifically say that his TVI provided the books located in the library, this can be inferred, as it is my experience that most school librarians do not have the experience of procuring braille books for their library.

Enthusiasm. Another subtheme in David's data is enthusiasm. David's interview data revealed a marked level of enthusiasm when he spoke to me about the technology he taught himself and his plans for the future. His enthusiasm was clear when he spoke about learning to live independently and pursuing a career in technical support.

Engagement. Finally, engagement was a subtheme that also arose from the data analysis. David's engagement in his learning and his determination to learn braille in spite of his initial attitudes towards braille, and to develop his own strategies to accomplish his school and home tasks demonstrates a continuous level of engagement, as evidenced by his previous subthemes.

Participant Two - Demographic Information

Esther is a seventeen-year-old female student who is nearing the end of her junior year of high school. She wears thick glasses, which she explained, assist her with depth perception. Her blindness is the result of Retinopathy of Prematurity. She shared with me that she is congenitally blind with light perception in left eye, and less in right eye. Esther recounted that she was diagnosed early enough that the doctor could try operating; however, too late to do any good. Esther lived in Korea for the first four years of her life, and in Guam for two years prior to coming to the United States. Esther's mother is Korean, and her father is American. At the time of our meeting, she had not seen her

father for over two years due to his working circumstances. Her father was expected to fly in the day we met for the interview. Esther appeared detached, with little interest in seeing her father. In her words, she is a "lone wolf."

In the Inclusion Criterion Questionnaire, the gatekeeper stated that Esther is a fluent contracted braille reader who is reading on or above grade level. Her reading proficiency was confirmed by her results on the academic section of the *ABLS* and the grade-appropriate reading comprehension sections and Word recognition sections of the *BRI* that I administered at our meeting (See Appendices K and L). Esther's reading speeds ranged from 112-145 words per minute. Her comprehension ranged from independent to independent/instructional. The gatekeeper evaluated Esther's literacy proficiency with the *BRI*.

Esther was very interested in participating in the study and was proactive in establishing contact with me. While her mother made the initial contact with me, it was Esther who pursued participation in the study. She is a determined young woman who has definite ideas and does not hesitate to express herself. English is not Esther's mother first language, and it was necessary for Esther to interpret most of my communication with her. It was apparent that the translator role is a familiar one for Esther, as she appeared to be in a relationship of co-dependency between her and her mother; Esther, due to her blindness, and her mom, due to her language barrier.

Esther appeared to be a very energetic young lady, outspoken and sure of herself, who was eager to participate in my study. Esther came in to the service center meeting room with her mother guiding her, holding her cane but not using it. Esther introduced herself and her mother to me and my research assistant. After a few minutes of

conversation with the Education Specialist for Students with Visual Impairments, the specialist and mother left, and we were left to our task.

Esther has plans to continue her education after high school. "College, university to double major in English, education, and communications and a minor in computer science." She wishes to become a TVI, a teacher in general, or work in assistive technology (Q31-P2). Esther shared that she currently uses braille "everywhere" (Q21-P2), and that "Usage of braille is never going to stop or slow, unless audio becomes better" (Q25-P2). In 2014, Esther competed as a varsity finalist in the Braille Challenge (see Definition of Terms). In 2016, she placed 3rd at the varsity level in her local Regional Braille Challenge.

Esther offered an extensive number of suggestions for TVIs to assist their students in developing their braille literacy skills. Among these suggestions are: "Don't hesitate to become creative; know what you're doing. I have had many TVIs that have no idea how to read braille; show your student that you know what you're doing. When TVIs attempted to push me towards audio, I refused; TVIs, with college bound students, should not leave it to the student to learn on their own. I learned advanced ideas of Nemeth on my own; TVIs should teach the braille, so that when the student walks into a classroom they are prepared to learn content. Audio is useful for skimming material or reading quickly, but not for comprehensive learning" (Q28-P2).

Esther revealed through the interview process, that academic, personal, environmental, family, and social factors influenced her braille literacy development.

Academic Influences

The most prevalent theme that emerged from the data analysis of Esther's interview, which impacted her braille literacy development, was academic influences.

Esther began receiving braille instruction at the age of four, which accounts for early emergent literacy development. Her mother, who taught herself braille, taught Esther braille at home using a slate and stylus and tactile graphic books (Q3-p2). Esther started public school at age five in the United States. She received TVI support during her academic career via an itinerant model. She received daily direct services from a TVI in kindergarten (Q7-p-2). The TVI taught Esther in kindergarten using a notetaker more often than a Perkins Braille Writer. Esther stated that she mastered all of the braille contractions early as she indicated that she knew the contractions "In second grade" (Q10-P2). Currently Esther uses a notetaker and a PC with a screen reader. "The Perkins is discouraged by the TVI because there will be no one in college to interline math" (Q23-P2). She reported that she uses the slate and stylus at home (Q23-P2a).

Esther shared that "the time with a CTVI has decreased throughout the years" (Q7-p2-a). When she was in Seattle prior to arriving at the state where she currently resides, there was always a TVI in math and science classes during middle school. The purpose of the TVI at that point was to interline materials (write in print what Esther wrote in braille), and explain to her any work on the board; suggesting that the classroom teacher did not take responsibility for the specialized instruction. Further, since she has been in high school, her direct instruction has reduced to twice a week (Q7-P2a). Esther explained that her time with the TVI is spent focusing on "college stuff;" however, Esther would like to focus on technology and advanced math (Q7-P2c).

Esther was adamant when expressing that her current TVI does not know Nemeth or assistive technology sufficiently to teach (Q7-P2d). Esther explained that she uses electronic braille more often than hard copy braille (Q22-P2). Her frustration was evident when she said "Braillists do not have qualifications to do standardized Nemeth. They don't know braille, they don't know Nemeth. I do not want the braillist to produce hard copy braille, because I don't really need any and because she doesn't know it. The braillist in Seattle produced very good braille" (Q22-P2a). Esther did not specify whether the braillist was a TVI, a certified braillist, or a certified paraeducator. My experience indicates that often the individual producing braille for students is not a certified TVI or braillist. Furthermore, it is not uncommon for a student to receive braille produced by a certified paraeducator.

In general, academic components were found to be lacking in the area of specialized services provided and support by the classroom teacher. The latter was most evident when Esther was asked about the degree of assistance she received from her classroom teacher when she started learning braille, her response was, "She did not, the TVI was responsible for braille instruction." Often, this is the case; my observations indicate that classroom teachers consistently delegate braille instruction as well as literacy development to the TVI.

These findings are significant in that they reveal that, despite decreased instruction, limited or no classroom teacher involvement, and insufficiently prepared TVIs, Esther's braille proficiency was found to be on par with her developmental level as evidenced by the results of the *ABLS* and the *BRI*. It is undeniable that academic influences contributed to Esther's braille literacy development. When asked how learning

braille has helped her, Esther responded, "With everything. There is still much to learn, but learning braille has made learning everything else easier. After receiving initial support, learning advanced braille has become easier to learn on my own" (Q20-P-2).

Environmental Influences

School and home environments played a significant role in Esther's braille literacy development. Esther revealed that she was not exposed to braille outside of school until the first or second grade (Q13-P2). Esther's braille literacy development (Q13-P2) was enhanced by the availability of classroom and school resources such as braille books, other than textbooks, and her library membership. This finding is significant as my experience indicates that in most cases, children do not have books in braille other than textbooks available to them at school or at home. Additionally, the school provided Esther with technology that was conducive to learning braille (Q6-P2). For example, in kindergarten, Esther was initially taught braille using a Perkins Braille Writer. She was then transitioned to an electronic notetaker (Q6-P2), and by the fifth grade, she learned how to use the notetaker to access and use an online library (Q13-P2).

Esther is currently a member of Bookshare and the NLS Q15-P2). Bookshare is an online library and the NLS offers online or hard copy books to its members. These memberships are provided through the public schools. Esther will be able to continue her memberships after she graduates from high school. Esther explained that she had been exposed to Bookshare more than she had been to NLS (Q15-P2a). This difference in exposure can be attributed to the school environment, as teachers may favor one library over the other. Students and teachers may perceive difficulties in using these libraries, and this may account for the difference in their use.

Esther currently uses an electronic notetaker and a screen reader on her PC. She does not utilize hard copy braille often (Q22-P2). When asked if she presently has braille books at home, she responded, "Not when I can use Bookshare, it is more convenient" (Q14-P2). I have found that with high school students, it is a common practice to use Bookshare or the NLS through an electronic device for reading purposes, rather than carry multiple volumes of hard copy braille.

Personal Influences

Esther's interview analysis revealed that personal influences were very important to developing competency in braille literacy. Esther's "insatiable appetite" to read was a major contributing factor to her braille literacy development (Q16-P2). This insatiable appetite allowed her to overcome certain barriers. Esther was asked how she felt when she started to learn braille, and she responded that with her mom, it was "confusing" because she taught both grade 1 and 2, but never taught grade 2 completely (Q9-P-2). However, Esther demonstrated tenacity by seeking her mom's assistance to confronting unfamiliar contractions. Esther's self-determination and tenacity is also evident when she expressed, "I learned more about anything by reading books than from my TVI or teachers" (Q16-P2a). "In public school, I knew enough to feel at home and confident" (Q9-P2). As a TVI, it has been my experience that students who are self-motivated and want to read braille will strive to develop braille literacy skills.

Esther explained that, while she is beginning to grow accustomed to reading books with speech on the notetaker, she prefers braille on a braille display or hard copy, (Q19-P2a-b). When asked how she uses braille now, Esther responded, "everywhere" (Q21-P2). Esther was adamant that "Usage of braille is never going to stop or slow unless

audio becomes better" (Q25-P2). She also shared that she enjoys reading braille and does not know why anyone would not enjoy reading braille (Q26-P2). I observed Esther's self-confidence in her literacy skills. My experience shows that students who have proficient braille literacy skills and who feel comfortable with their skills continue to read braille outside of school. When asked what she felt had helped her the most to become a good braille reader, Esther stated, "I always loved to read; that want to read helped me learn braille a lot faster than if I didn't want to read" (Q27-P2). Additionally, another contributing factor was her love of braille. This was evident when I asked her how she felt about braille, and Esther responded, "I love it" (Q19-P-2).

Esther expressed pride in her mother for teaching herself braille and for her efforts to teach her braille. When sharing with me about the TVI who brought her books from the district office in her early years of learning braille, her obvious respect and appreciation for this teacher was evident when she said, "TVI was fantastic" (Q17-P2a). She also shared that this same TVI produced very good braille.

Family Influences

Family influences were found to be foundational in the early stages of Esther's braille literacy development. At the age of four, Esther was taught braille by her mother at home using a slate and stylus (Q3-P2). Esther's mother obtained tactile graphic books, which she used to develop Esther's braille skills (Q8-P2). This is a notable piece of information as most parents, in my experience, wait for the public school TVI to teach braille to their child. Esther, however, experienced a degree of confusion due to her mother teaching her grade 1 and 2 braille simultaneously. Despite this confusion, her mother's teaching impacted Esther, so that when she began kindergarten in public school,

she felt confident and continued to learn (Q9-P2). Esther explained that her mother taught herself literary braille using online resources; however, she did not learn the Nemeth code (Q12-P2). Esther revealed that "After I learned enough braille with the TVI, she stopped" (Q12-P2).

Esther lived in Korea for the first four years of her life and in Guam for two. Their move (mother and daughter) to Seattle and subsequently to the state where they currently reside was for the purpose of Esther receiving benefits that would accommodate her blindness. I observed an interdependency between Esther and her mother, resulting from Esther's blindness and her mother's language barrier. This interdependence further consolidates the influence of the family support.

Social Influences

The social influences appeared to have had the least influence in Esther's braille literacy development. She commented "I am pretty much a lone wolf" (AC). This indicates a lack of social relationships, both at home and at school. Esther began kindergarten at approximately age six, when they moved from Guam to Seattle. Throughout the interview there was no indication of any relationships with peers. When asked if she was involved in any extracurricular activities, her response was "No" (Q29-P2). She explained that her extracurricular activities involved talking with adults about technology, but nothing with peers. When I asked if she was involved in any social activities she responded, "When moms get together" (P30-P2).

Summary

Aspects of the five a-priori themes were found to be influential on Esther's braille literacy development. Most of the influences were found to have an impact on her

literacy development in a positive manner, while the social component was found to not be influential on her development.

As it may be expected, the academic component was found to be the strongest influence in developing her ability to comprehend braille at an early age and to transition from her mother's teaching to formal instruction from a TVI. Esther stated that she mastered all of the braille contractions "in second grade" (Q10-P2). This statement is significant in that it indicates Esther's ability to learn, her desire to move forward from the early instruction provided by her mother, and the role that academics had on her learning. Esther's attitude about braille reflects not only an academic influence, but a personal one as well. This personal influence was made evident when she shared, "I love it" (Q19-P2). In my experience, young children adopt polar attitudes toward braille literacy. They either embrace learning braille with enthusiasm or they resist and outright refuse to learn it. My field notes reveal that Esther had pursued a personal effort to teach herself math and expand her understanding of assistive technology. Esther's braille proficiency was found to be on par with her developmental level as evidenced by the results of the *ABLS* and *BRI*.

Esther's determination was a strong personal component that influenced her braille literacy development. As she described it, her "insatiable appetite" to read was a major contributing factor to her braille literacy development (Q16-P2). Esther shared "I learned more about anything by reading books than from my TVI or classroom teachers" (Q16-P2a). My field notes corroborate this self-confident statement expressed by Esther. This self-confidence was manifested throughout our meeting. I asked Esther how she uses braille now, and she responded, "Everywhere" (Q21-P2). Esther was emphatic when

sharing that "Usage of braille is never going to stop or slow, unless audio becomes better" (Q25-P2). When I asked her how learning braille has helped her, Esther responded, "With everything. There is still much to learn, but learning braille has made learning everything else easier" (Q25-P2).

The school and home environments were also found to be significant contributors to Esther's braille literacy development. Her braille literacy development was enhanced by the availability of classroom and school resources such as braille books, other than textbooks, and library memberships (Q13-P2).

The family component was influential particularly in the early stages of Esther's braille literacy development. At the age of four, Esther was taught braille by her mother at home using a slate and stylus (Q3-P2). When she began kindergarten in public school, she felt confident and continued to learn (Q9-P2). The discovery of this ability to use braille empowered her to want to learn or search for more knowledge.

The data analysis shows that the social component appears to have had the least influence in Esther's braille literacy development. She commented "I am pretty much a lone wolf"(AC). This indicates a lack of social relationships, both at home and at school.

Subthemes

The subthemes that emerged from the data analysis of Esther's interview were tenacity, goal setting, self-empowerment, commitment, enthusiasm, gratitude and engagement.

Tenacity. Esther demonstrated tenacity when she sought her mom's assistance to learn unfamiliar contractions. Her self-determination and tenacity is evident when she expressed, "I learned more about anything by reading books than from my TVI or

classroom teachers" (Q16-P2a). “After receiving initial support, learning advanced braille has become easier to learn on my own" (Q20-P-2). When asked what she felt had helped her the most to become a good braille reader, Esther stated "I always loved to read; that want to read helped me learn braille a lot faster than if I didn't want to read” (Q27-P2). She continued “There is still much to learn, but learning braille has made learning everything else easier” (Q27-P2). It has been my experience that students who are self-motivated and want to read braille will strive to develop braille literacy skills.

Goal setting. Goal setting was a subtheme that emerged from the tenacity subtheme. My field notes suggest that Esther was determined to teach herself "advanced math" and resolved to meet this personal goal. Esther plans to attend university after high school "to double major in English, education, and communications with a minor in computer science. (Eventually), she “wants to become a TVI or teach in general, or work in assistive tech" (Q31-P2). Her goals are firm, and she is emphatic when she says she will attend a university.

Self-empowerment. Self-empowerment is a significant subtheme that emerged from Esther's data analysis, intertwined with self-advocacy. Esther mastered the braille contractions early in her education “in second grade” (Q10-P2), empowering herself to read and write braille, in a determined effort to develop her literacy skills. Esther was adamant when she shared, "I do not want the braillist to produce hard copy braille, because I don't really need any and because she doesn't know it" (Q22-P2a). My notes show that Esther empowered herself, made a decision based on her needs, and advocated for herself as to what braille would be produced for her. Her determination to teach herself advanced math was a self-empowering step on her part. Additionally, my field

notes reveal a conflict between Esther and the Service Center specialist who was responsible for purchasing technology for Esther. Esther shared that she had, on numerous occasions, spoken to this individual regarding her needs, yet, without positive results. My field notes indicate that Esther's mother speaks limited English; therefore, Esther must advocate for herself.

Commitment. Commitment is a subtheme that was evident in the data analysis, on the part of Esther, her mother, and the TVIs.

Esther. Prior to Esther starting school, her mother taught Esther braille at home. Esther explained that she experienced a degree of confusion "because she taught grade 1 and 2, and never taught 1 fully" (Q9-2). Despite this confusion, Esther stated that she mastered all of the braille contractions early "in second grade" (Q10-P2). This achievement speaks of her commitment to learn braille. Determined to keep her skills honed, she reported to use the slate and stylus at home (Q23-P2a). When asked what she felt had helped her the most to become a good braille reader, Esther stated, "I always loved to read; that want to read helped me learn braille a lot faster than if I didn't want to read" (Q27-P2). This response indicates her personal determination and commitment to develop her braille literacy skills. Esther shared with me that she still has much to learn, but learning braille has made learning everything else easier. This statement implies her commitment to continue learning and developing her skills. Esther has taken the initiative to advance her education on her own. "Advanced braille has become easier to learn on my own" (Q20-P-2). Esther is determined to attend university after high school.

Mother. Esther's mother played an important and committed role in her literacy development. At the age of four, Esther was taught braille by her mother at home using a

slate and stylus and tactile graphic books (Q3-P2, Q8-P2). Most parents, in my experience, wait for the TVI to teach braille to their child. Esther explained that her mother taught herself literary braille using online resources; however, she did not learn the Nemeth code (Q12-P2). Their move (mother and daughter) to Seattle and subsequently to the state where they currently reside was for the purpose of Esther receiving benefits that would accommodate her blindness and enhance her learning experience.

TVI. Esther's TVIs also played an important role by their commitment to her education and learning. She received daily direct services from a TVI in kindergarten (Q7-p-2) when she was in Seattle prior to coming to the state where she currently resides. There was always a TVI in math and science classes during middle school. The purpose of the TVI at that point was to interline (write in print what Esther wrote in braille) and explain to her any work on the board. Since she has been in high school, her direct instruction has reduced to twice a week (Q7-P2a). Service delivery for a student who is blind or visually impaired, as per best practices, is based on student need and appropriateness for the grade level. A commitment by the TVI is essential to ensure appropriate service delivery. Esther shared that the braillist in Seattle produced very good braille (Q22-P2a). Esther did not specify whether the braillist was a TVI, a certified braillist, or a paraeducator. Esther's braille literacy development was enhanced by the availability of classroom and school resources such as braille books other than textbooks and library memberships (q13-p-2). This finding suggests that there was a level of commitment from her TVI, as my experience indicates that, in most cases, children do not have books in braille other than textbooks available to them in school or at home. The

TVI also taught Esther how to use an electronic notetaker in kindergarten (Q6-P2). In 5th grade, she learned how to use an online library through the notetaker (Q13-P2). Esther is a member of Bookshare and NLS (Q15-P2). These memberships are provided through public schools and facilitated by the TVI.

Enthusiasm. Enthusiasm is an additional subtheme that emerged from Esther's data. Throughout our meeting, Esther's enthusiasm for learning and moving forward with her education was displayed in her excitement when she spoke about braille and her plans for the future. "I love it" she answered when I asked how she felt about braille (Q19-P2). I considered her love of braille to be sincere. Esther shared that she enjoyed reading braille, and she was genuinely perplexed to consider that anyone would not enjoy reading braille (Q26-P2). When I asked her how learning braille has helped her, her response was quick, "With everything" (Q20-P2). Her enthusiasm was also evident when she spoke about teaching herself advanced math. Esther has plans for the future, and her excitement at the prospect of attending university was evident.

Gratitude. Gratitude is a subtheme that arose from the data. Esther explained that her mother taught herself literary braille using online resources; however, she did not learn the Nemeth code (Q12-P2). Esther's gratitude was manifested when she expressed her pride in her mother's efforts to teach herself, and subsequently Esther, braille. Additionally, when sharing with me about the TVI who brought her books from the district office in her early years of learning braille, her obvious respect and appreciation for this teacher was evident when she said "(the) TVI was fantastic" (Q17-P2a). In most cases, children who are blind or visually impaired who are learning braille find themselves in a classroom where they are the only student learning braille. As a result,

they feel gratitude towards adults who show an interest in their learning and who provide needed materials.

Engagement. Finally, engagement was a subtheme that also arose from Esther's data analysis. Esther's engagement in her learning and her determination to learn braille in spite of her confusion when she started kindergarten, served her well. Her engagement in pursuing academic success demonstrates a continuous level of engagement, as evidenced by her previous subthemes

Participant Three - Demographic Information

Luke is a sixteen-year-old young man, and at the time of our meeting, he was preparing to begin his junior year of high school in the fall. Luke's blindness is the result of Leber's Congenital Amaurosis. He explained that he was born blind and only has light perception. Luke appears to be easy going with a serene attitude, exhibiting the demeanor of a young adult. Luke is soft spoken, reserved, and well mannered. He initially appeared to be nervous; however, as our conversation progressed, he relaxed. He shared with me that he has no involvement in extra-curricular or social activities.

In the Inclusion Criterion Questionnaire, the gatekeeper stated that Luke is a fluent contracted braille reader who is reading on or above grade level and he helps other students with their assignments. His proficiency was confirmed by his results on the *ABLS* and the grade-appropriate reading comprehension sections of the *BRI* that I administered at our meeting (See Appendices K and L). Luke's reading speeds ranged from 102-119 words per minute. His comprehension ranged from independent to independent/instructional. The gatekeeper evaluated Luke's literacy proficiency with the *BRI*, the eighth edition.

Luke walked into the library where we were meeting, using guide technique with his mother, holding his cane in front of him, but not using it. Based on my conversation with his mother, she appears to be involved in his education. She had quite a bit to say about the lack of TVI involvement.

When I asked Luke how he feels about braille, his response was, "pretty good" (Q19-P2). He did share that when he first started to learn braille it was "complicated" but after figuring it out, he was "intrigued, and went with the flow" (Q9-P2). "It's helped me discover something I can do on my own, so I can read, so I can do something, instead of just sitting around" (Q20-P2). Luke plans to attend a university with a good creative writing program; his goal is to become a writer. When I asked how he would use braille in the future, he shared he would use it to write and to continue to read, and stay in touch with people. Luke placed first in the varsity category, at his Regional Braille Challenge event in 2017.

Luke shared only one suggestion for TVIs to assist their students to develop their braille literacy skills, "Be patient and teach them at an easy steady pace" (Q28-P).

Luke revealed in the interview process that academic, environmental, personal, social, and family components influenced his braille literacy development. At the time of our meeting, Luke had been exposed to two very different educational experiences. He started pre-school in public school, and then enrolled in a Midwestern residential school for the blind from kindergarten through sixth grade. He returned to the public schools from seventh grade to present. Luke received TVI support during his academic career in the public schools via an itinerant model.

Academic Influences

Luke began receiving braille instruction during pre-school in public school (Q3-Ps). He recalled the TVI taking him to side of the classroom and "teaching me the Perkins" (Q5-P2). At the public school, Luke received instruction from the TVI once a week (Q7-P2). From kindergarten through sixth grade, Luke was enrolled a Midwestern residential school for the blind, where he received braille instruction daily (Q7-P2a). In seventh grade, Luke was once again enrolled in a public school where braille literacy instruction decreased to "once or twice a month" (Q7-P2c). Luke said that instruction further diminished in high school to, "On occasion, when the TVI comes to see me, she is not always in the campus office," (P7-P2d) and he is not "yet working on UEB" (Q7-P2e). My field notes indicate that the TVI who is working with Luke has a large caseload. My experience has been that TVIs who have large caseloads are likely to spend more time with children who are experiencing academic difficulties. When asked, "How did your teacher teach you, and what books or materials were used to help you learn braille," Luke responded, "same curriculum as other students" (Q6-P2, Q8-P2). This approach to teaching braille is ideal as it provides children with maximal exposure to the general education curriculum and socialization opportunities with peers.

Luke reported that he had learned all the braille contractions by grade four or five. However, upon contemplating his learning, Luke questioned whether it was thorough enough. "(I) still wonder if I know all of them, occasionally, I will run into a symbol and not know what it means" (Q10-P2). Luke's braille learning experience was challenging as it can be for some children. He revealed that "it was complicated at first, but after figuring it out, I was intrigued and went with the flow" (Q9-P2). He also revealed that

"practice" (Q27-P2) is what helped him most in learning braille and recommended that teachers should teach at a "slow and steady pace" (Q28-P2). My experience is that instruction that emphasizes the importance and value of braille literacy can spark a child's desire and motivation to learn. Another challenge for Luke was the fact that his classroom teacher in public school did not provide support for his braille literacy development (Q16-P2).

According to the *ABLS* and *BRI*, Luke is a fluent contracted braille reader, despite the fact that he experienced negative and positive academic influences. The most negative influential factors were the classroom teacher not helping early literacy instruction and the limited and infrequent braille instruction from a TVI in grades seven through ten. The positive academic influences that Luke experienced were receiving early braille instruction, using the general education curriculum, having daily braille instruction from kindergarten through sixth grade, and his determination to learn regardless of the challenges he faced.

Environmental Influences

The school and home environment had a mixed effect on Luke's braille literacy development. The environment of his early public school was lacking braille books, other than text books (Q17-P2). Even though Luke did not directly mention the availability of braille books other than text books at the residential school for the blind, his response, "not in public school" (Q17-P2) implies that braille books were available. In his current public school, Luke uses electronic braille on a notetaker provided by the Education Service Center (Q22-P2). Less frequently is the availability of hard copy braille. Luke stated that he "occasionally (receives) hard copy braille in school" (Q22-P2). In lieu of

hard copy braille "someone will read classroom handouts in the classroom to me" (Q22-P2a). There are also barriers to Luke's continued braille literacy development. Namely, while materials are produced in braille "when the classroom teacher sends it to the braillist," he "does not receive it in a timely manner, a week or two later" (Q22-P2b), and the infrequent TVI support.

Currently at school, Luke is using an electronic notetaker, rarely uses the Perkins, and no longer uses the slate and stylus (Q23-P2). The school provides Luke with a printer from which he prints his assignments and submits them to his teachers (Q23-P3). In some instances, when Luke cannot produce a written math assignment, he will read his work out loud to his teacher (Q23-P3). This may be because Luke does not know how to create Nemeth code on the notetaker. Luke's inability to create some math assignments on the notetaker could be attributed to a lack of training on this device. Another element of the school environment that facilitated Luke's braille literacy development is membership to Bookshare and the NLS. Luke expressed that he is more comfortable using Bookshare over NLS (Q15-P2a). In his words, NLS is "complicated" (Q15-P2). This perception may be due to lack of training on how to access NLS.

Luke received support from his home environment that was conducive to braille literacy development. Most instrumental was his mention that his parents purchased braille books for him (Q14-P2).

Personal Influences

As with all learning, personal factors were influential in Luke's braille literacy development. What is particularly salient about Luke's braille learning experience, is that he evolved from seeing braille as complicated to being "intrigued" by it, and committing

to learn it (Q9-P2). Luke expressed that he felt “pretty good” about braille now (Q19-P2). More importantly, he expressed that he had been empowered by braille. He made this empowerment evident when he stated “it’s helped me discover something I can do on my own. So I can read, so I can do something instead of just sitting around” (Q20-P2). Furthermore, Luke shared that he uses braille to “write my own books, to chat with friends, and read” (Q21-P2). Luke’s intention is to use braille in the future to “write and continue to read, and stay in touch with people” (Q25-P2). A personal factor that influenced Luke’s braille literacy development and future use of braille is the fact that he enjoys braille and finds it to be essential to accomplish his vocational goals.

Social Influences

Luke's social interactions appear to have had some influence on his braille literacy development. My field notes confirm Luke's positive demeanor was evidence of the importance he placed on the fact that his teacher used the same curriculum when teaching him braille as was used to teach the other students in the class when he responded to the question, “How did your teacher teach you?” "The same curriculum as the other kids" (Q6-P2). Later in the interview, Luke responded with the same pride in his voice when he answered the question “What books or materials were used to help you learn braille?” His response was "Same curriculum as other students" (Q8-P2). In my experience, this is an important indication of social integration. A young child's perception of equality when he/she is taught alongside his peers using the same materials, and not being singled out as different by using different materials, is valuable. My experience confirms that during Luke's seven years at a Midwestern residential school for the blind, he would have most certainly experienced a high level of social interaction with his peers who were also blind

or visually impaired. Daily classroom and dorm interactions are integral to the education at a residential school for the blind.

Although Luke may experience a certain level of camaraderie in his current public high school, when he relies on his peers who are sighted to "read classroom handouts in the classroom to me" (Q20-P2a); there is no evidence to support that this camaraderie extends outside of the classroom into teenage friendship. At the time of this interview, Luke shared that he is not involved in any extracurricular activities (Q29-P2) or any social activities (Q30-P2).

Family Influences

Family influences played a role in Luke's braille literacy development. He shared that his parents did "not (help) much" to teach him braille (Q11-P2). However, a certain level of involvement was evident when he answered the question, “Did your parents/family learn braille?” With pride in his voice, Luke answered "My dad learned uncontracted braille, self-taught through Hadley" (Q12-P2). Additionally, family involvement is evidenced by the fact that Luke did have braille books at home when he was first learning braille (Q13-P2), and he continues to have braille books at home, purchased through an online service (Q14-P2). My experience as a TVI and the literature is clear that family support for a child who is learning braille is of great value just as the family support is for a child who is learning print.

Summary

Luke's braille literacy development was impacted by the five a-priori identified codes: academic, environmental, personal, family, and social. Luke’s educational experience differs slightly from other participants in this study in that he has been

exposed to two contrasting educational experiences. He started preschool in public school, and then enrolled in a Midwestern residential school for the blind from kindergarten through sixth grade. Luke returned to the public schools in seventh grade to the present (Q7-P2-P2c).

The data analysis revealed that the academic component was the most influential in his braille literacy development. He began receiving braille instruction during preschool in public school (Q3-P2). Luke reported that he had learned all of the braille contractions by grade four or five. However, upon contemplating on his learning Luke questioned whether it was thorough enough. "(I) still wonder if I know all of them; occasionally, I run into a symbol and not know what it means" (Q10-P2). He shared that "It was complicated at first, but after figuring it out, I was intrigued, and went with the flow" (Q9-P2). He also shared that "Practice" (Q27-P2), is what helped him most in learning braille and that teachers should teach at a "slow and steady pace" (Q28-P2). What is particularly notable about Luke's braille learning experience, is that he evolved from considering braille as a complicated task to being intrigued by it, and committing to learn it (Q9-P2). Luke expressed that he felt "pretty good" about braille now (Q19-P2). Yet, more importantly, he expressed that he had been empowered by braille. He made this empowerment evident when he stated "It's helped me discover something that I can do on my own" (Q21-P2). Furthermore, Luke shared that he uses braille to "Write my own books, to chat with friends, and read" (Q21-P2). Luke's intention is to use braille in the future to "write and to continue to read and stay in touch with people" (Q25-P2).

The school and home environment had a mixed effect on Luke's braille literacy development. His early public school was lacking braille books other than textbooks

(Q17-P2). Even though Luke did not directly mention the availability of braille books other than textbooks at the residential school for the blind, his "Not in public school" (Q17-P2) implies that braille books were available at the school for the blind. In his current public school, Luke uses electronic braille on a notetaker, which has been provided to him by an Education Service Center (Q22-P2). Less frequently is he afforded the availability of hard copy braille.

A personal factor that influenced Luke's braille literacy development, and future use of braille is the fact that he enjoys braille and finds it to be instrumental to accomplish his vocational goals.

Luke's social interactions appear to have had a limited influence on his braille literacy development. Yet, he appreciates that he is able to perform academic tasks that do not deviate from what his classroom peers are doing.

Family influences were found to play an important role in Luke's braille literacy development. He shared that his parents or family did "not (help) much" to teach him braille (Q11-P2). However, a certain level of involvement was evident when he answered the question, “Did your parents/family learn braille?” With pride and gratitude in his voice, Luke answered "My dad learned uncontracted braille, self-taught through Hadley" (Q12-P2). Additionally, family involvement is evidenced by the fact that Luke did have braille books at home when he was first learning braille (Q13-P2), and he continues to have braille books at home, purchased through an online service by his parents (Q14-P2).

Subthemes

The subthemes that emerged from the data analysis of Luke's interview were tenacity, goal setting, self-empowerment, commitment, enthusiasm, gratitude and engagement.

Tenacity. Tenacity is a subtheme that resulted from the data analysis. Luke reported that he had learned all of the braille contractions by grade four or five. However, upon reflecting on his learning Luke questioned whether this learning had been thorough enough. "(I) still wonder if I know all of them, occasionally I run into a symbol and not know what it means" (Q10-P2). He revealed that "It was complicated at first, but after figuring it out, I was intrigued, and went with the flow" (Q9-P2). He also revealed that "Practice" (Q27-P2) is what helped him most in learning braille. Luke evolved from seeing braille as a complicated task to being intrigued by it, and committed himself to learn and develop this skill (Q9-P2). This commitment and his efforts to practice, lend credence to his tenacious attitude to persevere toward reaching his goals.

Goal Setting. Goal setting is a theme that emerged from the tenacity subtheme. At the time of our interview, Luke was a sophomore in high school and already had definitive plans for his future. He expressed that he wants to "(attend) University, with a good creative writing program to become a writer" (Q31-P2). In my experience, most students Luke's age either do not know what they want to pursue after high school or are not definite on ideas they are contemplating. My field notes show that Luke was definite and determined to achieve his set plans. There was no doubt in his voice or demeanor when he shared his plans with me.

Self-empowerment. Self-empowerment intertwined with self-advocacy is an additional subtheme. The empowerment afforded to Luke through his braille literacy development was evident when he expressed that he had been empowered by braille, making this evident when he stated "It's helped me discover something that I can do on my own (Q21-P2).

In 7th grade, when Luke was once again enrolled in a public school, braille literacy instruction decreased to "once or twice a month" (Q7-P2c). Luke said that instruction further diminished in high school to "on occasion, when the TVI comes to see me." Luke has self-advocated and established a process to read math assignments to the classroom teacher when he cannot produce the written assignment (Q23-P3). My experience has been that it is necessary for students who do not see a TVI on a regular basis, to develop strong self-advocacy skills in order to achieve the level of success that Luke has achieved.

Commitment. A valuable subtheme that arose is commitment on the part of Luke, his parents, and the TVIs.

Luke. When he was first learning braille, "It was complicated at first, but after figuring it out, I was intrigued, and went with the flow" (Q9-P2). This statement indicates that Luke put forth the effort necessary to learn braille and, after he figured it out and became intrigued, he committed himself to continue learning braille. He also revealed that "Practice" (Q27-P2) is what helped him most in learning braille." My experience has been that only those students who are determined to develop their braille literacy skills and put forth the effort to practice, become proficient contracted braille readers. Through

his own efforts and determination, Luke evolved from seeing braille as a complicated task to being intrigued by it, and committed himself to learn (Q9-P2).

Parents. Luke received support from his parents that influenced his braille literacy development. Most telling was his mention that his parents purchased books for him (Q14-P2). This financial commitment on the part of Luke's parents indicates a level of involvement. Additionally, his father learned uncontracted braille when Luke first started braille instruction.

TVI. When Luke started learning braille in preschool, in public school, he shared that the TVI used "The same curriculum as the other kids" (Q6-P2). This approach to teaching braille is ideal as it provides students with maximum exposure to the general education curriculum, and socialization opportunities with peers and can only be achieved through a strong commitment on the part of the TVI. Luke's TVI determined to assist Luke in his early braille literacy development, and took the initiative to establish memberships to Bookshare and the NLS.

Enthusiasm. Enthusiasm is another subtheme that the data revealed. My field notes indicate that Luke had a calm and easy-going personality. However, his enthusiasm for braille showed when he expressed his thoughts about braille, "It's helped me discover something that I can do on my own," and when he shared that he uses braille to "Write my own books, to chat with friends, and read" (Q21-P2). My field notes indicate that the tone in his voice changed to one of enthusiasm and expectation when he spoke of braille.

Gratitude. Gratitude is a defined subtheme in the data. Luke shared that his parents did "not (help) much" to teach him braille (Q11-P2). However, with pride in his voice Luke answered, "My dad learned uncontracted braille, self-taught through Hadley"

(Q12-P2). My field notes indicate that his demeanor changed when speaking of his dad's efforts to learn braille, even though there was little assistance from his dad to teach Luke. Additionally, there was a clear attitude of gratitude regarding his education at a residential school for the blind, as reflected in my field notes.

Engagement. Luke demonstrated engagement in his academic pursuits and his braille literacy development. His initial confusion with the code and his subsequent pondering as to whether he knows all of the contractions has not deterred him from continuing to be engaged in his education. His ability to transition from public school to a residential school and back to a public school is evidence of his dedication and engagement. Further evidence of Luke's engagement is found in his previous subthemes.

Participant Four - Demographic Information

Peter is a sixteen year old young man and, at the time of our meeting, he was at the end of his junior year of high school. Peter's blindness is the result of an optic nerve tumor, which was diagnosed shortly before his fifth birthday. He is the only student with whom we met at his home. It is evident that Peter's parents are involved in his education and encouraged Peter to speak up and advocate for himself. His mom shared that they are involved with the National Federation of the Blind (NFB). Peter shared with me that he is involved in the University Interscholastic League (UIL) and other school activities that provide social interactions with his peers. Peter is also the only participant who has had only one TVI throughout his educational journey.

In the Inclusion Criterion Questionnaire, the gatekeeper stated that Peter is a fluent contracted braille reader who is reading on or above grade level. His proficiency was confirmed by his results on the *ABLS* and the grade-appropriate reading

comprehension sections of the *BRI* that I administered at our meeting (See Appendices K and L). Peter's reading speeds ranged from 88-103 words per minute. His comprehension ranged from independent to independent/instructional. The gatekeeper explained that Peter has participated in literacy assessments required of all students in his general education program. The gatekeeper assessed Peter's level of proficiency using the braille code, and his general education program assessed his literacy development. When I asked Peter how he feels about braille, his response was, "It is the only medium I can read. I like it pretty good" (Q19-P2). He shared that when he first started to learn braille he "thought it was pretty cool. There were times when I was learning, I had trouble going from reading the braille to typing it. I was having a hard time visualizing how it was supposed to be typed. For The most part I thought it was cool" (Q9-P2). "Braille has helped me succeed in school. I love it" (Q20-P2).

Peter plans to attend a Texas university to major in engineering. When I asked how he would use braille in the future, he shared that it is his primary mode of reading and writing; therefore, he will use it for "everything." Peter has been participating in the Braille Challenge for several years. In 2015, he placed 2nd in the national competition, and in 2016, he placed 1st in his local regional event.

Peter shared a few suggestions for TVIs to assist their students to develop their braille literacy skills. "Make sure students have a good foundation in knowing the braille letters, contractions and symbols. Find books that they're interested in, so they enjoy learning it, so it's not just work, it's fun and interesting for them to learn" (Q28-P).

Peter's interview data revealed that the academic, environment, personal, family, and social components influenced his braille literacy development. Of these factors, Peter noted that academic influences were most significant in his learning experience.

Academic Influences

Peter first started to learn braille in kindergarten when he enrolled in school at the age of five (Q3-P2). Peter shared that if "print was really big, I could probably still read it with my eyes" (Q4-P2). Peter shared that he had learned to read print prior to kindergarten (Q4-P6). This statement is significant as often, when children can read print, albeit with effort, they may be steered by teachers to learn print instead of braille. Evidently, Peter had a progressive eye condition. He expressed "Both of my eyes at the time could see. My right eye was better then left eye. I was past the border between print and braille, but I could still read print barely" (Q4-P2). Best practices in the field of vision recommend that if a child has a diagnosed progressive condition, braille instruction should begin early, based on educational need. When a student has a diagnosed progressive eye condition, the need to teach braille is more pressing than if the student has a stable vision condition (Paths to Literacy, n.d.a). After he began to learn braille, Peter shared, "(I) kept up with a few of the shapes of the print letters, so I could write my name" (Q4-P4). Children without adequate functional vision need to be aware of how the letters of the print alphabet are formed and to be given instruction in manuscript, cursive, and signature writing. They need to learn to write their signatures because a signature is critical for signing checks, applications, and the many forms that one must complete over the course of a lifetime (Wolffe, 2000). Students who are blind need to develop a basic print-writing skill to develop a legal signature (Koenig &

Holbrook, 2000c). Learning to write his name may be attributed to the foresight of his TVI. Best practice in the field of vision encourages TVIs to not only prepare students for the present, but foresee their future needs. Peter received support during his entire academic career from the same TVI via an itinerant model.

When Peter first started receiving braille instruction, his TVI taught him uncontracted braille (Q8-P4). Peter was introduced to contracted braille at some point during the first grade (Q8-P4). Peter stated that he had learned the braille contractions by "the end of the second semester of second grade, or the first semester of third grade (Q10-P2). My experience indicates that the mastery of the braille contractions by this time in his education is on par with expectations and future success. Peter shared that he was exposed to several academic strategies that were fundamental to his braille literacy development. One teaching strategy was the use of "big blocks with braille on them, big dots" (Q6-P2). He shared that his TVI had several tools similar to this one. Additionally, throughout the years, the TVI taught Peter braille music, allowing him to participate in band playing the French horn (Q19-P6). The braille music also afforded him the opportunity to learn to play the piano, guitar, ukulele, mandolin, and saw (Q19-P6). Currently, Peter uses electronic braille on a notetaker "almost exclusively" (Q22-P2; Q23: P2). He also uses audio on various devices and knows how to use a slate and stylus but does not use it regularly (Q15-P2; Q24-p2).

Further evidence of Peter's academic support for the development of his braille literacy was provided in his detailed description of frequency of service delivery. He was the only participant who disclosed his service delivery in detail. At the beginning, in kindergarten, he received instruction 3 to 4 times a week. This frequency of instruction

decreased as he progressed through the grades. At present, Peter explained that services from his TVI include: "Direct time, one hour and a half, every six weeks, broken up into 45 minute chunks. Indirect time (is), about one hour. This (time) is for materials I need brailled or delivered. Math needs to be translated or made clear how to braille it" (Q7-P6).

Despite the overwhelming evidence of supportive academic interactions, in terms of classroom teacher support, Peter indicated that teachers were limited to teaching him content (Q16-P2). This delegation of teaching responsibilities to the TVI is not unusual and has been evident throughout all of the participant's data.

Peter had a lengthy set of recommendations for TVIs. These recommendations included: "Make sure students have a good foundation in knowing the braille letters, contractions, and symbols. Find books that they're interested in so they enjoy learning, so it's not just work, it's fun and interesting for them to learn" (Q28-P2).

Environmental Influences

The school and home environment were found to be conducive to Peter's braille literacy development. Namely, these environments were considered conducive to learning if they had evidence of appropriate books, electronic devices, and library resources. Peter expressed that, at his school there were "a few books we would read in class and my VI teacher brailled those. I would read those along with the class" (Q8-P2). The school provided Peter with a Perkins Braille Writer, which he used in kindergarten until he was introduced to a notetaker in the second semester of the second grade (Q11-P3, P4, P6). Additionally, Peter had braille books available other than textbooks in his classroom (Q15-P2). Finding braille books other than textbooks in an elementary

classroom is unusual. My field observations and experience suggest that most elementary school classrooms lack braille books other than textbooks.

Another resource that enhanced Peter's braille literacy development was the use of Bookshare and NLS library. Peter shared that he used Bookshare more than NLS. His limited use of NLS may be due to his perception of the difficulty in accessing NLS and his perception of available material. Specifically, Peter perceived that NLS had "limited BRF books (electronic braille files)" and it was "a pain" to create an NLS account (Q15-P2). Whereas with Bookshare, Peter felt that this resource was easily accessible, comprehensive in terms of resource availability, and free from error (Q15-P4).

In terms of the home environment, Peter expressed that he did have available resources. Peter shared that when he first started learning braille, he had books purchased from Seedlings at home (Q13-P2). When asked, "Do you have braille books at home now?" He responded "yes, not many" (Q14-P2). Peter's current limited availability of braille books at home may be due to the fact that he downloads books from Bookshare. My field notes suggest that Peter's family is invested in his education and purchased a notetaker to support his braille literacy development.

Personal Influences

Peter demonstrated a high degree of personal motivation towards academic success. From the data analysis, it is evident that he made a special effort to go beyond expectations to develop braille literacy skills. Peter's attitude toward learning braille reflected enthusiasm. When asked, "How did you feel when you were learning braille?" He responded, "I thought it was pretty cool. There were times when I was learning, I had trouble going from reading the braille to typing it. I was having a hard time visualizing

how it was supposed to be typed. For the most part, I thought it was cool" (Q9-P2). The enthusiasm that Peter expressed toward learning braille is of particular importance considering his sudden vision loss prior to his fifth birthday. In fact, this speaks to a high degree of resiliency as he was able to embrace learning braille rather than resist it. When asked if he was OK with learning braille, Peter simply answered "yes" (Q9-P4). He acknowledged that currently it is "the only way I can read fluently" and that he uses it with "math, music and everything" (Q21-P2). Peter considers that braille has helped him "succeed in school" (Q20-P2). When asked about his appreciation for braille, Peter said, "I love it" (Q20-P2). Further evidence of Peter's appreciation for braille resonates when he shared, "it is my primary form of reading and writing, I will use it for everything" (Q25-P2).

Family Influences

Data analysis of Peter's interview confirmed that family influences played a significant role in his braille literacy development. Peter's parents assisted him early on with his braille literacy development. This was evident when Peter shared that both of his parents learned the braille alphabet "so they could help me" (Q12-P2). He shared that "they did not learn a whole lot of it. Probably Mom more than Dad, but both of them learned it" (Q12-P2). Additionally, he stated that "They had cheat sheets, if I came across a contraction I didn't remember or recognize, they could tell me what it stood for" (Q11-P2). This statement is noteworthy, as in my experience, I have found that often parents do not assist their child in learning braille, regardless of how supportive they may be of the endeavor. When he first started to learn braille, his parents purchased braille books for Peter from Seedlings (P13-P2). Peter did state that currently he has braille books at home,

"not many" (Q14-P2). It is my experience that students at this age prefer to download books from Bookshare or NLS rather than have to deal with bulky hard copy volumes. My field notes indicate that his parents purchased an expensive notetaker for Peter, on which he was able to complete school work and download books. Family support was also evident when Peter shared that occasionally his school work was dropped off at his TVI's house so that she could interline it. In my experience, not all parents would be willing to take time out of their busy schedule to go out of their way to drop off school work at the TVI's home.

Social Influences

Social interactions appear to have a limited influence on Peter's braille literacy development. He shared that at times he uses a slate and stylus when "sighted friends" want to see braille (Q23-Pb). This may suggest that Peter values braille literacy and finds pride in his skill. He played in his middle school band, and currently he plays the guitar in high school (Q19-P2). These extracurricular activities provide Peter with socialization opportunities, and he is able to develop his braille music literacy skills. Additionally, Peter shared that he competes in University Interscholastic League (UIL) Speech and Debate (Q29-P2). Outside of school, Peter is involved with The National Federation of the Blind (Q3-P2). From my experience, I am aware that this national organization's fundamental tenets promote self-advocacy and braille literacy.

Summary

Peter noted that academic influences were most significant in his learning and braille literacy development. Peter first started to learn braille in kindergarten when he enrolled in school at the age of five (Q3-P2). This is when his TVI taught him to read

uncontracted braille (Q8-P4). He was introduced to contracted braille later during the first grade (Q8-P4), and eventually, he mastered all the braille contractions by "the end of the second semester of second grade, or the first semester of third grade" (Q10-P2). Currently, Peter uses braille on an electronic note taking device "almost exclusively" (Q22-P2; Q23:P2). He also uses the audio function on various devices and knows how to use a slate and stylus but does not use it regularly (Q15-P2; Q24-p2). In kindergarten, Peter received instruction 3 to 4 times a week. The frequency of instruction that he received decreased as he progressed through the grades. At present, Peter explained, the services from his TVI include: "Direct time, one hour and a half, every six weeks."

Peter expressed that when he first started to learn braille at his school, there were "a few books we would read in class and my VI teacher brailled those." Another resource that enhanced Peter's braille literacy development was the use of Bookshare and NLS libraries. Peter shared that when he first started learning braille, he had books purchased by his parents from Seedlings at home (Q13-P2).

A high degree of Peter's personal motivation towards academic success was revealed through the data analysis. Most relevant is the evidence that he made a special effort to go beyond expectations to develop braille literacy skills. Peter considers that braille has helped him "succeed in school" (Q20-P2). When asked about his appreciation for braille, Peters said "I love it" (Q20-P2). Peter shared that both of his parents learned the braille alphabet "so they could help me" (Q12-P2). Social interactions also appeared to influence Peter's braille literacy development. He played in his middle school band and currently he plays the guitar in high school (Q19-P2). These extracurricular activities provide Peter with socialization opportunities, and through them, he is able to develop his

braille music literacy skills. Additionally, Peter shared that he competes in UIL Speech and Debate (Q29-P2). Outside of school, Peter is involved with The NFB (Q3-P2).

Subthemes

The subthemes that emerged from the analysis of Peter's interview data were tenacity, goal setting, self-empowerment intertwined with self-advocacy, commitment, enthusiasm, gratitude, and engagement.

Tenacity. Peter shared that when he started school if "print was really big, I could probably still read it with my eyes" (Q4-P2). He shared that he had learned to read print prior to kindergarten (Q4-P6). In my experience, children who have some vision when they start school resist the learning of braille. Peter demonstrated a certain degree of tenacity by embracing the learning of braille. After he began to learn braille, in his words "(I) kept up with a few of the shapes of the print letters, so I could write my name" (Q4-P4). Writing his name was an additional skill he pursued. Peter stated that he had learned the braille contractions by "the end of the second semester of second grade, or the first semester of third grade" (Q10-P2). My experience indicates that the learning of the braille contractions by this time in his education is on par with expectations. Peter's vision loss was sudden shortly before his fifth birthday. Undoubtedly he and his parents were forced to make personal, family and educational changes at this point in their lives. Despite this major change in his young life, Peter demonstrated great tenacity and embraced the learning of braille.

Goal setting. Goal setting is a subtheme that emerged from the tenacity subtheme. Involvement in extracurricular activities such as band or UIL is not required in school. Therefore, his desire to be involved in band and UIL prompted his desire to learn

braille music and to continue to develop his literacy skills. This goal to participate was his personal goal, and he self-advocated to learn the music. When I asked Peter what his plans for the future looked like, he responded, "College and major in engineering, probably industrial engineering. A&M or Rice." My field notes indicate that his determination was clear in his voice when he spoke of his plans to attend a Texas university. Additionally, he had no doubt that he would achieve his goals.

Self-Empowerment. Self-empowerment intertwined with self-advocacy is a notable subtheme in Peter's data. Peter was introduced to contracted braille at some point during the first grade (Q8-P4). The TVI taught Peter braille music, allowing him to participate in band playing the French horn (Q19-P6). He also learned to play the piano, guitar, ukulele, mandolin, and saw (Q19-P6). His determination to learn the braille contractions empowered him to want to learn braille music, and subsequently learn to play several instruments. Involvement in music programs is not required in school; therefore, his involvement in band and his desire to learn braille music in order to play in the school band was his personal goal and he self-advocated to learn the music. His self-advocacy is evident in his educational success and involvement in music and UIL. It is my experience that extracurricular involvement requires self-confidence and self-advocacy on the part of the student. While these activities are open to all students, it is the responsibility of the student to pursue successful involvement. Additionally, extracurricular activities such as band and UIL are highly visual activities. In order for a student who is blind or visually impaired to participate successfully, a great deal of determination, self-empowerment, and self-advocacy is necessary. My field notes

indicate that Peter plays a leadership role in the student division of NFB. This organization strongly promotes self-empowerment and self- advocacy.

Commitment. This subtheme was clearly defined on the part of Peter, his parents, and TVI.

Peter. A certain level of commitment would be necessary for Peter to have learned the braille contractions by "the end of the second semester of second grade, or the first semester of third grade" (Q10-P2). This is noteworthy considering Peter's sudden loss of vision shortly before his fifth birthday. Peter was also determined to learn how to write his name in print (Q4-P4). His commitment to learn braille music allowed Peter to participate in band playing the French horn (Q19-P6). He also learned to play the piano, guitar, ukulele, mandolin, and saw (Q19-P6). Peter's successful academic participation in dual-credit classes demonstrates a high level of commitment on his part. My field notes indicate an active participation in a leadership role in the NFB Youth division. His commitment to this organization has been a fruitful experience.

Parents. Parental involvement was evident when Peter shared that when he first started learning braille, he had books purchased from Seedlings at home (Q13-P2). His parents purchased a notetaker to support his braille literacy development. His parents assisted him early on with his braille literacy development. This was evident when Peter shared that both of his parents learned the braille alphabet "so they could help me" (Q12-P2). Family support was also evident when Peter shared that occasionally his school work was dropped off at his TVI's house so that she could interline. My field notes indicate that his parents accompanied Peter to Los Angeles to participate in Braille Challenge competitions. Outside of school, Peter and his parents are involved with NFB (Q3-P2).

My experience is that this national organization's fundamental tenets promote self-advocacy and braille literacy.

TVI. Learning to write his name may be attributed to the foresight of Peter's TVI. In kindergarten, he received instruction 3 to 4 times a week. This frequency of instruction decreased as he progressed through the grades. At present, Peter explained that services from his TVI include: direct and indirect time (Q7-P6). When he started school, there were "a few books we would read in class, and my VI teacher brailled those." Another resource that enhanced Peter's braille literacy development and was initiated by the TVI were the use of Bookshare and NLS library. The TVI also taught Peter braille music, allowing him to participate in band playing the French horn (Q19-P6).

Enthusiasm. Enthusiasm is a subtheme that emerged from the data analysis. When asked, "How did you feel when you were learning braille?" He responded, "I thought it was pretty cool. There were times when I was learning, I had trouble going from reading the braille to typing it. I was having a hard time visualizing how it was supposed to be typed. For the most part, I thought it was cool" (Q9-P2). The enthusiasm that Peter expressed toward learning braille is of particular importance considering his sudden vision loss prior to his fifth birthday. Peter considers that braille has helped him "succeed in school" (Q20-P2). When asked about his appreciation for braille, Peter said "I love it" (Q20-P2). My field notes indicate that Peter expressed enthusiasm for all learning. He shared with me his plans to take advanced placement (AP) Physics and AP Chemistry his senior year of high school. The audio tapes of our meeting evidence his delight when he read for me and when he answered my comprehension questions. Peter is

a young man who delights in learning, evidenced by his tone when he shared his high school learning experiences with me.

Gratitude. Gratitude is another subtheme that arose from the data. My field notes indicate that Peter held a high regard for his TVI. He shared that she taught him not only what he needed at the time, but also prepared him with skills he would need in the future. His tone was that of pride when he shared that his TVI had been selected Teacher of the Year through the Braille Institute. Peter is the only participant who had only one TVI throughout his educational journey. Additionally, when he shared with me that both his parents learned braille and assisted him when he first started to learn braille, my notes indicate a level of gratitude toward his parents. Peter shared with me that his parents participate in NFB, and they join him when he travels to Los Angeles for Braille Challenge competitions.

Engagement. As with the other participants, Peter demonstrated a high level of engagement in his education and literacy development. Due to the fact that his vision loss occurred shortly before his fifth birthday, a complete round-about was necessary in his educational foundation. Nevertheless, Peter embraced the learning of braille, and as evidenced by his prior subthemes, he achieved academic success. The level of success that Peter achieved in school and outside of school would not have been possible if he was not committed and engaged in his educational pursuits.

The following figures illustrate the common influencing factors and unanticipated findings.

Figure 4.1 A-priori Codes.

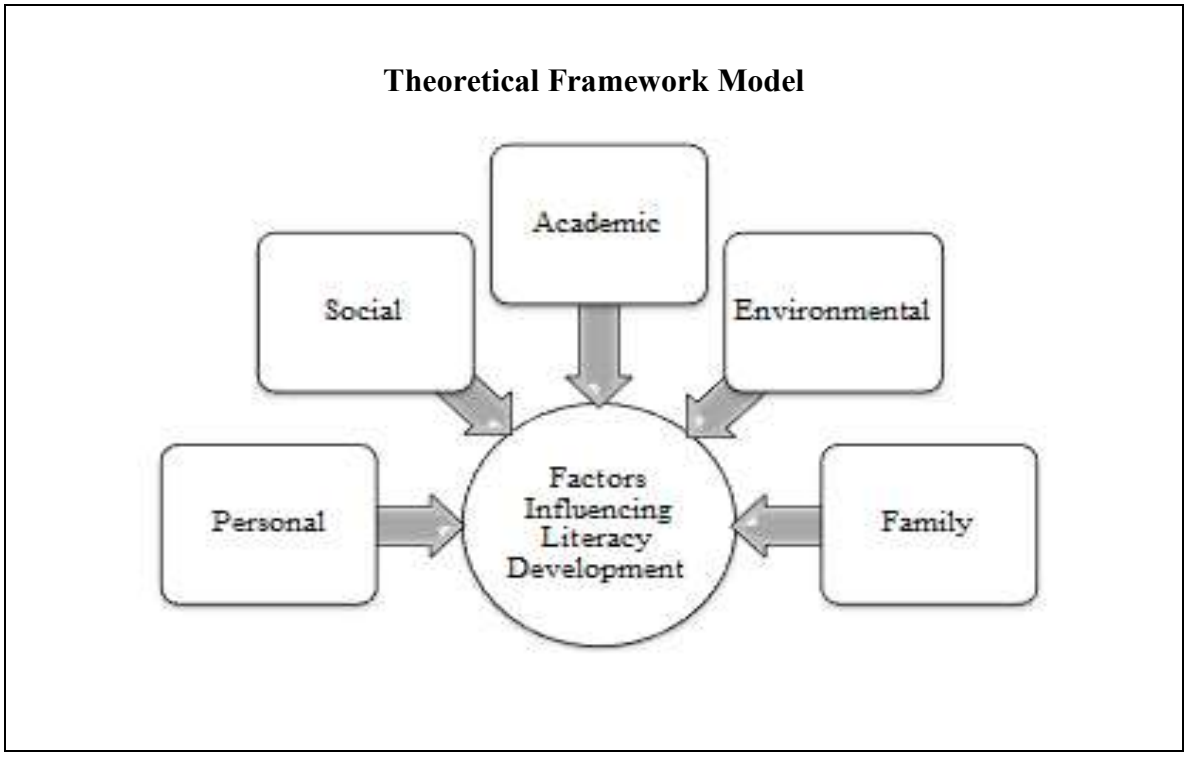
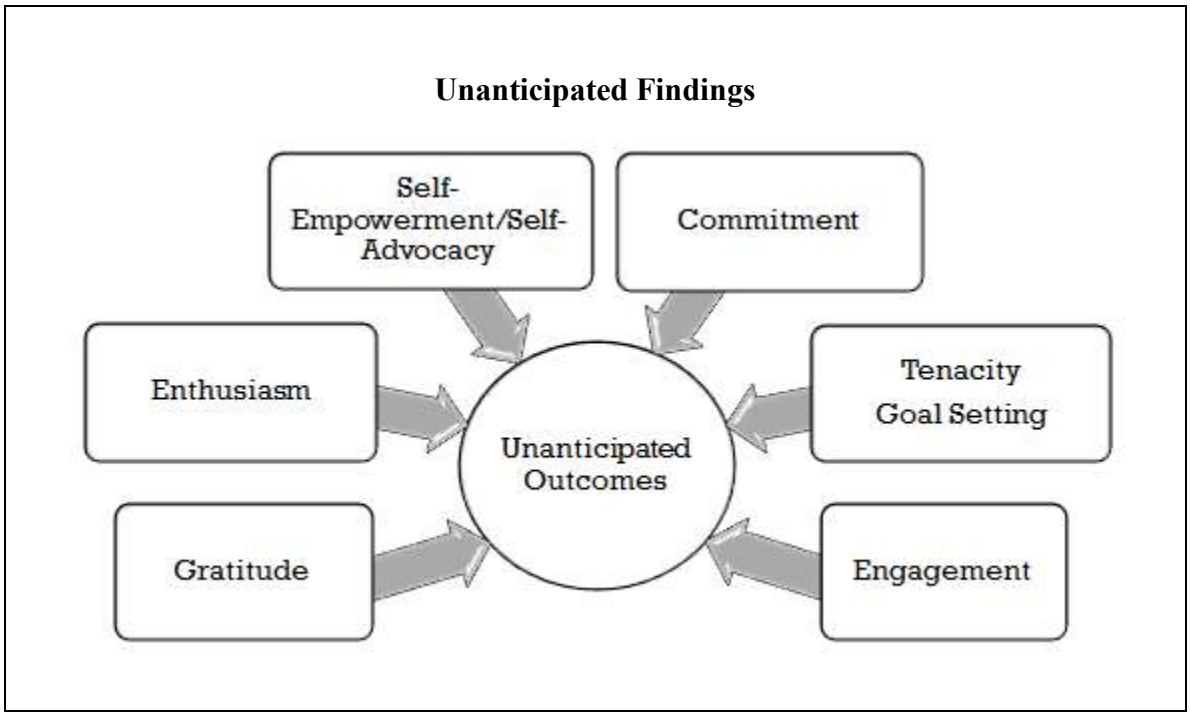


Figure 4.2 Unanticipated Findings that Evolved from the Data



Commonalities

The purpose of this dissertation study was to identify and compare the commonalities found in four students in grades 10-11 in a southwestern state in the United States who possess comprehensive braille literacy skills. By means of qualitative data analysis, I sought to determine what academic factors, personal and/or family dynamics, and environmental or social components influence the learning of braille for a student who is blind or visually impaired. My participants were three young men and one young lady ages 16 and 17, in high school, grades 10-11, who were fluent braille readers, were English language braille users, and had no additional disabilities other than blindness or visual impairment. The forthcoming information is a brief description of the commonalities that I identified through the interview process. I will discuss the findings of my study in Chapter V.

David, Esther and Luke have a congenital eye condition. David has no vision; Esther, Luke and Peter have light perception. Peter was diagnosed with an optic tumor shortly before his fifth birthday that caused his blindness. Peter explained "nothing wrong with my eyes directly" (Q1-P2). When the students first started to learn braille, they had little to no vision other than light perception. Peter was able to read print if the letters were "really big; I was past the border between print and braille, but I could still read print barely" (Q4-P2).

The most notable commonality in the education of my four participants is that the academic component was the most influential in their braille literacy development. The social component played varying degrees of influence. David, Esther, and Luke had little to no social interactions with sighted peers. Peter was the only student involved in

extracurricular activities with peers who are sighted, and is involved in a national organization with other students who are blind or visually impaired.

David and Luke started learning braille in pre-school, Esther began learning braille at home with her mother prior to starting kindergarten, and Peter began learning in kindergarten. David, Esther, and Peter have experienced a public-school education to date, and Luke has experienced both public school and at a residential school.

David, Luke and Peter began learning braille using a Perkins Braille Writer. Esther, who started learning braille at home from her mother while they still lived in Korea, used a slate and stylus. They were transitioned to electronic notetakers early in their elementary years.

The four students experienced a different level of service delivery from a TVI when they first started learning; however, they shared the experience of decreased time as they progressed through the grades. David received daily instruction in elementary school. While in middle and high school, the TVI provided him with assistance in math and science. Esther reported that in kindergarten she received daily instruction. During middle school, a TVI provided support in math and science classes. She explained that in high school, she sees the TVI twice a week. Luke received once-a-week instruction in public school pre-school. During his kindergarten through 6th grade years at a Midwestern residential school for the blind, he received instruction daily. In the seventh and eighth grade, Luke received TVI services "once or twice a month" (Q7-P2f). Luke now receives TVI services “on occasion when the TVI comes to see me" (Q7-P2d). Peter shared that he received services 3 or 4 times a week "at the beginning" (Q7-P2). He shared that the time has decreased as he progressed through the grades. David, Luke, and

Peter were taught using the general education curriculum when they started to learn braille.

When asked how they felt when they were learning braille, Esther, Luke and Peter shared that it was complicated for them; however, once they figured it out, they were comfortable with it. When asked how they feel about braille now, Esther shared, "I love it" (P19-P2); Luke answered, "pretty good" (Q19-P2); Peter responded to this question by saying, "It is the only medium I can read, I like it pretty good" (Q19-P2); and David shared, "I used to hate it because I wasn't like my peers" (Q9-P2). When I asked him how he feels about braille now David responded, "It has its place" (Q19-P2).

The students mastered the braille contractions at different times in their elementary years; however, their mastery was on target for academic success. Their mastery ranged from third or fourth grade, second grade, fourth or fifth grade, second or third grade.

Regarding parents learning braille, all four students reported that one or both parents learned uncontracted braille, three moms and two dads. However, they also reported that assistance from parents to learn braille was varied, ranging from none to some or minimal. David, Luke, and Peter reported to have had braille books at home when they first started to learn braille. These books were either purchased by the parents, borrowed from school, or from the state library. At the time of our interview, David shared that he might have books at home. Esther reported that she downloads braille books from Bookshare. Luke reported that he has books at home purchased through Amazon, and Peter said that he did, but not many. All four participants are members of Bookshare and the State Library. These memberships were established by their TVI.

When asked how the general education teacher helped them use braille in the classroom when they started learning, all four students said she did not. David, Esther, and Peter reported that they had braille books other than textbooks in the classroom. Luke shared that he did not in public school.

When asked how they use braille now, Esther, Luke and Peter's responses wove a thread of self-empowerment, self-advocacy, self-reliance, and independence. David shared that he uses braille in math and science classes. The four students use electronic braille, occasionally using hard copy braille. The four participants shared that they will continue to use braille in the future.

David, Esther, and Luke shared that they are not involved in any social or extracurricular activities. Peter is involved with UIL, band and the NFB. They all have decisive determined plans for the future.

Esther, Luke, and Peter shared that they enjoy reading braille. David shared "It's doable, I find that I am slower. ... It works, I just prefer to use speech" (Q26-P2). When asked what they thought had helped them to become good braille readers, their answers were varied; however, a thread of self-determination and tenacity ran through their answers.

The following statements are my participants' answers to the question, "How has knowing braille helped you?" David - "It Means that I can read"; Esther - "With everything, there is still much to learn but learning braille has made learning everything else easier"; Luke - "It's helped me discover something I can do on my own, so I can read, so I can do something instead of just sitting around"; Peter - "Braille has helped me succeed in school. I love it."

CHAPTER V
DISCUSSION

Introduction

The purpose of this dissertation study was to identify and compare the commonalities found in four students who are blind or visually impaired in grades 10-11 in a southwestern state in the United States and who possess comprehensive braille literacy skills. I sought to determine what academic factors, personal and/or family dynamics, and environmental or social components influenced the learning of braille for these students. In addition, I was open to any other themes that emerged from the data analysis. My literature review revealed that no evidence of parallel studies, examining commonalities among braille readers who possess comprehensive fluent braille literacy skills in grades 10-12, currently exists.

In this chapter, I will discuss the findings, implications for practice, limitations of my study, and implications for future research.

Braille Literacy Skills

The four participants possessed comprehensive braille literacy skills as evidenced by the Academic Section of *ABLS* and the grade-appropriate comprehension passages of *BRI*. Their reading speed varied; however, their WPM did not influence their comprehension. Their comprehension was excellent and ranged from independent to independent/instructional levels. The gatekeepers all reported that these students were fluent contracted braille readers on grade level, based on their individual assessments, state required assessments, and class work. Some participants (i.e., Esther and Peter) had successfully taken dual credit courses.

Further, the students reported that they had mastered all of the braille contractions at different times. David in 3rd or 4th grade; Esther in 2nd grade; Luke in 4th or 5th grade, although he pondered if he knew all of them, sharing that occasionally he would come across a symbol and not know what it meant; and Peter shared that he had learned them by the end of the 2nd semester of 2nd grade, or 1st semester of 3rd grade. David and Luke received braille instruction from a TVI in pre-school, and Esther received initial instruction at home from her mother. Peter began learning braille in kindergarten.

The Institute of Reading Development (IRD, 2017) proposes that the first stage of learning to read begins when children are 4 or 5 years old and begin to learn their letters. This stage is considered to be complete once learners achieve fluency in easy readers, books written with a controlled vocabulary and simple sentences. Students usually achieve the goals of stage 1 during second grade, although some children complete this stage mid-first grade or mid-third grade. Based on this information, David, Esther, and Peter were on par with their peers who were sighted.

The Institute also recognizes that the second stage of learning to read is developing independent reading skills. This begins when children achieve fluency in easy readers, usually at some point during second grade. When children enter stage 2, some have already transitioned from oral to silent reading, and the rest will make that transition in the upcoming year. Stage 2 is completed when children achieve fluency in children's novels, usually in third or fourth grade. Some students complete this stage in second grade or later in fifth grade. Based on this information and on their mastery of the braille contractions, all four students were on par with their peers who were sighted.

Braille readers experience a three-pronged challenge when developing their skills. These challenges are: (a) to decode braille as patterns of texture under the moving finger pad or finger pads, (b) to gain the linguistic meaning of the braille code, and (c) to coordinate movements of reading fingers with perceptual and linguistic processing (Hughes, 2011). These challenges are further punctuated by Swenson (2013) who delineates fundamental differences between braille and print. Among these differences are that braille learners have significantly more symbols to learn than their sighted counterparts. Also, in braille, nearly every character is a top-bottom, left-right reversal of one or more other characters, and there are multiple meanings for individual characters. Braille characters often have more than one meaning, depending on their position in the braille cell, in a word, or in a sentence. Additionally, punctuation marks are the same size and shape as letters and contractions. And lastly, braille is different from print in that braille characters are relatively redundant and have few identifying characteristics.

Analysis of the data revealed that the academic component was the most important influence in the development of comprehensive braille literacy skills for the participants. While all four students demonstrated braille and academic proficiency, I identified some concerns with their literacy development experience. The students reported to have limited use of hard copy braille. They reported that this was due to the limited braille proficiency on the part of the person preparing the braille. They also reported problems with the classroom teachers not sending materials to the braillist in a timely manner. Students are often prevented from meaningful participation in learning because instructional materials are inaccessible to them (Hatlen, 2004; Hoben & Lindstrom, 1980; LaVenture, 2003).

Another concern that may be considered a barrier in their learning is that their service delivery from a TVI is often limited. The students experienced different service delivery times when they first began learning braille. David reported that in elementary school, the teacher came every day. David did not specify how long the teacher stayed on a daily basis to provide instruction. Esther reported that in kindergarten, she received daily services. Again, she did not specify the amount of time. Luke shared that in preschool, in public school when he was first learning, the teacher came once a week. Peter reported services at the beginning were 3 or 4 times a week. Daily instruction is critical for the development of braille literacy skills. Ideally, instruction should range from one to two hours per day (Koenig & Holbrook, 2000a; Corn & Koenig, 2002).

Consistent with best teaching practices, well-designed reading instruction in braille is associated with the development of proficient literacy skills in children who are blind or visually impaired (Emerson, Sitar, Erin, Wormsley, & Herlich, 2009). Instruction must focus on basic reading processes and not just on the braille code, which most students seem to master with relative ease (Emerson, Holbrook, et al., 2009). It is the responsibility of the TVIs to incorporate reading processes into their instruction, monitor student progress along with the classroom teacher, and be ready to take the lead in seeking further assessments, resources, and interventions if students start to fall behind (Swenson, 2011).

The use of contractions in reading and writing requires specific, direct ongoing instruction. Students' braille skills need to be continually monitored to ensure the early detection of and intervention for deficits before they affect other areas of learning (Tallon & Herzberg, 2013). Contractions cannot be introduced and not be monitored.

The four students reported that their time with a TVI decreased throughout the years. In my experience, this is not necessarily unusual; however, my concern stems from my field notes that indicate that all four students felt that currently additional time with a TVI would be beneficial. Continued intensive instruction in writing and reading from a teacher who knows braille is imperative throughout the elementary school years (Emerson, Holbrook, et al., 2009; Harley et al. 1997; Koenig & Holbrook, 2000a; Swenson, 1999). Reducing TVI services is not in the students' best interest, as time with a TVI is essential to facilitate mastery of the expanded core curriculum (ECC) as students progress through the grades. These are unique educational needs specific to students who are blind or visually impaired beyond the core curriculum provided in the public schools. The ECC includes (a) compensatory or functional academic skills, (b) orientation and mobility, (c) social interaction skills, (d) independent living skills, (e) recreation and leisure skills, (f) career education, (g) assistive technology, (h) sensory efficiency skills, and (i) self-determination (American Foundation for the Blind, 2017d). The domains of the ECC should be systematically and intentionally addressed by all members of the instructional team, resulting in dramatic improvement of independence and readiness for the post-school environment for a student who is blind or visually impaired (Dignan, n.d.). Visual impairment can affect all areas of functioning, beyond the classroom. The ECC affords an extension beyond the core curriculum of reading, writing, and calculation. It includes skills necessary to benefit from instruction in the core curriculum and to achieve functional independence. This curriculum provides opportunities for equality for students who are blind or visually impaired. Dignan (n.d.) states that to not teach the ECC is to deny this basic human right.

It appears that children are not receiving this degree of personalized attention as evidenced by the findings from this study. The lack of social interactions and social skills reported by the participants is of great concern and should be addressed as part of the ECC.

Another academic concern that should be noted is the lack of involvement of the classroom teachers with my participant's literacy development. All four participants reported that the classroom teacher did not play a role in their braille literacy development. The collaboration between classroom and TVIs is paramount in the development and maintenance of a successful reading program for students (Emerson, Sitar, et al., 2009).

I also identified findings from this study that suggest that there are concerns with the degree in which family components influence a child's literacy development. Family support may be considered to be one of the most important influences in establishing a foundation to developing braille literacy skills. My field notes indicate that once the students began learning braille, parent involvement in their braille literacy development dwindled throughout their child's academic career. The data did reveal some family involvement in the area of time and financial investment. Several parents did attempt to learn braille when their child first started their instruction. Some parents purchased braille books for their children to have at home; however, they did not continue to pursue their own braille proficiency.

Children who are blind or visually impaired are likely to move towards reading instruction with fewer concepts of written language than are their peers who are sighted (Tompkins & McGee, 1986). There are two reasons why potential braille readers do not

begin their literacy instruction on the same footing as their sighted peers: (a) the lack of exposure to braille, and (b) the absence of understanding that reading and writing fulfill specific functions in this society (Marvin & Mirenda, 1993). There is sufficient evidence in the literature that clearly suggests that children who have been exposed to emergent literacy activities at a young age demonstrate higher rates of achievement in reading in later school years; therefore, literacy begins in the home (e.g., Senechal & LeFevre, 2002). While family involvement has received some attention in the literature, it is certainly necessary to continue exploring this issue from a perspective that leads to parental empowerment to support their child who is visually impaired in their academic development.

The social component was found to reveal several notable concerns that may influence a learner's braille literacy experience. The students reported little to no extracurricular activity and no social activities. Esther shared that she met with peers when their mothers got together, but not often. Peter participated in UIL, band, and outside of school, NFB sponsored functions. David attended a one-week summer camp with other students who are blind or visually impaired. Academic success is not all that students need if they are to thrive as productive, fulfilled citizens in our society (Sacks & Wolffe, 1992). Students educated solely within the public schools can lead sheltered lives. This is most evident of adolescents who are blind or visually impaired whose peers are involved in age-appropriate, teenage activities that rely on sight, and who may benefit from exposure to structured activities that can alleviate their social isolation in the mainstream (Sacks, Wolffe, & Tierney, 1998).

My field notes reveal that my participants did not participate in any social activities with their peers who are sighted. The ability to relate to peers is necessary for young children's development in a number of areas (Hartup, 1983). An important process resulting in various developmental benefits is the establishment of peer relationships and requires several social skills (Guralnick & Groom, 1987). Balancing successful academic achievement with mastery of a unique set of skills that promote independence and social competence is a challenge in the education of students who are blind or visually impaired, at the same time holding them responsible to the same high academic standards as their peers who are sighted (Sacks et al., 2009). They must demonstrate the ability to engage with classmates and adults, successfully travel a school campus, and complete classroom assignments and activities in a timely manner. I pose the question that if students do not possess appropriate social skills, how are they to function in a sighted society? Sacks and Silberman (2000) propose that effective social skills are needed for successful progression in school, integration into society, and finding and maintaining employment. Teaching social skills to students who are blind or visually impaired is the responsibility of the TVI, since this is an area of the ECC (Sacks & Silberman, 2000).

Almost all social skills employed by children and adults who are sighted have been learned through visual observation of the environment and other persons. Children and adults who are blind or visually impaired do not casually and incidentally learn appropriate social interaction skills as persons who are sighted. Therefore, these skills must be carefully, consciously, and sequentially taught to students who are blind and visually impaired (American Foundation for the Blind, 2017d). The existing core curriculum does not address this crucial need in a satisfactory manner; therefore,

instruction in social interaction skills is part of the ECC. This is a fundamental need, and it can often mean the difference between social isolation and a satisfying and fulfilling life as an adult (American Foundation for the Blind, 2017d). It is imperative to note that, given the lack of social interactions reported by my participants in this study, they would have certainly benefitted from instruction by a TVI in social skill development as delineated in the ECC.

Discussion of Findings

In this study, I sought to determine what academic factors, personal and/or family dynamics, and environmental or social components influenced the learning of braille for my four participants who are blind or visually impaired. After an exhaustive data analysis process, the development of five a-priori themes, the discovery of subthemes, and the careful scrutiny of my field notes and observations, I am confident that I answered the initial research question with resulting questions for future research.

The academic component was examined in terms of instruction and the interactions of the student with the TVI and the classroom teacher. More specifically, the academic component was examined in regard to its influence on the participant's braille literacy development. The most notable, and perhaps natural, finding, which is of great importance, is the role that the academic component played in the development of braille literacy for all four participants.

Another important finding from this research is that service delivery time provided to each student diminished as they progressed through their education; however, it was evident that TVI presence and influence was instrumental to the child's learning and academic development. Due to the fact that all students have their own unique

learning needs and styles, the type of service delivery provided to students should reflect their need for specialized instruction at different times in their development. These needs may change as the student progresses through his or her education (Willings, 2015). In general, all the TVIs that the participants reported on provided direct services and transcription of student produced work and in class assistance, particularly for math and science. Braille production of materials for student use was varied. Brailled materials produced either by the TVI or a braillist were more often than not, not received in a timely manner by the students. The data indicates that this was either due to the latency of the classroom teacher or the inexperience of the person producing the braille. This study found that the general education classroom teacher provided no support for the development of braille literacy to any of the students.

The students began receiving braille instruction either in pre-school, kindergarten, or at home prior to starting kindergarten. The data revealed that the students' personal determination, motivation, and initiative had a significant role in their braille literacy development. Self-motivation can have a vast impact on student success in school. Until about age seven, children are naturally motivated to learn. After this time, they will need the ability to motivate themselves. Self-motivation is a vital skill for success (Enright, 2015). It is important to note that three of the students had several TVIs during their academic career to date. One student had the same TVI from kindergarten to the present. It is also important to note that Luke spent grades 1-6 at a residential school for the blind.

The personal component was examined to understand how the student's personal attitudes, dispositions, and perceptions are important in considering their influence on academic success and future employability. The personal component was varied in

importance to the student's braille literacy development. The data revealed that for Esther, the personal component was secondary in importance to her braille literacy development. Whereas David's, Luke's, and Peter's data revealed that this component was third in importance. David's data revealed that, in the beginning, he resisted the learning of braille as a result of his belief that learning braille made him different from his peers. However, the data also revealed a change in David's attitude as he developed his braille literacy skills. His attitude merged into one of seeing braille as a tool that he had at his disposal when he chose to use it. Esther, Luke and Peter's attitudes towards braille were consistent as they learned and developed their skills. Their data indicate some difficulty with the mechanics in the beginning; however, their love of braille grew with the development of their skills. For Esther, Luke, and Peter, their braille literacy is paramount in their lives and will continue to be of great importance to them.

The family dynamic was specifically examined in terms of how family support influenced braille literacy development. As is evident in my literature review, family support and interaction with the learning process is paramount to success in the development of braille literacy skills. Also as evidenced in my literature review, family support may be considered to be one of the most important influences in establishing a foundation to developing braille literacy skills. Empowerment occurs when parents and families experience confidence that they have the information and problem-solving skills that are needed in their personal situations (Harrison et al., 2003). According to the National Agenda for the Education of Children and Youths with Visual Impairments, parental involvement is important and essential in the education of their children (Corn, Hatlen, Huebner, Ryan, & Siller, 1995).

The data also revealed that, even though family involvement was present from the conception of their braille literacy development, the prominence of this component was relegated to having minimal influence on the student's literacy development. The data showed that either one or both parents made an effort to learn braille in order to support their child's literacy development. However, the data also revealed that none of the parents continued with their learning of braille past some basic uncontracted skills. Additionally, the data showed that parental support for some students was evident in their financial investment of books and technology.

The environmental component was examined to understand how the school and home influenced the development of braille literacy skills in terms of available resources within the school and home, specifically accessible online libraries, materials and books at school and home, and assistive technology. The environmental component was varied in importance. Once again, it was Esther who showed a difference. Her data revealed the environmental component to be third in importance, whereas the other participants ranked the environment as a second most cited source of their braille literacy development.

The participants were provided with resources such as technology and memberships to libraries that enhanced their braille literacy development. Libraries, education, literacy, and national development (i.e., economic, social, culture and political development) (Pathak, 2007) have always been intertwined and have influenced everyone from the primary school students to the highest levels of education. Over the past several years, education has experienced the positive involvement of libraries (InfoScience Today, 2017). Assistive technology provides students who are blind or visually impaired

increased access to the general education curriculum, increasing the potential for academic success. These tools provide them with independence to compete effectively with peers who are sighted (Willings, 2015). Additionally, the students had access to braille books at school and at home.

The social component was shown to have the least influence in the student's braille literacy development. Esther and Luke reported to have no involvement in extracurricular or social activities. David reported that the extent of his social activities is his attendance at summer camp for a week with other students who are blind or visually impaired. Peter's data revealed his involvement in UIL, band, and outside of school, the NFB.

Much discussion has occurred regarding the social skills of children who are blind or visually impaired. Studies have been conducted and articles have been written, and yet social skills continue to be of ongoing concern for our children. It is a well-known fact that social skills develop naturally for children who are sighted. This takes place through observation and incidental learning. Social interactions begin at home and then the child's social circles gradually widen as they get older. These skills play an important role in a student's success in the community and workplace (Sacks, 2017). Children who are blind or visually impaired are either unable or have difficulty learning appropriate social skills through observation and imitation. Therefore, ongoing assistance from parents and TVIs is crucial for them to develop the self-esteem, self-confidence, and sense of identity that they need for social competence (Sacks & Silberman, 2000).

Unanticipated Findings

Beyond the findings that were examined in light of the a-priori themes, this study found a series of subthemes that should not go unnoticed. These subthemes are: tenacity, self-empowerment intertwined with self-advocacy, commitment, enthusiasm, gratitude, and engagement.

The participants demonstrated tenacity when they overcame initial difficulties in learning braille and were determined to learn it. They learned the contractions and became fluent contracted braille readers possessing comprehensive literacy skills. Ability is simply not enough when striving for academic achievement. It is important also to have the correct mindset and apply appropriate strategies for overcoming obstacles, staying on task, and learning and growing over the long-term. Academic tenacity is not about being smart, but learning smart (Kaufman, 2014).

Gratitude is an additional subtheme revealed under the tenacity theme. Esther regarded her mother with respect and gratitude for her efforts to teach her braille. The data analysis of Luke's interview indicates his gratitude towards his father's efforts to learn braille. Peter was clearly grateful to his one TVI for all her efforts to ensure his success in school and his development of braille literacy skills. According to Froh, Miller, and Snyder (2007), an important component of positive psychology and essential to living the good life is gratitude. It is interconnected with positive outcomes, subjective well-being, relational support, and prosocial behavior (Froh, Miller, & Snyder, 2007).

Goal-setting was a subtheme under the tenacity subtheme. The students set goals for themselves involving furthering their education by learning technology, advanced math skills, participating in UIL, learning braille music, and learning to play instruments.

Often these skills were self-taught, or they advocated for themselves to be taught by the TVI. Of great importance is that the data revealed that the four students had definite plans for their future involving university or a two year program. They demonstrated decisiveness in their plans for a future career. They communicated no wavering or indecisiveness when it came to their future goals.

Self-empowerment intertwined with self-advocacy, is the second subtheme to emerge from the data analysis. The data shows that the students experience a sense of self-empowerment because they are able to read, write, and communicate with others through the use of braille. This self-empowerment has allowed these students to be enthusiastic and decisive about their future. Self-empowerment is the act of taking control of our own lives, setting goals, and making positive choices (Shah, 2016). An understanding of our strengths and weaknesses, and to have a belief in ourselves is essential. My field notes indicate that these four participants demonstrated a strong self-esteem and self-confidence combined with their belief in their skills and abilities. Their attitude was one of success and belief in their abilities, regardless of their blindness.

Self-advocacy was a thread intertwined with self-empowerment, which ran through the data analysis. The students advocated for themselves with teachers, parents and Education Service Center specialists regarding their needs, including learning how to speak up for themselves, making their own decisions about their lives, learning how to get information so that they could understand things that are important, defining support systems, knowing their rights and responsibilities, problem solving, listening and learning, reaching out to others when they need help and friendship, and learning about self-determination (U.S. Department of Education, 2014).

The third subtheme that emerged from the data analysis was commitment. Commitment on the part of the students, parents, and TVIs was evident throughout the data. This commitment was evident and of great importance to the braille literacy development of the students. The students exhibited great commitment to their learning as evidenced by their braille and academic success. They were determined to overcome obstacles and developed not only comprehensive braille literacy skills, but were committed to be successful academically, developing strategies and processes for achieving their goals. My participants were committed to teach themselves technology, advanced math skills, and to learn to play instruments by learning braille music. Student commitment is evident in their determined plans for the future.

Parental commitment was varied but nevertheless, it was evident. Investment of time, finances, and support was present in the data. Esther's mother demonstrated commitment by teaching Esther braille at home prior to their move to the United States. The parents committed to learning uncontracted braille, although they did not pursue their own proficiency.

TVI commitment was clear in terms of service delivery, resources, and their efforts to prepare the students for the future. Although the services were varied and some concerns exist (e.g., services were found to be lacking), services that were provided were a committed effort. TVIs committed to the student's education when they decided to utilize the same curriculum to teach the students braille as was used to teach the sighted children to read. Their initiation of library memberships was also a demonstration of their commitment.

Enthusiasm is a subtheme that emerged clear in the data. The students' enthusiasm for braille and what they are able to do as a result of learning braille is evident in the data. Additionally, Peter showed a marked enthusiasm for all learning including music. Luke's enthusiasm was evident when he spoke of writing his own books. Esther wanted to pursue advanced math skills, and her enthusiasm was present when she spoke about teaching herself advanced math concepts. David's enthusiasm was clear when we spoke about technology and his desire to work in assistive technology.

Gratitude emerged from the data as a subtheme. Esther regarded her mother with respect and gratitude for her efforts to teach herself and subsequently Esther braille. The data analysis of Luke's interview indicates his gratitude towards his father's efforts to learn braille. Peter was clearly grateful to his one TVI for all her efforts to ensure his success in school and his development of braille and music literacy skills. According to Froh, Miller, and Snyder (2007), an important component of positive psychology and essential to living the good life is gratitude. It is interconnected with positive outcomes, subjective well-being, relational support, and pro-social behavior (Froh et al., 2007).

Engagement was the final subtheme clearly marked in the data of my four participants. Without marked engagement on the part of the students, they would not have been able to achieve the level of success that they did. Parents, schools, TVIs, and the community can provide or not provide the best educational experience for our children; however, if they do not possess the desire to be engaged, pro-active, and self-determined, they will not succeed.

Implications for Practice

The data analysis and subsequent findings indicate several implications for practice. First, while the academic component was revealed to be of great importance to the student's braille literacy development, the classroom teacher involvement was nonexistent. How much richer would the learning of these students have been with classroom teacher involvement? I suggest that as TVIs providing services to students engaged in the general education curriculum, they need to expect and ensure the involvement of the classroom teacher. Secondly, the minimal provision of prepared braille materials for these students indicates a lack of service. I suggest that a concerted effort needs to be made on the part of TVIs to ensure that their students receive, in a timely manner, well prepared brailled materials. In addition, the literature shows that family involvement is integral to the development of braille literacy skills. As TVIs, we should encourage this involvement well beyond the early intervention and pre-school years. The social component is another area of concern. Social interactions are visually rich encounters that many times our students miss. As TVIs in the public schools, concerted efforts need to be made to not only encourage but to provide our students with the skills that should be taught through the ECC to facilitate these social encounters. Additionally, independent living skills, which encompass a broad range of skills, are key components of the ECC for students with visual impairments (Kelley & Smith, 2000) and should be addressed by the TVI.

Limitations of Study

In addition to the limitations I previously discussed in Chapter I and III, I found the following limitations to be noteworthy. The time I spent with students was restrictive. A one and a half to two hour session was inadequate. While the students were energetic

and willing to participate in my study, the session was involved and thought provoking. Spending two days with each student for approximately one to two hours would have better suited my purposes. In a replication of my study I would prefer to conduct the literacy evaluations on one day and the interview on another.

The Assessment of Braille Literacy Skills (*ABLS*) is an instrument designed to follow students from grade to grade. This tool gives the current and future TVI a broad view of literacy development progress. I was not afforded this view into the student's literacy development because I chose not to gain entry into the public schools. I believe that the lack of this information, if available, was a limitation as it would have provided me additional data. Also, although the *BRI* is used widely to assess literacy proficiency, it is not specifically designed for children who are blind or visually impaired braille readers.

Implications for Further Research

Braille literacy continues to be a significant concern and global discussion, and as such, future research is warranted. A replication of my study would be of value with the addition of parental, student, and teacher input. Additionally, a written survey completed by both parents and students would provide the participants the opportunity to ponder their answers and provide valuable information. The written answers from students would give the researcher a written sample of their literacy proficiency. Expanding the study to the written component would be valuable information.

Given that studies involving children who are blind or visually impaired historically have small samples, expanding the study to other states and possibly middle school students would provide a larger sample. I would be interested in conducting these

variations of my study along with the inclusion of middle school students in the future. My study included three young men and a young lady, and a larger sample would allow a comparison of the literacy development between boys and girls. A study investigating resiliency in students who are blind or visually impaired may reveal needs and provide educational suggestions for those responsible for their education.

Summary

Through the analysis of the data I collected to answer my research question, I sought to determine what academic factors, personal or family dynamics, and environmental or social components influence the learning of braille for a student who is blind or visually impaired.

The overall theory that emerged is that the academic component was the most significant influence in the braille literacy development of my participants. This fact reinforces the importance of the educational setting, amount of time devoted to braille instruction, classroom teachers, and TVI in a students' education. A dual partnership between home and environment would be most conducive to braille literacy development with the responsibility being shared by the family and school. The least prominent component was the social interaction in which the students engaged. This finding is of great concern in regard to the well-being and social implications for students who are blind or visually impaired. It has been my experience that social interactions for students at this age may be difficult due to the nature of the visual contact involved. Personal, family, and environmental factors had varying degrees of importance. Through the data, it was clear that some students have resources available to them while others do not.

These resources vary depending on family involvement, socio economic status, and TVI involvement.

The subthemes that emerged from the data analysis were: tenacity, with goal setting as a theme under it; self-empowerment intertwined with self-advocacy; commitment, enthusiasm, gratitude, and engagement.

Conclusion

In order for children to be successful in mathematics, science, history, and language arts, the ability to read and write is essential. In the United States, learning reading and writing skills is regarded as a birthright (Geisler, 1994). Consistent, well-designed reading instruction in braille is associated with the development of proficient literacy skills in children who are blind or visually impaired (Emerson, Sitar, et al., 2009). It is important to keep in mind that technological advances, such as audio on demand and speech output on many devices, may dispose individuals outside the field of blindness education to misguidedly believe that braille is no longer necessary. Braille is necessary for literacy, representing access that audio and speech output do not. Often, braille is the gateway to independence and employment (Meador, 2016). Ashcroft (1963) states that braille is a complete reading and writing medium in which reading and writing requires essentially the same functions as any other reading and writing, for the purpose of gaining and conveying meaning.

When we as parents send our children who are sighted to school, we are entrusting the education system to provide a good quality education in which our children will develop literacy and numeracy skills, social skills, and the rudimentary competence to be successful in life. As parents, we should be expected to partner with the education

system in preparing our children for life as successful productive independent citizens. When parents of children who are blind or visually impaired send their children to school, they should have the same expectations, hopes and dreams for their children.

When teachers of students with visual impairments enter their chosen profession, we should do so not with the attitude that we are going to save the world but that we are going to teach, champion, and assist in the provision of the best possible education for our students. When general education teachers decide to in bark on a career in the education arena, their attitude should be one of inclusion, acceptance, and a strong desire to teach all children, which should include children who are blind or visually impaired. Our children who happen to be blind or visually impaired deserve the same educational experiences as their peers who are sighted. In order to level the playing field for our children, literacy, whether it is braille or print literacy, and the opportunity to grow and develop should be the norm and not the exception. Much has been written in past decades regarding the education of children who are blind or visually impaired. Studies have been conducted, books and articles have been written, and many people have made careers in the field of vision.

As a veteran TVI, who happens to be blind, I propose it is simpler than we have for decades made it out to be. Our children are more alike to their counter parts who are sighted than we think. Our children deserve the opportunity to develop braille literacy skills. It is unconscionable to think that a child who is sighted would not be afforded the opportunity of literacy; I propose that it is also unconscionable to think that a child who is blind or visually impaired would not be afforded the same opportunity.

Through my dissertation stud, I have met with four young people in high school who shared with me their experiences as they developed braille literacy skills. I have written about their experiences, shared their suggestions, and provided my interpretations of their experiences. It is my hope that my study will provide our field with some thought-provoking considerations when it comes to teaching our children to be independent, self-sufficient, literate individuals.

REFERENCES

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print: A summary*. Urbana-Champaign, IL: University of Illinois.

Ajuwon, P. M., & Oyinlade A. O. (2008). Educational placement of children who are blind or have low vision in residential and public schools: A national study of parents' perspectives. *Journal of Visual Impairment and Blindness, 102*, 325-339.

Alreck, P., L., & Settle, R. B. (1995). *The survey research handbook*. Burr Ridge, IL: Irwin Professional Publishing.

American Foundation for the Blind. (2017a). Braille. *Living with Vision Loss*. Retrieved from http://www.afb.org/info/living-with-vision-loss/braille/12

American Foundation for the Blind. (2017b). *Glossary of Eye Conditions*. Retrieved from http://www.afb.org/info/living-with-vision-loss/eye-conditions/12

American Foundation for the Blind. (2017c). Screen Reader. *AFB Store*. Retrieved from Screen Reader http://www.afb.org/ProdBrowseCatResults.aspx?CatID=49

American Foundation for the Blind. (2017d). The Expanded Core Curriculum for blind and visually impaired children and youths. *Programs and Services*. Retrieved from http://www.afb.org/info/programs-and-services/professional-development/education/expanded-core-curriculum/the-expanded-core-curriculum/12345

American Printing House for the Blind (APH). (2016). *Annual Report, Fiscal Year 2016: The year of braille*. Retrieved from http://www.aph.org/files/annual-reports/APH-Annual-Report-FY16.pdf

Anderson, R. C., Wilson, P. T., & Fielding, L. G. (1988). Growth in reading and how children spend their time outside of school. *Reading Research Quarterly, 23*, 285-303. Retrieved from http://www.jstor.org/stable/748043?seq=13

Anthony, A. (2016). Reading rate vs. fluency. Retrieved from http://education.seattlepi.com/reading-rate-vs-fluency-1742.html

Anthony, J. L., & Francis, D. J. (2005). Development of phonological awareness. *Current Directions in Psychological Science, 14*, 255-259. doi:10.1111/j.0963-7214.2005.00376.x

Argyropoulos, V. S. (2002). Tactual shape perception in relation to the understanding of geometrical concepts by blind students. *British Journal of Visual Impairment, 20*, 7-16. doi:10.1177/026461960202000103

Argyropoulos, V., Katsoulis, P., & Eliadou, C. (2006). Teachers' and blind students' attitudes towards braille: A comparative study. *Proceedings of the 12th International Council for Education of People with Visual Impairment (ICEVI) World Conference 2005, Kuala Lumpur, Malaysia*, 1-9. Retrieved from http://icevi.org/publications/icevi_wc2006/03%20%20access%20_to_%20literacy_through_braille%20or%20print/Papers/eu_007_vassilios%20&%20others.pdf

Argyropoulos, V. S., & Martos, A. C. (2006). Braille literacy skills: An analysis of the concept of spelling. *Journal of Visual Impairment & Blindness, 100*, 676-686.

Argyropoulos, V., Martos, A., & Leoutsakos, B. (2005). Blind students and spelling: An investigation into braille literacy skills. *Proceedings of the ICEVI European Conference 2005 on Education child- aiming for Excellence, Chemnitz*, 180-185. Retrieved from http://www.icevi-europe.org/chemnitz2005/icevi-chemnitz2005.pdf

Argyropoulos, V. S., Sideridis, G. D., & Katsoulis, P. (2008). The impact of the perspectives of teachers and parents on the literacy media selections for independent study of students who are visually impaired. *Journal of Visual Impairment & Blindness, 102*, 221-231.

Arter, C. (1997). The primary school child. In H. F. Mason & S. McCall (Eds.), *Visual impairment: Access to education for children and young people* (pp. 97-109). London: David Fulton.

Arter, C., & Mason, H. (1994). Spelling for the visually impaired child. *British Journal of Visual Impairment, 12*, 18-21. doi:10.1177/026461969401200106

Ashcroft, S. C. (1963). Blind and partially seeing children. In L. M. Dunn (Ed.), *Exceptional children in schools*. New York: Holt, Rinehart, and Winston.

Association for Education and Rehabilitation of the Blind and Visually Impaired (AER) (2013). Position Paper 3: Literacy Media Decisions for Students with Visual Impairments http://aerbvi.org/modules.php?name=News&file=article&sid=2621

Bailet, L. L. (2001). Development and disorders of spelling in the beginning school years. In A. M. Bain, L. L. Bailet, & L. C. Moats (Eds.), *Written language disorders: Theory into practice* (pp. 1-41). Austin, TX: Pro-Ed.

Baker, L., Sonnenschein, S., & Serpell, R. (1999). *A five-year comparison of actual and recommended parental practices for promoting children's literacy development.* Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada (ERIC Document Reproduction Service No. ED-435-466).

Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly, 34*, 452-477. doi:10.1598/RRQ.34.4.4

Barlow-Brown, F., & Connelly, V. (2002). The role of letter knowledge and phonological awareness in young braille readers. *Journal of Research in Reading, 25*, 259-270.

Barraga, N. (1963). Mode of reading for low vision students. *International Journal for the Education of the Blind, 12*, 107-107.

Bates, E. (1979). *The emergence of symbols: Cognition and communication in infancy*. New York: Academic Press.

Beers, K. (2003). *When kids can't read: What teachers can do: A guide for teachers 6-12*. Portsmouth, NH: Heinemann.

Bell, E. C., & Mino, N. M. (2013). Blind and visually impaired adult rehabilitation and employment survey: Final results. *Journal of Blindness Innovation and Research, 3*(1). Retrieved from https://nfb.org/images/nfb/publications/jbir/jbir13/jbir030101.html

Bennett, K. K., Weigel, D. J., & Martin, S. S. (2006). Children's acquisition of early literacy skills: Examining family contributions. *Early Childhood Research Quarterly, 17*, 295-317. doi:10.1016/S0885-2006(02)00166-7

Bentin, S., & Leshem, H. (1993). On the interaction between phonological awareness and reading acquisition: It's a two-way street. *Annals of Dyslexia, 43*, 125-148.

Berg, B. L. (1995). *Qualitative research methods for the social sciences* (2nd ed.) Needham Heights, MA: Allyn & Bacon.

Berg, B. L. (1998*). Qualitative research methods for the social sciences* (3rd ed.). Needham Heights, MA: Allyn & Bacon.

Berg B. L. (2009). *Qualitative Research for the social sciences* (7th ed.). Boston: MA: Allyn and Bacon.

Bernas-Pierce, J. (Ed.). (1998).Cortical visual impairment pediatric visual diagnosis fact sheet. *See/Hear 3*(4). Retrieved from http://www.tsbvi.edu/seehear/fall98/cortical.htm

Bergin, C. (2001). The parent-child relationship during beginning reading. *Journal of Literacy Research, 33*, 681-706. doi:10.1080/10862960109548129

Bertelson, P., Mousty, P., & D'Alimonte, G. (1985). A study of braille reading: Patterns of hand activity in one-handed and two-handed reading. *Quarterly Journal of Experimental Psychology Section A, 37* (2), 235-256.

Best, J. W., & Kahn, J. V. (1989). *Research in education* (6th ed.). Englewood Cliffs, NJ: Prentice Hall.

Biemiller, A. (2001). Teaching vocabulary: early, direct, and sequential. *American Educator, 25*(1), 24-28.

Bigelow, A. (1987). Early words of blind children. *Journal of Child Language, 14*, 47-56. doi:ccbleaj_ajag/S0305000900012721

Bigelow, A. (1990). Relationship between the development of language and thought in young blind children. *Journal of Visual Impairment & Blindness, 84*, 414-419.

Birks, M., & Mills, J. (2011). *Grounded theory: A practical guide*. Thousand Oaks, CA: Sage.

Bishop, V. E. (1996). Causes and functional implications of visual impairment. In A. L. Corn & A. J. Koenig (Eds.), *Foundations of low vision: Clinical and functional perspectives* (pp. 86-114). New York: AFB Press.

Bjorklund, D. F. (2000). *Children's thinking: Developmental function and individual differences* (3rd ed.). Belmont, CA: Wadsworth.

Blankenship, K. (2008). Reading is rocket science. *Journal of Visual Impairment & Blindness, 102*, 197-200.

Blischak, D. M., Shah, S. D., Lombardino, L. J., & Chiarella, K. (2004). Effects of phonemic awareness instruction on the encoding skills of children with severe speech impairment. *Disability and Rehabilitation, 26*, 1295-1304. doi:10.1080/09638280412331280325

Bobys, A. R. (2000). What does emerging literacy look like? *Young Children, 55*(4). 16-22.

Boyd, N. (n.d.). Grounded theory design: Definition, advantages & disadvantages (Psychology 105: Research Methods in Psychology course notes). *Study.com*. Retrieved from http://education-portal.com/academy/lesson/grounded-theory-design-definition-advantages-disadvantages.html#lesson

Brady, S., Fowler, A., Stone, B., & Winbury, N. (1994). Training phonological awareness: A study with inner-city kindergarten children. *Annals of Dyslexia, 44*, 26-59. Retrieved from

file:///C:/Users/Mom/AppData/Local/Microsoft/Windows/Temporary%20Internet%20Files/Content.IE5/GQ6D5THY/HL0929.pdf

Braille Institute of America. (2016). The Braille Challenge. Retrieved from http://www.brailleinstitute.org/braille-challenge-homepage.html?gclid=CNKV2P7S79MCFQEwaQodn0YFTA

Brennan, S. A., Luze, G. J., & Peterson C. (2009). Parents' perceptions of professional support for the emergent literacy of young children with visual impairments. J*ournal of Visual Impairment & Blindness, 103*, 694-704.

Bretherton, I. (1992). Social referencing, intentional communication, and the interfacing of minds in infancy. In S. Feinman (Ed.), *Social referencing and the social construction of reality in infancy* (pp. 57-77). New York: Plenum Press.

Broughman, S., Bien, E., & Shaughnessy, P. (1985). *Low achieving children: The first seven years*. Hillsdale, NJ: Lawrence Erlbaum.

Brummitt-Yale, J. (2014). What is reading fluency? *K12 Reader: Reading instruction resources*. Retrieved from http://www.k12reader.com/what-is-reading-fluency/

Bruns, D. A., & Pierce, C. D. (2007). Let's read together: Tools for early literacy development for all young children. *Young Exceptional Children, 10*(2), 2-10. doi:10.1177/109625060701000201

Bryman, A. (1988). *Quantity and quality in social research*. London: Unwin Hyman.

Bus, A. G. (2001). Joint caregiver-child storybook reading: A route to literacy development. In S. B. Neuman & D. K. Dickinson (Eds.), *Handbook of early literacy research* (pp. 179-191). New York: Guilford Press.

Bus, A. G. (2003). Social-emotional requisites for learning to read. In A. van Kleeck, S. A. Shahl & E. B. Bauer (Eds.), *On reading books to children: Parents and teachers* (pp. 3-15). Mahwah, NJ: Lawrence Erlbaum Associates.

Bus, A. G., van IJzendoorn, M. H., & Pelligrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research, 65*(1), 1-21. doi:10.3102/00346543065001001

Byrne, B., & Fielding-Barnsley, R. (1993). Evaluation of a program to teach phonemic awareness to young children: A 1-year follow up. *Journal of Educational Psychology, 85*, 104-111.

Calvo, M. G., & Carreiras, M. (1993). Selective influence of text-anxiety on reading

processes. *British Journal of Psychology, 84*, 375-388. doi:10.1111/j.2044-8295.1993.tb02489.x

Carreiras, M., & Álvarez C. J. (1999). Comprehension processes in braille reading. *Journal of Visual Impairment & Blindness, 93*, 589-95.

Carver, R. P. (1990). *Reading rate: A review of research and theory*. San Diego, CA: Academic Press.

Castellano, C. (2005). *Making it work: Educating the blind/ visually impaired students in the regular school*. Connecticut: Age Publishing.

Chall, J. S. (1996). *Stages of reading development* (2nd ed.). New York: Harcourt Brace.

Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (1990). *The reading crises: Why poor children fall behind*. Cambridge, MA: Harvard University Press.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage.

Cherry, K. (2016). What is the hawthorne effect? *Verywell*. Retrieved from https://www.verywell.com/what-is-the-hawthorne-effect-2795234

Clark, C., & Stoner, J. B. (2008). An investigation of the spelling skills of braille readers. *Journal of Visual Impairment & Blindness, 102*, 553-563.

Clark-Bischke, C., & Stoner, J. B. (2009). An investigation of spelling in the written compositions of students who read braille. *Journal of Visual Impairment & Blindness, 103*, 668-679.

Clay, M. M. (1991). *Becoming literate: The construction of inner control*. Portsmouth, NH: Heinemann.

Cohen, D., & Crabtree, B. (2006). Grounded Theory. *Qualitative Research Guidelines Project*. Retrieved from http://www.qualres.org/HomeGrou-3589.html

CNIB. (2013). Braille Literacy. *CNIB: Seeing beyond vision loss.* Retrieved from http://www.cnib.ca/en/living/braille/literacy/Pages/default.aspx

Coker, D. L., Jr., & Ritchey, K. D. (2010). Curriculum-based measurement of writing in kindergarten and first grade: An investigation of production and qualitative scores. *Exceptional Children, 76*, 175-193.

Commitment [Def. 2b]. (2017). In *Merriam-Webster online dictionary.* Retrieved from https://www.merriam-webster.com/dictionary/commitment

Comprehensive [Def. 1]. (2017). In *Merriam-Webster online dictionary.* Retrieved from https://www.merriam-webster.com/dictionary/comprehensive

Corn, A. L., Hatlen, P., Huebner, K. M., Ryan, F., & Siller, M. A. (1995). *The national agenda for the education of children and youths with visual impairments, including those with multiple disabilities*. New York: AFB Press.

Corn, A. L., & Koenig, A. J. (2002). Literacy for students with low vision: A framework for delivering instruction. *Journal of Visual Impairment & Blindness, 96*, 305-321.

Council for Exceptional Children (CEC). Division on Visual Impairments (2003). *Family-focused services for infants and young children with visual impairments*. Position paper. Retrieved from http://www.stemvi.com/public_html/Postion%20Papers/family_centered.htm

Council of Executives of American Residential Schools for the Visually Handicapped (CEARSVH). (1990). Literacy for blind and visually impaired school-age students. *RE:view, 22*, 159-163.

Craig, C. J. (1996). Family support of the emergent literacy of children with visual impairments. *Journal of Visual Impairment & Blindness, 90*, 194-200.

Craig, C. J. (1999). Home literacy experiences of a child with a visual impairment. *Journal of Visual Impairment & Blindness, 93*, 794-797.

Crandell, J., & Wallace, D. H. (1974). Speed reading in braille: An empirical study. *New Outlook for the Blind, 68*, 13-19.

Creswell, J. W. (2008). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (3rd ed.). Upper Saddle River, NJ: Pearson Education.

Crocker, A. D., & Orr, R. R. (1996). Social behaviors of children with visual impairments enrolled in preschool programs. *Exceptional Children, 62*, 451-461.

Cromer, R. F. (1973). Conservation by the congenitally blind. *British Journal of Psychology, 64*, 241-250. doi:10.1111/j.2044-8295.1973.tb01348.x

Cryer, H., and Home, S. (2011). Use of braille displays. *RNIB Centre for Accessible Information* (Research Report #15). Birmingham. Retrieved from https://www.rnib.org.uk/sites/default/files/2011_06_Use_of_braille_displays.doc

Culbertson, J., & Willis, D. (1993). Introduction to testing young children. In J. Culbertson & D. Willis (Eds.), *Testing young children.* Austin, TX: Pro-Ed Inc.

Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology, 33*, 934-945. doi: 10.1037/0012-1649.33.6.934

Cutter, J. (2004). Parents: Blind children's first mobility teachers: The early years. *Future Reflections, 23* (2), 45.

Cylke, F. K. (2001). Foreword. In J. M. Dixon (Ed.), *Braille into the next millennium* (pp. 1-3). Washington, DC: National Library Service for the Blind and Physically Handicapped and Friends of Libraries for Blind and Physically Handicapped Individuals in North America.

D'Allura, T. (2002). Enhancing the social interaction skills of preschoolers with visual impairments. *Journal of Visual Impairment & Blindness, 96*, 574-586.

Davidson, P. W., Appelle, S., & Haber, R. N. (1992). Haptic scanning of braille cells by low and high-proficiency blind readers. *Research in Developmental Disabilities, 13*, 99-111. doi:10.1016/0891-4222(92)90018-2

Davidson, P. W., Wiles-Kettenmann, M., Haber, R. N., & Apelle, S. (1980). Relationship between hand movements, reading competence and passage difficulty in braille reading. *Neuropsychologia, 13*, 629-635. doi:10.1016/0028-3932(80)90102-5

de Vega, M., Carreiras, M., Gutierrez, M., & Alonso, M. L. (1990). *Lectura y comprension [Reading and comprehension]*. Madrid: Alianza Editorial.

Denzin, N. K. (1970). *The research act: A theoretical introduction to sociological methods*. Chicago: Aldine.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2000*). Handbook of qualitative research* (2nd ed.). Thousand Oaks, CA: Sage

Denzin, N. K., & Lincoln, Y. S. (2003). *Collecting and interpreting qualitative materials* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Denzin, N., & Lincoln, Y. S. (2008). Introduction. The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research* (3rd revised ed., pp. 1-44). Thousand Oaks, CA: Sage.

Dignan, K. C. (n.d.). Expanded core curriculum. *Texas School for the Blind and Visually Impaired*. Retrieved from http://www.tsbvi.edu/tb-ecc

Dixon, J. M. (2001). *Braille into the next millennium*. Washington, DC: National Library Service for the Blind and Physically Handicapped and Friends of Libraries for Blind and Physically Handicapped Individuals in North America.

Dodd, B., & Conn, L. (2000). The effect of braille orthography on blind children's phonological awareness. *Journal of Research in Reading, 23*(1), 1-11. doi:10.1111/1467-9817.00098

Dostal J., & Hanley S. (2011). What is emergent literacy? *Learning about literacy*. Retrieved from http://archive.is/CyrH

Douglas, G., Grimley, M., Hill, E., Long, R., & Tobin, M. J. (2002). The use of the NARA for assessing the reading ability of children with low vision. *British Journal of Visual Impairment, 20*, 68-75.

Doyle, B. G., & Bramwell, W. (2006). Promoting emergent literacy and social-emotional learning through dialogic reading. *The Reading Teacher, 59*, 554-564. doi:10.1598/RT.59.6.5

Duke, N. K. & Purcell-Gates, V. (2003). Genres at home and at school: Bridging the known to the new. *The Reading Teacher, 57*, 30-37.

Dunst, C. J. (2002). Family-centered practices: Birth through high school. *Journal of Special Education, 36*(3), 139-147. doi:10.1177/00224669020360030401

Dunst, C. J., Trivette, C. M., Masiello, T., Roper, N., & Robyak, A. (2006). *Framework for developing evidence-based early literacy learning practices*. CELL papers, 1 (1). Retrieved from http://www.earlyliteracylearning.org/cellpapers/cellpapers_v1_n1.pdf

Education of All Handicapped Children Act of 1975. Pub. L. No. 94-142, 20 U.S.C. § 1400. Retrieved from http://www.scn.org/~bk269/94-142.html

Ehri, L. C. (2000). Learning to read and learning to spell: Two sides of a coin. *Topics in Language Disorders, 20*(3), 19-36.

Ehri, L., & Wilce, L. (1982). Recognition of spellings printed in lower and mixed case: Evidence for orthographic images. *Journal of Reading Behavior, 14*, 219-230. doi:10.1080/10862968209547451

Ehri, L., & Wilce, L. (1987). Does learning to spell help beginners learn to read words? *Reading Research Quarterly, 22*, 47-56.

Emerson, R. W., Holbrook, M. C., & D'Andrea, F. M. (2009). Acquisition of literacy skills by young children who are blind: Results from the ABC Braille Study. *Journal of Visual Impairment & Blindness, 103*, 610-624.

Emerson, R. W., Sitar, D., Erin, J. N., Wormsley, D. P., & Herlich, S. L. (2009). The effect of consistent structured reading instruction on high and low literacy

achievement in young children who are blind. *Journal of Visual Impairment & Blindness, 103*, 595-609.

Enright, T. (2015). Eight ways to encourage self-motivation in your child https://childdevelopmentinfo.com/development/eight-ways-to-encourage-self-motivation-in-your-child/#.WRIGy5U2zX4

Erickson, K. A., & Hatton, D. (2007a): Literacy and Visual Impairment. *Seminars in Speech & Language, 28*(1), 58-68.

Erickson, K. A., & Hatton, D. (2007b): Expanding understanding of emergent literacy: Empirical support for a new framework. *Journal of Visual Impairment & Blindness, 101*, 261-277.

Erickson, K. A., Hatton D., Roy V., Fox D., & Renne D. (2007). Literacy in early intervention for children with visual impairments: Insights from individual cases. *Journal of Visual Impairment & Blindness, 101*, 80-95.

Erin, J. N. (1993). The road less traveled: New directions for schools for students with visual impairments. *Journal of Visual Impairment & Blindness, 87*, 219-223.

Erin J. (2008). *Alphabetic & contracted braille.* Texas Focus 2008. Austin: TSBVI.

Erin, J. N. (2009). The case of the reluctant reader: Insights from three professionals. *Journal of Visual Impairment & Blindness, 103*, 69-77.

Erin, J. N. (2014). Adaptation of a reading program to meet the needs of braille readers. *Journal of Visual Impairment & Blindness, 108*, 145-146.

Erin, J. N., & Wright, T. S. (2011). Learning to write in braille: An analysis of writing samples from participants in the Alphabetic Braille and Contracted (ABC) braille study. *Journal of Visual Impairment & Blindness, 105*, 389-401.

Evans, M. A., Shaw, D., & Bell, M. (2000). Home literacy activities and their influence on early literacy skills. *Canadian Journal of Experimental Psychology, 54* (2), 65-75. doi:10.1037/h0087330

Fantuzzo, J., Tighe, E., & Childs, S. (2000). Family involvement questionnaire: A multivariate assessment of family participation in early childhood education. *Journal of Educational Psychology, 92*, 367-376. doi:10.1037/0022-0663.92.2.367

Family Connect. (2016). Incidental learning: What is it? *Family connect for parents of children with visual impairments*. Retrieved from http://www.familyconnect.org/info/education/tips-for-families/incidental-learning/125

Farrell, G. (1956). *The story of blindness*. Cambridge: Harvard University Press.

Fellenius, K. (1996). Reading competence of visually impaired pupils in Sweden. *Journal of Visual Impairment & Blindness, 90*, 237-246.

Fellenius K. (1999) Reading environment at home and at school of Swedish students with visual impairments. *Journal of Visual Impairment & Blindness, 93*, 211-224.

Ferguson, R. J. (2001). *We know who we are: A history of the blind in challenging educational and socially constructive policies*. San Francisco: Caddo Gap Press.

Ferrell, K. A., Shaw, A. R., & Deitz, S. J. (1998). *Project PRISM: A longitudinal study of developmental patterns of children who are visually impaired* (Final Report, CFDA 84.023C, Grant H023C10188). Greeley: University of Northern Colorado, Division of Special Education.

Flick, U. (2009). *An introduction to qualitative research*. (4th ed.). Thousand Oaks, CA: Sage.

Foulke, E. (1996). Is it too late to rescue braille literacy? *Braille Monitor, 39*(10). Retrieved from https://nfb.org/Images/nfb/Publications/bm/bm96/brlm9611.htm#5

Fraiberg, S. (1977). *Insights from the blind*. New York: Basic Books.

French, R. S. (1932). *From Homer to Helen Keller*. New York: American Foundation for the Blind.

Frith, U. (1981). Experimental approaches to developmental dyslexia: An introduction. *Psychological Research, 18*, 350-357.

Frith, U., & Frith, C. (1983). Relationships between reading and spelling. In J. P. Kavanagh & R. L. Venezky (Eds.), *Orthography, reading, and dyslexia* (pp. 287-295). Baltimore, MD: University Park Press.

Froh, J. J. Miller, & D. N., & Snyder S. F, (2007). Gratitude in children and adolescents: Development, assessment, and school-based intervention *School Psychology Forum*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/summarydoi#g_?aj#d;a#d;a#d;ahc#d;cbig

Gaur, A. (1992). *A history of writing*. New York: Cross River Press.

Gay, L. R., Mills, G. E., & Airasian, P. (2009). *Educational research: Competencies for analysis and applications* (9th ed.). Upper Saddle River, New Jersey: Pearson Education.

Geertz, C. (1973). *The interpretation of cultures: Selected essays*. New-York/N.Y.: Basic Books.

Geisler, C. (1994). *Academic literacy and the nature of expertise: Reading writing and knowing in academic philosophy*. New Jersey: Lawrence Earlbaum Associates.

Gillon, G. T., & Young, A. A. (2002). The phonological-awareness skills of children who are blind. *Journal of Visual Impairment & Blindness, 96*, 38-49.

Glaser, B. G. (1992). *Basics of grounded theory analysis*. Mill Valley, California: Sociology Press.

Glaser, B. G. (2001). *The grounded theory perspective: Conceptualization contrasted with description*. Mill Valley, CA: Sociology Press.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine.

Glesne, C. (1999). *Becoming qualitative researchers: An introduction* (2nd ed.) New York: Longman.

Goldstein, P. (1994). A comparison of language screening procedures in the identification of children with language delays in prekindergarten classes. *Dissertation Abstracts International, 55*, 2791.

Goldstein P. (2004). Helping young children with special needs develop vocabulary. *Early Childhood Education Journal, 32*(1), 39-43.

Gompel, M., van Bon, W. H. J., Schreuder, R., & Adriaansen, J. J. M. (2002). Reading and spelling competence of Dutch children with low vision. *Journal of Visual Impairment & Blindness, 96*, 435-447.

Gray, P. G., & Todd, J. E. (1968). *Mobility and reading habits of the blind: An inquiry made for the Ministry of Health, covering the registered blind of England and Wales in 1965* (No. 1968-00-00). London: Her Majesty's Stationery Office.

Gray, G. & Wilkins, S. (2005). A snapshot of 2003-4: blind and partially sighted in higher education and Northern Ireland. *The British Journal of Visual Impairment, 23*, (1), 4-10.

Greaney, J., & Reason, R. (1999). Phonological processing in braille. *Dyslexia, 5*, 215-226. doi:10.1002/(SICI)1099-0909(199912)

Greaney, J., & Reason, R. (2000). Braille reading by children: Is there a phonological explanation for their difficulties? *British Journal of visual Impairment, 18*, 35-40. doi:10.1177/026461960001800106

Greenberg, D., Ehri, L., & Perin, D. (1997). Are word reading processes the same or different in adult literacy students and 3rd-5th graders matched for reading level? *Journal of Educational Psychology, 89*, 262-275. doi:10.1037/0022-0663.89.2.262

Grenier, D., & Giroux, N. (1997). A comparative study of spelling performance of sighted and blind students in senior high school. *Journal of Visual Impairment & Blindness, 91*, 393-401.

Griffith, P. (1991). Phonemic awareness helps first graders invent spellings and third graders remember correct spellings. *Journal of Reading Behavior, 23*, 215-233. doi:10.1080/10862969109547737

Guralnick, M. J., & Groom, J. M. (1985). Correlates of peer-related social competence of developmentally delayed preschool children. *American Journal of Mental Deficiency, 90*, 140-150.

Guralnick, M. J., & Groom, J. M. (1987). The peer relations of mildly delayed and nonhandicapped preschool children in mainstreamed playgroups. *Child Development, 58*, 1556-1572. doi:10.2307/1130695

Haberlandt, K. F., & Graesser, A. (1985). Component processes in text comprehension and some of their interactions. *Journal of Experimental Psychology: General, 114*, 357-374. doi:10.1037/0096-3445.114.3.357

Hanson, R. A., & Farrell, D. (1995). The long-term effects on high school seniors of learning to read in kindergarten. *Reading Research Quarterly, 30*, 908-933. doi:10.2307/748204

Harley, R. K., & English, W. H. (1989). Support services for visually impaired children in local day schools: Residential schools as a resource. *Journal of Visual Impairment & Blindness, 83*, 403-406.

Harley, R. K., Truan, M. B., & Sanford, L. D. (1997). *Communication skills for visually impaired learners* (2nd ed.). Springfield, IL: Charles C Thomas.

Harrison, J. R., Cooch C. G., & Alsup J. (2003). Using distance education for families to improve children's braille literacy. *Journal of Visual Impairment and Blindness, 97*, 169-172.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Paul H Brookes.

Hartup, W. W. (1983). Peer relations. In E. M. Hetherington (Ed.), *Handbook of child psychology: Socialization, personality, and social development* (p. 103-196). New York: John Wiley & Sons.

Harvey, L. (2017). Observation. *Social research glossary*, *Quality Research International*. Retrieved from http://www.qualityresearchinternational.com/socialresearch/observation.htm

Hasbrouck, J., & Tindal, G. A. (2006). Oral reading fluency norms: A valuable assessment tool for reading teachers. *The Reading Teacher, 59*, 636-644. doi:10.1598/RT.59.7.3

Hatlen, P. (2000). Historical Perspectives. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. I: History and Theory of Teaching Children and Youths with Visual Impairments*. New York: AFB Press.

Hatlen, P. (2004). Is social isolation a predictable outcome of inclusive education? *Journal of Visual Impairment & Blindness, 98*, 676-678.

Hatton, D. D., & Erickson, K. (2005). *Highly literate individuals with visual impairments: Practical applications from research*. Paper presented at the Seventh Biennial Getting in Touch with Literacy Conference, Denver, CO.

Hatton, D. D., Erickson, K. A., & Lee, D. B. (2010). Phonological awareness of young children with visual impairments. *Journal of Visual Impairments & Blindness, 104*, 743-752.

Hatton, D. D., McWilliam, R. A., & Winton, P. J. (2002). *Infants and toddlers with visual impairment: Suggestions for early interventionists*. (Report No. EDO-EC-02-14). Arlington, VA: Eric Clearinghouse on Disabilities Gifted Education.

Hennink, M., Hutter, I., & Bailey, A. (2011). *Qualitative research methods*. Thousand Oaks, CA: Sage.

Hersh, C. A., Stone, B. J., & Ford, L. (1996). Learning disabilities and learned helplessness: A heuristic approach. *International Journal of Neuroscience, 84*, 103-113.

Hislop, D. W. (1984). *Characteristics of tactual reading by blind Optacon and braille readers* (Doctoral dissertation, University of Illinois at Chicago, 1984). Dissertation Abstracts International, 45 (2B), 0799.

Hoben, M., & Linstrom, V. (1980). Evidence of isolation in the mainstream. *Journal of Visual Impairment & Blindness, 74*, 289-292.

Hoehn, R. M. (1966). *Guide for supplementing the blind child's spelling program* (Unpublished master's thesis). Illinois State University, Normal.

Holbrook, M. C., & Spungin, S. J. (2009). Supporting students' literacy through data-driven decision-making and ongoing assessment of achievement. *Journal of Visual Impairment & Blindness, 103*, 133-136.

Hong, S., & Erin, J. N. (2004). The impact of early exposure to uncontracted braille reading on students with visual impairments. *Journal of Visual Impairment & Blindness, 98*, 325-340.

Hood, J. C. (2007). Orthodoxy versus power: The defining traits of grounded theory. In A. Bryant & K. Charmaz (Eds.), *The sage handbook of grounded theory* (pp. 151-162). London: Sage.

Huebner, K. M., Merk-Adam, B., Stryker, D., & Wolffe, K. (2004). *The revised 2004 national agenda for the education of children and youths with visual impairments, including those with multiple disabilities*. New York: AFB Press.

Hughes, B. (2011). Movement kinematics of the braille-reading finger. *Journal of Visual Impairment & Blindness, 105*, 370-381.

Hutchinson, S. A. (1986). Education and grounded theory. *Journal of Thought, 21*(3), 50-68.

Imamura, S. (1965). *Mother and blind child* [Research Series No. 14]. New York: American Foundation for the Blind.

Individuals with Disabilities Education Act of 1997. Public Law 105-17, 20 U.S.C. §§ 1400 *et seq.* Retrieved from http://thomas.loc.gov/home/thomas.php

Individuals with Disabilities Education Improvement Act (IDEIA) of 2004. Public Law 108-446, 20 U.S.C. §§ 1400 *et seq*.

InfoScience Today. (2017). The role of libraries in education. *InfoScience today*. Retrieved from http://www.infosciencetoday.org/library-science/the-role-of-libraries-in-education.html

Institute of Reading Development (IRD). (2017). Stages of reading development. *Our approach.* Retrieved from http://rutgers.rutgers.rutgers.stagesofreadingdevelopment.org/our-approach/stages-of-reading-development/

International Reading Association. (2004). *Literacy development in the preschool years*. (Position Statement). Newark, NJ. Retrieved from https://www.literacyworldwide.org/docs/default-source/where-we-stand/literacy-development-preschool-position-statement.pdf?sfvrsn=6

Irwin, R. B. (1955). *As I saw it*. New York: American Foundation for the Blind.

Isbell, R. T. (2002). Telling and retelling stones Learning language and literacy. *Young Children, 57*(2), 26-30.

Jackson, R. M. (2005). Curriculum access for students with low-incidence disabilities: The promise of universal design for learning. *National Center on Accessing the General Curriculum (NCAC)*. Retrieved from http://aem.cast.org/about/publications/2005/ncac-curriculum-access-low-incidence-udl.html

Jan, J. E., Freeman, R. D., & Scott, E. P. (1977). *Visual impairment in children and adolescents*. New York: Grune & Stratton.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly, 24*, 602-611.

Johns, J. L. (2012). *Johns Basic Reading Inventory* (11th ed.). Dubuque, IA: Kendall Hunt.

Johnson, L. (1989). Let's teach grade one braille. *Journal of Visual Impairment & Blindness, 83*, 491-493.

Johnson, D. (1999). Critical issue: Addressing the literacy needs of emergent and early readers. *North Central Regional Educational Laboratory.* Retrieved from http://files.eric.ed.gov/fulltext/ED480227.pdf

Johnston, S., McDonnell, A., and Hawken, L. (2008). Enhancing outcomes in early literacy for young children with disabilities: Strategies for success. *Intervention in School and Clinic, 43*, 210-217. doi:10.1177/1053451207310342

Jorm, A. (1981). Children with reading and spelling retardation: Functioning of whole-word and correspondence-rule mechanisms. *Journal of Child Psychology and Psychiatry, 22*, 171-178. doi:10.1111/j.1469-7610.1981.tb00540.x

Juel, C., Griffith, P., & Gough, P. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. *Journal of Educational Psychology, 78*, 243-255. doi:10.1037/0022-0663.78.4.243

Just, M. A., & Carpenter, P. A. (1980). A theory of reading: From eye fixations to comprehension. *Psychological Review, 87*, 329-354.

Justice, L. M., Chow, S., Capellini C., Flanigan, K., Colton, S. (2003). Emergent literacy intervention for vulnerable preschoolers: Relative effects of two approaches. *American Journal of Speech-Language Pathology, 12*, 320-332.

Kaderavek, J. N., & Sulzby, E. (1998). Low versus high orientation towards literacy in children. Paper presented at the annual convention of the American Speech-Language-Hearing Association, San Antonio, TX.

Kamei-Hannan C., & Sacks S. Z (2012). Parents' perspectives on braille literacy: Results from the ABC braille study. *Journal of Visual Impairment & Blindness, 106*, 212-223.

Kapperman, G., & Sticken, J. (2000). Assistive technology. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. II: Instructional strategies for teaching children and youths with visual impairments* (pp. 500-528). New York: AFB Press.

Kassow, D. Z., (2006). Parent-child shared book reading: Quality versus quantity of reading interactions between parents and young children. *Talaris Research Institute, 1*(1), 1-9. Retrieved from http://www.earlylit.net/resources/parentchsharedbktalaris.pdf

Kaufman, S. B. (2014). Why academic tenacity matters. *Scientific American. Retrieved from* https://blogs.scientificamerican.com/beautiful-minds/why-academic-tenacity-matters

Ke, J., & Wenglensky, S. (2010). Grounded theory. *Keep it simple*. Retrieved from http://avantgarde-jing.blogspot.co.uk/2010/03/grounded-theory.html

Kekelis, L. S., & Sacks, S. Z. (1992). The effects of visual impairment on children's social interactions in regular education programs. In S. Z. Sacks, R. J. Gaylord-Ross, & L. S. Kekelis (Eds.), *The development of social skills by blind and visually impaired students: Exploratory studies and strategies* (pp. 59-82). New York: American Foundation for the Blind.

Kelley, P., & Smith, P. (2000). Independent living skills. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. II: Instructional strategies for teaching children and youths with visual impairments* (pp. 569-615). New York: AFB Press.

Kimbrough P. (2008). How braille began. *Enabling Technologies*. Retrieved from http://www.brailler.com/braillehx.htm

Klein, M. L. (1981). Key generalizations about language and children. *Educational Leadership, 38*, 446-448.

Koenig, A. (1987). *A study of expressive writing skills of blind students including partial replication of the National Assessment of Educational Progress Third Writing Evaluation.* (Doctoral dissertation, Vanderbilt University). Dissertation Abstracts International, 48, 1734A.

Koenig, A. J. (1992). A framework for understanding the literacy of individuals with visual impairments. *Journal of Visual Impairment & Blindness, 86*, 277-284.

Koenig, A. J. (1996). Growing into literacy. In M. Cay Holbrook (Ed.), *Children with visual impairments: Parent guide*. (pp. 227-257). Woodbine House, Inc.

Koenig, A. J. & Farrenkopf, C. (1997). Essential experiences to undergird the early development of literacy. *Journal of visual impairment & blindness, 91*, 14-25.

Koenig, A. J., & Farrenkopf C. (2004). *Assessment of Braille Literacy Skills*. Houston: Region IV Education Service Center.

Koenig, A., & Holbrook, M. C. (1989). Determining the reading medium for students with visual impairments: A diagnostic teaching approach. *Journal of Visual Impairment & Blindness, 83*, 296-302.

Koenig, A. J., & Holbrook, M. C. (2000a) Ensuring high-Quality instruction for students in braille literacy programs. *Journal of Visual Impairment & Blindness, 94*, 677-695.

Koenig, A. J. & Holbrook, M. C. (2000b). Glossary. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. II: Instructional strategies for teaching children and youths with visual impairments*. New York: AFB Press.

Koenig, A. J., & Holbrook, M. C. (2000c). Literacy skills. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. II: Instructional strategies for teaching children and youths with visual impairments* (pp. 265-329). New York: AFB Press.

Koestler, F. A. (1976). *The unseen minority: A social history of blindness in America*. New York: David McKay.

Kreuzer, D. (2007). *An analysis of writing practices in 4th- and 5th grade students with visual impairments*. (Doctoral dissertation, University of California, Berkeley). UMI No. 3331676.

Kusajima, T. (1974). *Visual reading and braille reading: An experimental investigation of the physiology of visual and tactual reading*. New York: American Foundation for the Blind.

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6*, 293-323. doi:10.1016/0010-0285(74)90015-2

Laing, E., & Hulme, C. (1999). Phonological and semantic processes influence beginning readers' ability to learn to read words. *Journal of Experimental Child Psychology, 73*, 183-207. doi:10.1006/jecp.1999.2500

Laroche, L., Boulé, J., & Wittich W. (2012). Reading speed of contracted French braille. *Journal of Visual Impairment & Blindness, 106*, 37-42.

LaRose, S. B. (2001a). Teaching reading in braille. *Night-Light.* Retrieved from http://night-light.org/index/blindness-resources/literacy/teaching-reading/

LaRose, S. B. (2001b). The importance of braille literacy. *Night-Light*. Retrieved from http://www.night-light.org/index/blindness-resources/literacy/braille-importance/

Larsen, S. C., Hammill, D. D., & Moats, L. C. (1999). *Test of Written Spelling* (4th ed.). Austin, TX: Pro-Ed.

LaVenture, S. (2003). The Individuals with Disabilities Education Act (IDEA): Past and present. *Journal of Visual Impairment & Blindness, 97*, 517-518.

Leseman, P. P. M., & de Jong, P. F. (1998). Home literacy: Opportunity, instruction, cooperation and social-emotional quality predicting early reading achievement. *Reading Research Quarterly, 33*, 294-318. doi:10.1598/RRQ.33.3.3

Lesiak, J. L. (1997). Research based answers to question about emergent literacy in kindergarten. *Psychology in the Schools, 34*, 143-160. doi:10.1002/(SICI)1520-6807(199704)

Lewis, D., & Smith, R. (1980). *American sociology and pragmatism*. Chicago: University of Chicago Press.

Light, A., & Smith, A. K. (1993). Home literacy experiences of preschoolers who use AAC systems and of their nondisabled peers. *Augmentative and Alternative Communication, 9*, 10-25. doi:10.1080/07434619312331276371

Lincoln, Y., & Cuba, E. (1985). Naturalistic inquiry. Beverly Hills, CA: Sage.

Logsdon, A. (2014). What is reading fluency? *About Health*. Retrieved from http://learningdisabilities.about.com/od/glossar1/g/rdgfluency.htm

Lombardino, L. J., Bedford, T., Fortier, C., Carter, J., & Brandi, J. (1997). Invented spelling: Developmental patterns in kindergarten children and guidelines for early

literacy intervention. *Language, Speech, and Hearing Services in Schools, 28*, 333-343. doi:10.1044/0161-1461.2804.333

Lonigan, C. J. (1994). Reading to preschoolers exposed: Is the emperor really naked? *Developmental Review, 14*, 303-323. doi:10.1006/drev.1994.1011

Lonigan, C. J., Anthony, J. L., Phillips, B. M., Purpura, D. J., Wilson, S. B., & McQueen, J. D. (2009). The nature of preschool phonological processing abilities and their relations to vocabulary, general cognitive abilities, and print knowledge. *Journal of Educational Psychology, 101*, 345-358.

Lonigan, C. J., & Shanahan, T. (2008). *Developing early literacy*. Report of the National Early Literacy Panel Executive Summary. Washington, DC: National Institute for Literacy. Retrieved from https://lincs.ed.gov/publications/pdf/NELPSummary.pdf

Loots, G., Devise, I., & Sermijn, J. (2003). The interaction between mothers and their visually impaired infants: An intersubjective developmental perspective. *Journal of Visual Impairment & Blindness, 97*, 403-417.

Lorimer, J. (1990). Improving braille reading skills: The case for extending the teaching of braille reading to upper primary and lower senior classes. *British Journal of Visual Impairment, 8*, 87-89. doi:10.1177/026461969000800303

Louis Braille School. (n.d.). Braille Contractions. *Louis Braille School Online Resource Center*. Retrieved from http://louisbrailleschool.org/resources/exploring-braille/braille-contractions/

Lowenfeld, B. (1975). *The changing status of the blind*. Springfield, IL: Charles C Thomas.

Lowenfeld, B. (1982). In search of better ways. *Education of the Visually Handicapped, 14*, 69-77.

Mahoney, C. (1997). Chapter 3: Common Qualitative Methods. In J. Frechtling & L. S. Westat (Eds.), *User-friendly handbook for mixed method evaluations*. Retrieved from http://www.nsf.gov/pubs/1997/nsf97153/chap_3.htm

Mangold, S. (1978). Tactile perception and braille letter recognition: Effects of developmental teaching. *Journal of Visual Impairment & Blindness, 72*, 259-266.

Mangold, S. S. (1997). The braille literacy movement: A dichotomy of action. In A. J. Koenig, & M. C. Holbrook (Eds.), *Proceedings of the Second Biennial Conference of Getting in Touch with Literacy* (pp. 10-11). Alexandria, VA: Association for the Education and Rehabilitation of the Blind and Visually Impaired.

Marcell, B. (2011-12). Putting fluency on a fitness plan: Building fluency's meaning-making muscles. *The Reading Teacher, 65*, 242-249.

Maroney, D., & Davis, D. L. (2001). Parenting a child with special needs: The emotional reactions and adjustments of parents and the support that caregivers can offer. *Mental health issues for infants and toddlers with special health needs.* Retrieved from http://www.jfkpartners.org/Emotional_Responses.pdf

Marvin, C., & Mirenda, P. (1993). Home literacy experiences of preschoolers enrolled in Head Start and special education programs. *Journal of Early Intervention, 17*, 351-367. doi:10.1177/105381519301700402

McBride, V. (1974). Explorations in rapid reading in braille. *New Outlook for the Blind, 68*, 8-13.

McCall, S. (1997). The development of literacy through touch. In H. Mason & S. McCall (Eds.), *Visual impairment: Access to education for education for children and young people* (pp. 149-158). London: David Fulton.

McCall, S. (1999). Accessing the curriculum. In C. Arter, L. H. Mason, S. McCall, & S. Stone (Eds.), *Children with visual impairment in mainstream settings* (pp. 29-40). London: David Fulton.

McDonnall, M. C., O'Mally, J., & Crudden, A. (2014). Employer knowledge of and attitudes toward employees who are blind or visually impaired. *Journal of Visual Impairment & Blindness, 108,* 213-225. Retrieved from http://www.afb.org/afbpress/pubjvib.asp?DocID=jvib080305

McGee, L. M. (1986). Young children's environmental print reading. *Childhood Education 63*, 118-125.

McKenna, M., Kear, D., & Ellsworth, R. (1995). Children's attitudes toward reading: A national survey. *Reading Research Quarterly, 30*, 934-956. doi:10.2307/748205

McMahon, E. (1994). The role of residential schools for the blind in 1990. *RE:view, 25*, 163-172.

Meador, C. (2016). The year of braille (Annual Report, Fiscal year 2016). *American Printing House for the Blind*. Retrieved from http://www.aph.org/files/annual-reports/APH-Annual-Report-FY16.pdf

Millar, S. (1997). *Reading by touch*. New York: Routledge.

Miller, B. (1999). Spelling bees and grammar gorillas. *Braille Monitor, 42*, Retrieved from https://nfb.org/Images/nfb/Publications/bm/bm99/bm991105.htm

Mills, A. (1988). Visual handicap. In D. Bishop & K. Mogford (Eds.), *Language development in exceptional circumstances* (pp. 150-164). New York: Churchhill Livingstone.

Mioduser, D., Lahav, O., & Machmias, R. (2000). Using computers to teach remedial spelling to a student with low vision: A case study. *Journal of Visual Impairment & Blindness, 94*, 5-16.

Moats, L. C. (2001). Spelling disability in adolescents and adults. In A. M. Bain, L. L. Bailet, & L. C. Moats (Eds.), *Written language disorders: Theory into practice* (pp. 43-75). Austin, TX: Pro-Ed.

Moats, L. C. (2005). How spelling supports reading: And why it is more regular and predictable than you may think. *American Educator, 25*(2), 12-43.

Moats, L. C. (2008). *Using spelling as a diagnostic tool*. Paper presented at the 2009 convention of the American Speech-Language-Hearing Association, Chicago.

Monson, M. R., & Bowen, S. K. (2008). The development of phonological awareness by braille users: A review of the research. J*ournal of Visual Impairment & Blindness, 102*, 210-220.

Morgan, P. L., Fuchs, D., Compton, D. L., Cordray, D. S., & Fuchs, L. S. (2008). Does early reading failure decrease children's reading motivation? J*ournal of Learning Disabilities, 41*, 387-404. doi:10.1177/0022219408321112

Morris, D., & Perney, J. (1984). Developmental spelling as a predictor of first-grade reading achievement. *Elementary School Journal, 84*, 441-457. doi:10.1086/461375

Morrow, L. M., Gambrell, L. B., & Pressley, M. (2003). *Best practices in literacy instruction*. New York: Guilford Press.

Mousty, P., & Bertelson, P. (1985). A study of braille reading: 1. Reading speed as a function of hand usage and context. *Quarterly Journal of Experimental Psychology, 37A*, 217-233. doi:10.1080/14640748508400931

Mullen, E. A. (1990). Decreased braille literacy: A symptom of a system in need of reassessment. *RE:View, 22*, 164-169.

Murphy, J. L., Hatton, D., & Erickson, K. A., (2008). Exploring the early literacy practices of teachers of infants, toddlers, and preschoolers with visual impairments. *Journal of Visual Impairment & Blindness, 102*, 133-146.

National Braille Press. (2013). What is braille? *About braille.* Retrieved from http://www.nbp.org/ic/nbp/braille/whatisbraille.html

National Early Literacy Panel. (2009). *Developing early literacy: Report of the National Early Literacy Panel, Executive Summary.* Washington, DC: National Institute for Literacy. Retrieved from http://lincs.ed.gov/publications/pdf/NELPReport09.pdf

National Federation of the Blind of Texas. (2017). Who we are. *About Us.* Retrieved from https://www.nfbtx.org/about-who-we-are.php

National Information Center for Children and Youth with Disabilities. (2001). *General information about visual impairments* (Fact sheet No. 13). Washington, DC: Author.

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office. Retrieved from http://www.nichd.nih.gov/publications/nrp/smallbook.cfm

National Library Service for the Blind and Physically Handicapped. (2017a). BARD: Braille and audio reading download. *NLS: That All May Read*. Retrieved from https://loc.gov/nls/bardnls/index.html

National Library Service for the Blind and Physically Handicapped. (2017b). About this site. *NLS: That All May Read*. Retrieved from loc.gov/nls

National Reading Panel. (2000). *Report of the National Reading Panel: Teaching children to read*. Washington, DC: U.S. Department of Health and Human Services.

Neuman, S. B., Copple, C., & Bredekamp, S. (1998). *Learning to read and write: developmentally appropriate practices for young children* (Joint Position Statement of the International Reading Association and the National Association for the Education of Young Children). Washington, DC. Retrieved from http://www.naeyc.org/files/naeyc/file/positions/PSREAD98.PDF

Newman, A. P., & Beverstock, C. (1990). *Adult literacy: Contexts and challenges*. Newark, DE: International Reading Association.

No Child Left Behind (NCLB) Act of 2001. (2002). Public Law 107-110, S 115, Stat. 1425.

Nolan, C. Y. (1965). Blind children, degree of vision, mode of reading: A 1963 replication. *New Outlook for the Blind, 59*, 233-238.

Nolan, C. Y. (1983). *Providing educational materials under the act to promote the education of the blind*. Lexington, KY: American Printing House for the Blind.

Nolan, C. Y., & Bott, J. E. (1971). Relationships between visual acuity and reading medium for blind children-1969. *New Outlook for the Blind, 65*, 90-96.

Offredy, M., & Vickers, P. (2010). Grounded theory (Chapter 5: Research design course notes). Retrieved from http://www.researchproposalsforhealthprofessionals.com/grounded_theory.htm

Olson, M. R. (1977). *The effects of training in rapid reading on the reading rate and comprehension of braille and large print readers*. (Doctoral dissertation). Dissertation Abstracts International, 37, 4287-4288.

Orcher, L. T. (2005). *Conducting research*. Glendale, California: Pyrczak Publishing.

Pacer Center. (2010). Direct and Indirect Services. Retrieved from http://www.pacer.org/parent/php/PHP-c180.pdf

Parlakian, R. (2004). Early literacy and very young children. *Zero to Three, 25*(1), 37-44.

Pathak, R. P. (2007). *Philosophical and sociological perspectives of education*. Noida, India: Atlantic Publishers and Distributors Ltd. Retrieved from https://books.google.com/books?id=2HIGasC09bgC&pg=PA100&lpg=PA100&dq=vaizey+national+develop&source=bl&ots=bUUxEDk5wh&sig=VWKC7EfwlmUZLRSgM68CLRVZ8Ng&hl=en&sa=X&ved=0ahUKEwjZzpuPz-HUAhVE04MKHTdwB9YQ6AEIPDAE#v=onepage&q=vaizey%20national%20develop&f=false

Paths to Literacy (n.d.a). Instructional strategies for teaching dual media to students who are visually impaired. Retrieved from http://www.pathstoliteracy.org/topic/dual-media/instructional-strategies-dual-media-learners

Paths to Literacy. (n.d.b). Tactile graphics. Retrieved from www.pathstoliteracy.org/tactile-graphics

Patillo, S., Heller, K. & Smith, M. (2004). The impact of a modified repeated-reading strategy paired with optical character recognition on the reading rates of students with visual impairments. *Journal of Visual Impairment & Blindness, 98*, 28-46.

Payne, S. (n.d.). Public Law 94-142. *University of Notre Dame*. Retrieved from https://www3.nd.edu/~rbarger/www7/pl94-142.html

Perkins School for the Blind. (n.d.). Unified English Braille. *Perkins Scout*. www.perkinselearning.org/scout/unified-english-braille-ueb

Perkins School for the Blind. (2017). About Perkins braillers. *Perkins School for the Blind Assistive Technology Store*. Retrieved from http://www.perkinsproducts.org/about-perkins-braillers

Petersen, D. (2000) Using transitions to promote literacy in preschool and primary classrooms. *Young Children, 55*(4), 24-26.

Pick, A. D., Thomas, L, & Pick, H. L. (1966). The role of grapheme-phoneme correspondence in the perception of braille. *Journal of Verbal Learning and Verbal Behavior, 5*, 298-300. doi:10.1016/S0022-5371(66)80034-8

Pikulski, J. J., & Chard, D. J. (2005). Fluency: Bridge between decoding and reading comprehension. *The Reading Teacher, 58*, 510-519. doi:10.1598/RT.58.6.2

Pinnell, G. S. (2008). How does literacy collaborative emphasize the five essential elements of reading? *Literacy collaborative.* Retrieved from http://literacycollaborative.org/docs/fiveEssentialElements.pdf

Pinnell, G. S., Pikulski, J. J., Wixson, K. K., Campbell, J. R., Gough, P. B., & Beatty, A. S. (1995). *Listening to children read aloud*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Preisler, G. M. (1995). The development of communication in blind and in deaf infants: Similarities and differences. *Child Care, Health and Development, 21*, 79-110. doi:10.1111/j.1365-2214.1995.tb00412.x

Pre-reading of visually impaired children (visual and tactile real life experience). (n.d.). In *Croatian Scientific Bibliography*. Retrieved from https://bib.irb.hr/datoteka/513603.Pre-reading_of_visualy_imapred_children_visual_and_tactile_experience.pdf

Pring, L. (1982). Phonological and tactual coding of braille by blind children. *British Journal of Psychology, 73*, 351-359. doi:10.1111/j.2044-8295.1982.tb01817.x

Pring, L. (1984). A comparison of the word recognition processes of blind and sighted children. *Child Development, 55*, 1865-1877. doi:10.2307/1129933

Pring, L. (1994). Touch and go: Learning to read braille. *Reading Research Quarterly, 29*, 67-74. doi:10.2307/747738

Prizant, B. M., Wetherby, A. M., & Roberts, J. E. (2000). Communication problems. In C. Zeanah (Ed.), *Handbook of infant mental health* (2nd ed.) (pp. 282-297). New York: Guilford.

Rajeev, L. (2011). 6 great methods to carry out qualitative research accurately. *Buzzle.* Retrieved from http://www.buzzle.com/articles/methods-of-qualitative-research.html

Ranalli, R. (2008). A boost for braille. *The Boston Globe*. Retrieved from http://www.perkins.org/news-events/press/a-boost-for-braille.html

Rasinski, T. V. (1999). Exploring a method for estimating independent, instructional, and frustration reading rates. *Reading Psychology: An International Quarterly, 20*, 61-69. doi:10.1080/027027199278501

Rasinski T. V. (2000) Speed does matter in reading. *The Reading Teacher, 54*, 146-151.

Rex, E. J. (1989). Issues related to literacy of legally blind learners. *Journal of Visual Impairment & Blindness, 83*, 306-307, 309-313.

Rex, E. J., Koenig, A. J., Wormsley, D. P., & Baker, R. L. (1995). *Foundations of braille literacy*. New York: American Foundation for the Blind.

Richgels, D. (1995). Invented spelling ability and printed word learning in kindergarten. *Reading Research Quarterly, 30*, 96-109.

Roberts, F. (1986). Education for the visually handicapped: A social and educational history. In G. T. Scholl (Ed.), *Foundations of education for blind and visually handicapped children and youths* (pp. 1-18). New York: American Foundation for the Blind.

Rodenberg, L. W. (1955). *The story of embossed books for the blind*. New York: American Foundation for the Blind.

Roscigno, V. J. (2000). Family/school inequality and African-American/Hispanic achievement. *Social Problems, 47*, 266-290. doi:10.2307/3097201

Roskos, K., Christie, J. F, & Richgels, D. J. (2003). The essentials of early literacy instruction. *Young Children, 58*(2), 52-60.

Rowell, E. (1998). A letter a week, a story a day, and some missed opportunities along the way: A study of literacy in prekindergarten classes. *Child Study Journal, 28*, 201-211.

Ryles, R. (1996). The impact of braille reading skills on employment, income, education, and reading habits. *Journal of Visual Impairment and Blindness, 90*, 219-226.

Ryles, R. N. (1997). *The relationship of reading medium to the literacy skills of high school students who are visually impaired*. (Doctoral dissertation, University of Washington). UMI No. 9819296. Dissertation Abstracts International, 58, 4616.

Ryles, R. (2001). Braille as a predictor of success. In J. M. Dixon (Ed.), *Braille into the next millennium* (pp. 462-491). Washington, DC: National Library Service for the Blind and Physically Handicapped and Friends of Libraries for Blind and Physically Handicapped Individuals in North America.

Sacks, S. Z. (2006). The importance of peers and role models. In S. Z. Sacks, & K. E. Wolffe (Eds.), *Teaching social skills to students with visual impairments: From theory to practice* (pp. 195-233). New York: AFB Press.

Sacks, S. Z., Hannan, C. K. & Erin, J. N. (2011). Children's perceptions of learning braille: Qualitative and quantitative findings of the ABC braille study. *Journal of Visual Impairment & Blindness, 105*, 266-275.

Sacks, S. Z., Kamei-Hannan, C., Erin, J. N., Barclay L., & Sitar D. (2009). Social experiences of beginning braille readers in literacy activities: Qualitative and quantitative findings of the ABC braille study. *Journal of Visual Impairment & Blindness, 103*, 680-693.

Sacks, S. Z., & Silberman, R. K. (2000). Social skills. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. II: Instructional strategies for teaching children and youths with visual impairments* (pp. 616-652). New York: AFB Press.

Sacks, S. Z., & Wolffe, K. E. (1992). The importance of social skills training in the transition process for students with visual impairments. *Journal of Vocational Rehabilitation, 2*, 46-55.

Sacks, S. Z., & Wolffe, K. E. (Eds.). (2006*). Teaching social skills to students with visual impairments: From theory to practice*. New York: AFB Press.

Sacks, S. Z., Wolffe, K. E., & Tierney, D. (1998). Lifestyles of students with visual impairments: Preliminary studies of social networks. *Exceptional Children, 64*, 463-478.

Saint-Germain, M. A. (1998). Data collection strategies ii: Qualitative research (PPA 696 Research Methods course notes). *California State University Long Beach*. Retrieved from www.csulb.edu/~msaintg/ppa696/696quali.htm

Savaiano, M. E., & Hatton, D. D. (2013) Using repeated reading to improve reading speed and comprehension in students with visual impairments. *Journal of Visual Impairment & Blindness, 107*, 93-106.

Scarborough, H. S. (1998). Early identification of children at risk for reading disabilities: Phonological awareness and some other promising predictors. In B. K. Shapiro, P.

J. Accardo, & A. J. Capute (Eds.), *Specific reading disability: A view of the spectrum* (pp. 75-119). Timonium, MD: York Press.

Schore, A. N. (1994). *Affect regulation and the origin of the self: The neurobiology of emotional development*. Hillsdale, NJ: Lawrence Erlbaum.

Schreiber, P. A. (1980). On the acquisition of reading fluency. *Journal of Reading Behavior, 12*, 177-186. doi:10.1080/10862968009547369

Schroeder, F. (1989). Literacy: The key to opportunity. *Journal of Visual Impairment & Blindness, 83*, 290-293.

Schroeder, F. K. (1996). Perceptions of braille usage by legally blind adults. *Journal of Visual Impairment and Blindness, 90*, 210-218.

Schroeder, F. K. (1997). Who should read braille? In A. J. Koenig & M. C. Holbrook (Eds.), *Proceedings of the Second Biennial Conference of Getting in Touch with Literacy* (pp. 13-18). Alexandria, VA: Association for the Education and Rehabilitation of the Blind and Visually Impaired.

Schwandt, T. A. (2001). *Dictionary of qualitative inquiry* (2nd ed.). Thousand Oaks, CA: Sage.

Seidman, I. (2006). *Interviewing as qualitative research* (3rd ed.) New York: Teachers College Press.

Senechal, M., & LeFevre, J. A. (2001). Storybook reading and parent teaching: Links to language and literacy development. In P. R. Britto & J. Brooks-Gunn (Eds.), *The role of family literacy environments in promoting young children's emerging literacy skills* (Vol. 92, pp. 39-52). San Francisco: Jossey-Bass.

Senechal, M., & LeFevre, J. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child Development, 73*, 448-460. doi:10.1111/1467-8624.00417

Senechal, M., LeFevre, J., Smith-Chant, B. L., & Colton, K. V. (2001). On refining theoretical models of emergent literacy: The role of empirical evidence. *Journal of School Psychology, 39*, 439-460.

Senechal, M., LeFevre, J.-A., Thomas, E. M., & Daley, K. E. (1998). Differential effects of home literacy experiences on the development of oral and written language. *Reading Research Quarterly, 33* (1), 96-116. doi:10.1598/RRQ.33.1.5

Shah, N. (2016). Self empowerment. *The Huffington Post*. Retrieved from http://www.huffingtonpost.com/nipa-shah/self-empowerment_1_b_7647728.html

Sherman, R., Webb, R., & Andrews, S. (1984). Qualitative inquiry: An introduction. *Journal of Thought, 19*(2), 24-33.

Sideridis, G. D., Morgan, P. L., Botsas, G., Padeliadu, S., & Fuchs, D. (2006). Identification of students with learning disabilities based on motivation, metacognition, and psychopathology: A ROC analysis. *Journal of Learning Disabilities, 39*, 215-229.

Silverman, D. (2007). *A very short, fairly interesting and reasonably cheap book about qualitative research*. Thousand Oaks, CA: Sage.

Skellenger, A. C., Rosenblum, B. K., & Jager, B. K. (1997). Behaviors of preschoolers with visual impairments in indoor play settings. *Journal of Visual Impairment & Blindness, 91*, 519-530.

Skill [Def. 3]. (2017). In *Merriam-Webster online dictionary.* Retrieved from https://www.merriam-webster.com/dictionary/skills

Smartt, S. M., & Reschly, D. J. (2007). Barriers to the preparation of highly qualified teachers in reading (National Comprehensive Center for Teacher Quality Research and Policy Brief). Washington, DC: National Comprehensive Center for Teacher Quality. Retrieved from http://files.eric.ed.gov/fulltext/ED520775.pdf

Smith, D. E., & Chapel, J. R. (1970). Reading readiness. *Reading Horizons*, 10*(2)*, pp. 59-62.

Snape, D., & Spencer L. (2003). The foundations of qualitative research. In J. Ritchie & J. Lewis (Eds.), *Qualitative research practice: A guide for social science students and researchers* (pp. 1-23). Thousand Oaks, CA: Sage.

Snow, C. E., Griffin, P., & Burns, M. S. (2005). *Knowledge to support the teaching of reading: Preparing teachers for a changing world*. San Francisco: Jossey-Bass.

Sonnenschein, S., Baker, L., Serpell, R., Scher, D., Truitt, V. G., & Munsterman, K. (1997). Parental beliefs about ways to help children learn to read: The impact of an entertainment or a skills perspective. *Early Child Development and Care, 127*, 111-118. doi:10.1080/0300443971270109

Sonnenschein, S., Baker, L., Serpell, R., & Schmidt, D. (2000). *Reading is a source of entertainment: The importance of the home perspective for children's literacy development*. Mahwah, NJ: Lawrence Erlbaum.

Sodoro, J., Allinder, R. M., & Rankin-Erickson, J. L. (2002). Assessment of phonological awareness: Review of methods and tools. *Educational Psychology Review, 14*, 223-260. doi:10.1023/A:1016050412323

Souza, A. (2007, September 2). Preschoolers learn need to read. *Merced Sun-Star (CA)*.

Spungin, S. J. (1990). *Braille literacy: Issues for blind persons, families, professionals, and producers of braille*. New York: American Foundation for the Blind.

Spungin, S. J. (1996). Braille and beyond: Braille literacy in a larger context. *Journal of Visual Impairment & Blindness, 90*, 271-274.

Spungin, S. J., & Ferrell, K. A. (2007). Appendix C: The role and function of the teacher of students with visual handicaps. In A. J. Koenig & M. C. Holbrook (Eds.), (*Foundations of education* (2nd ed., Vol. 2, pp. 785-791). Retrieved from http://www.afb.org/foe/book.asp?ch=v2appC

Statewide Vision Resource Centre (SVRC) (2013). Tips for promoting braille literacy skills. Retrieved from http://svrc.vic.edu.au/curriculum/braille-literacy-skills/

Steinman, B. A., LeJeune, B. J., & Kimbrough B. T. (2006). Developmental stages of reading processes in children who are blind and sighted. *Journal of Visual Impairment & Blindness, 101*, 36-46.

Stephens, O. (1989). Braille Implications for living. *Journal of Visual Impairment & Blindness, 83*, 288-289.

Stern, P., Allen, L., & Moxley, P. (1982). The nurse as grounded theorist: History, process and uses. *The Review Journal of Philosophy and Social Science, 7*, 200-215.

Stratton, J. M. (1996). Emergent literacy: A new perspective. *Journal of Visual Impairment & Blindness, 90*, 177-183.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research*. Thousand Oaks, CA: Sage.

Street, B. (2003). What's new in new literacy studies? Critical approaches to literacy in theory and practice. *Current Issues in Comparative Education*, *5*(2), 1-14.

Strickland, D. S., & Morrow, L. M. (1988). New perspectives on young children learning to read and write. *The Reading Teacher, 42*, 70-71.

Sullivan, E. J. (1996). What the future holds for braille. *Duxbury Systems, Inc.* Retrieved from http://www.duxburysystems.com/hksb96.asp

Sulzby, E., & Teale, W. (1991). Emergent literacy. In R. Barr, M. L. Kamil, P. B. Mosenthal, S P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 727-757). New York: Longman.

Swenson, A. M. (1999). *Beginning with braille: Firsthand experiences with a balanced approach to literacy*. New York: AFB Press.

Swenson, A. M. (2008). Reflections on teaching reading in braille. *Journal of Visual Impairment and Blindness, 102*, 206-209.

Swenson, A. M. (2011). The ABC braille study: Results and implications for teachers. *Paths to Literacy*. Retrieved from http://www.pathstoliteracy.org/research/abc-braille-study-results-and-implications

Swenson, A. M. (2013). *Flying fingers: Fluency instruction for beginning braille readers*. Paths to Literacy. Retrieved from http://www.pathstoliteracy.org/flying-fingers

Tait, P. E. (1972). Behavior of young blind children in a controlled play situation. *Perceptual and Motor Skills, 43*, 963-969.

Tallon, E. M., & Herzberg, T. S. (2013). The use of final-letter braille contractions: A case study. *Journal of Visual Impairment & Blindness, 107*, 221-225.

Teale, W. H. (1986). Home background and young children's literacy development. In W. H. Teale & E. Sulzby (Eds.), *Emergent literacy: Writing and reading* (pp. 173-206). Norwood, NJ: Ablex.

Teale, W. H. (1987). Emergent literacy: Reading and writing development in early childhood. In E. Readance & R. S. Baldwin (Eds.), *Thirty-sixth yearbook of the national reading conference* (pp. 45-74). Rochester, NY: National Reading Council.

Teale, W., & Sulzby, E. (1986). *Emergent literacy: Writing and reading*. Norwood, NJ: Ablex.

Templeton, S. (2002). Effective spelling instruction in the middle grades: It's a lot more than memorization. *Voices from the Middle, 9*(3), 8-14.

Tenacity [Def. 2]. (2017). In *Dictionary.com.* Retrieved from www.dictionary.com/browse/tenacity

Tennant, A. (2000). Reading matters: What is reading? *One Stop English.* Macmillan Publishers http://www.onestopenglish.com/skills/reading/reading-matters/reading-matters-what-is-reading/154842.article

Texas Department of State Health Services. (2014). Vision. *Vision and hearing screening.* Retrieved from https://www.dshs.state.tx.us/vhs/vision.shtm

Texas State Legislature. (1991). House bill No. 2277: An act relating to braille instruction for blind or visually handicapped students. Austin, TX.

Tindal, G. A., & Marston, D. B. (1990). *Classroom-based assessment: Evaluating instructional outcomes*. Columbus, OH: Merrill.

Tompkins, G. E., & McGee, L. M. (1986). Visually impaired and sighted children's emerging concepts about written language. In D. Yaden, & S. Templeton (Eds.), *Metalinguistic awareness and beginning literacy* (pp. 259-275). Portsmouth, NH: Heinemann.

Torgenson, J. K., Wagner, R. K., & Rashotte, C. A. (1994). Longitudinal studies of phonological procession and reading. *Journal of Learning Disabilities, 27*, 276-286.

Toussaint, K. A., Tiger, J. H., & Rehfeldt, R. A. (2010). Teaching early braille literacy skills within a stimulus equivalence paradigm to children with degenerative visual impairments. *Journal of Behavior Analysis, 43*, 181-194. doi: 10.1901/jaba.2010.43-181

Treiman, R., & Rodriguez, K. (1999). Young children use letter names in learning to read words. *Psychological Science, 10*, 334-338.

Trent, S. D., & Truan, M. B. (1997). Speed, accuracy, and comprehension of adolescent braille readers in a specialized school. *Journal of Visual Impairment & Blindness, 91*, 494-500.

Trivette, C. M., & Dunst, C. J. (2005). Evaluation of the Tune In video practice guide for increasing young children's engagement with caregivers. *Centerscope, 4*(2), 1-5.

Trochim, W. M. K. (2006). Qualitative methods. *The research methods knowledge base*. Retrieved from www.socialresearchmethods.net/kb/qualmeth.php

Troughton, M. (1992). *One is fun: Guidelines for better braille literacy*. Ontario: Canadian Institute for the Blind.

University of Michigan. (2014). *Special education legislation: A synopsis of federal and state policies*. Retrieved from http://sitemaker.umich.edu/356.zipkin/the_education_for_all_handicapped_children_act

University of North Carolina at Chapel Hill. (2014). What is sociology? *Department of Sociology.* Retrieved from http://sociology.unc.edu/undergraduate-program/sociology-major/what-is-sociology/

University of Surrey. (n.d.). The advantages and disadvantages of questionnaires.

Introduction to research: Unit 5 -- Qualitative research. *Introduction to research.* Retrieved from http://libweb.surrey.ac.uk/library/skills/Introduction%20to%20Research%20and%20Managing%20Information%20Leicester/page_51.htm

U.S. Department of Education. (2014). Reading first. *Programs.* Retrieved from http://www2.ed.gov/programs/readingfirst/index.html

Vellutino, F. (1977). Alternative conceptualizations of dyslexia: Evidence in support of a verbal deficit hypothesis. *Harvard Educational Review, 47*, 334-353.

Vellutino, F., Scanlon, D., Sipay, E., Small, S., Pratt, A., Chen, R., & Denckla, M. (1996). Cognitive profiles of difficult-to-remediate and readily remediated poor readers: Early intervention as a vehicle for distinguishing between cognitive and experimental deficits as basic causes of specific reading disability. *Journal of Educational Psychology, 88*, 601-638.

Venezky, R. L. (1980). From Webster to Rice to Roosevelt. In U. Frith (Ed.), *Cognitive process in spelling* (pp. 9-30). London: Academic Press.

Wadsworth, B. J. (1989). *Piaget's theory of cognitive and affective development* (4th ed.). New York: Longman.

Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin, 101*, 192-212. doi:10.1037/0033-2909.101.2.192

Wakefield, C. A. L., Homewood, J., & Taylor, A. J. (2006). Early blindness may be associated with changes in performance on verbal fluency tasks. *Journal of Visual Impairment & Blindness, 100*, 306-310.

Wanzek, J., Vaughn, S., Wexler, J., Swanson, E. A., Edmonds, M., & Kim, A. (2006). A synthesis of spelling and reading interventions and their effects on the spelling outcomes of students with LD. *Journal of Learning Disabilities, 39*, 528-543.

Warren, D. H. (1994). *Blindness and children: An individual differences approach. New York: Cambridge University Press.*

Warren, D. H., & Hatton, D. D. (2002). Cognitive development in visually impaired children. In I. Rapin & S. Segalowitz (Eds.), *Elsevier's handbook of neuropsychology* (2nd ed., pp. 439-538). New York: Elsevier.

Wayne, A., & Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational Research, 73*, 810-112. doi:10.3102/00346543073001089

Wedding, J. A. (1997). *A comparison of braille reading and writing instruction in rural and urban areas for students in the state of Texas who are functionally blind* (Unpublished doctoral dissertation). Texas Tech University, Lubbock, Texas.

Wetherby, A., & Prizant, B. (1989). The expression of communicative intent: Assessment guidelines. *Seminars in Speech & Language, 70*(1), 77-91. doi:10.1055/s-0028-1082491

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. Child Development, 69, 848-872.

Williams, M. (1971). Braille reading. *Teacher of the Blind, 59*, 103-116.

Willings, C. (n.d. a). Service Delivery Models. *Teaching students with visual impairments*. Retrieved from www.teachingvisuallyimpaired.com/service-delivery-models.html

Willings, C. (n.d. b). Assistive technology. *Teaching students with visual impairments.* Retrieved from http://www.teachingvisuallyimpaired.com/assistive-technology.html

Willings, C. (2015). Teacher of students with visual impairments (TVI). *Teaching students with visual impairments.* Retrieved from http://www.teachingvisuallyimpaired.com/teacher-of-students-with-visual-impairments.html

Willoughby, D. M., & Duffy, S. L. M. (1989). *Handbook for itinerant and resource teachers of blind and visually impaired students*. Baltimore, MD: National Federation of the Blind.

Wilson, S. (1977). The use of ethnographic techniques in educational research. *Review of Educational Research, 47*, 245-256.

Wittenstein, S. H., & Pardee, M. L. (1996). Teachers' voices: Comments on braille and literacy from the field. *Journal of Visual Impairment & Blindness, 90*, 201-209.

Wolffe, K. E. (2000). Career education. In A. J. Koenig, & M. C. Holbrook (Eds.), *Foundations of education. Vol. II: Instructional strategies for teaching children and youths with visual impairments* (pp. 679-719). New York: AFB Press.

Wolffe, P., & Nevills, P. (2004). *Building the reading brain, PreK-3*. Thousand Oaks, CA: Corwin Press.

Wormsley, D. P. (1979). *The effects of a hand movement training program on the hand movements and reading rates of young braille readers* (Unpublished doctoral dissertation). University of Pittsburgh, Pittsburgh, PA.

Wormsley, D. P. (1996). Reading rates of young braille-reading children. *Journal of Visual Impairment & Blindness, 90*, 278-282.

Wormsley, D. (2006, November). *Using the functional approach to teach braille literacy*. Presentation at the Virginia Workshop on blindness and Visual Impairments. Hampton, Virginia.

Wormsley, D. P., & D'Andrea, F. M. (1997). *Instructional strategies for braille literacy*. New York: American Foundation for the Blind.

Wright, T., Wormsley D. P., & Kamei-Hannan C. (2009) Hand movements and braille reading efficiency: Data from the alphabetic braille and contracted braille study. *Journal of Visual Impairment & Blindness, 103*, 649-661.

Young, A., & Gillon, G. (1998). *Phonological awareness skills training for children with severe visual impairments: Insights from a case study*. Paper presented at the biennial conference of the New Zealand Speech-Language Therapists' Association, Dunedin.

Appendix A

Recruitment Email

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Note: Recruiting teachers of students with visual impairment (TVIs) who have students in grades 9-12 who are fluent braille users, reading on or above grade level, to participate in a braille literacy development study.

Colleagues,

I am a Doctoral Candidate at Texas Tech University in the College of Education. My research interests lie in the education of students who are blind or visually impaired. The purpose of my study is to identify and compare commonalities among 4-6 students in grades 9-12, who are fluent contracted braille users who are reading on or above grade level. The results of this study may serve as a starting point when attempting to determine improvements or changes in frequency of instruction, service delivery model, and/or curriculum used when teaching children braille.

I am currently recruiting teachers of students with visual impairments (TVIs) and their students in grades 9-12 to participate in my study. The TVIs will be asked to complete a short (3 question) questionnaire. Additionally, the TVI will be asked to disseminate recruitment information to the parents/legal guardians of selected students. The gatekeeper may disseminate the recruitment information provided by the researcher by means of e-mail or postal mail. The researcher will provide stamped envelopes that the gatekeeper will address with student address. Student participants will be asked to take part in a semi-structured interview, a literacy evaluation, and a direct observation. Student participants will be compensated for their time with a $25.00 gift certificate to National Braille Press. TVIs will be placed in a drawing for a $50.00 Visa/MasterCard gift card.

I am requesting your participation if you are a TVI who:

- has a student in grades 9-12 who is a fluent contracted braille user, reading on or above grade level;
- has an interest in participating in my study and is willing to complete a short (3 question) criterion questionnaire and disseminate recruitment information to the parents/legal guardians of identified students.

And if your student:

- is in grades 9-12;
- is a fluent contracted braille user, reading on or above grade level;
- is an English-language braille user; and
- has no additional disabilities aside from blindness or visual impairment.

Thank you for your consideration and assistance in identifying participants for my study. If you are interested in assisting with my study or have questions, please feel free to contact me via email or phone.

Sincerely,
Bertha Avila Guerrero, M.Ed.
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Appendix B

Gatekeeper Inclusion Criterion Questionnaire

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Thank you for agreeing to participate in this research study. The purpose of this qualitative dissertation study is to identify and compare commonalities among children who are blind or visually impaired and are in grades 9-12, who are fluent contracted braille readers, who read on or above grade level. Please answer the following questions and return to me via e-mail at
guerrero.avila@sbcglobal.net

Student Name: (please provide a numeric code)
Date of Birth:
Grade:
Eye Condition:
Date:

Is your student a fluent contracted braille reader?
Does your student read on or above grade level?
What literacy assessment do you use to assess literacy development?

Appendix C

Recruitment Letter to Parents/Legal Guardians of Student Participants

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Invitation to Participate

Hello, my name is Bertha Avila Guerrero and I am a doctoral candidate at Texas Tech University. I am writing today to invite your child to participate in a research study about braille literacy. This study is a requirement for me to complete my degree at the university.

The purpose of this study is to identify and compare common factors of students in grades 9-12 who are fluent contracted braille readers, who read on or above grade level.

Your child's teacher has identified him/her as a student who may be qualified to participate in this study. Without naming your child, the teacher has completed a short questionnaire about his/her literacy skills. Based on this questionnaire, I am asking that you allow your child to participate in this study. Your child will be asked to participate in an interview, a reading test, and an observation of your child reading. During the interview, your child will be asked some questions about his/her experiences when learning braille and developing literacy skills. The interview will be audiotaped. Secondly, your child will take part in a reading test. This test will be videotaped. Finally, your child will be observed reading a grade-level appropriate passage and will answer some comprehension questions. This observation will also be videotaped. The audio tapes, video tapes, and transcripts of your child's participation will be labeled with a code name and will be kept in a secure location accessible only by the researcher. They will be destroyed five years after completion of the study (projected date, June 2020). The interview, reading test, and observation will take approximately 3-4 hours and will take place either in your home or at the Education Service Center in you region.

There are no known risks or discomforts associated with this research.

This study may be a starting point when teachers of students with visual impairments (TVIs) and Admission Review and Dismissal (ARD) committees try to improve or make changes in method and amount of instruction, and/or curriculum used when teaching children braille.

Confidentiality of your child will be maintained by ensuring that all information gained from the questionnaire completed by your child's teacher, interview, reading test, and reading observation, along with results are kept in a secure, confidential location accessible only by the researcher. An assigned name will be used to describe your child's information. Only the researcher and assistant will know the names of student participants.

Your child does not have to participate, and there will be no negative results if your child withdraws from the study. You and your child may ask any questions concerning this research and have those questions answered before agreeing to participate or during the study.

You may call me at 254-661-2056, or E-mail guerrero.avila@sbcglobal.net. You may also contact Dr. Nora Griffin-Shirley, PhD at 806-834-0225 or E-mail n.griffin-shirley@ttu.edu or Rona Pogrund, PhD, rona.pogrund@ttu.edu,806-834-3865

If you have questions about your child's rights as a participant that have not been answered by me or by Drs. Griffin-Shirley or Pogrund, you may ask your questions to the Human Research Protection Program (HRPP) (hrpp@ttu.edu), Office of the Vice President for Research, Texas Tech University, Lubbock, Texas 79409, (806-742-2064).

Please contact me at 254-661-2056 or at guerrero.avila@sbcglobal.net if you are interested in having your child assist me with my research.

Respectfully,

Bertha Avila Guerrero

Appendix D

Informed Consent Form for Parents/Legal Guardians of Minor Student Participants

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Dear Parent/Legal Guardian:

I am asking that your child be allowed to take part in a research study. The following is more information about the study. If you decide you would like for your child to participate, please sign at the bottom of this form.

What is this project studying?
This project is studying common factors between high school students who are contracted braille readers. We are focusing on students who are reading on or above grade level and are skilled in braille. This study may help guide teachers when they are making decisions for other students learning braille.

What would my child be doing to participate?
There are three parts to the study: an interview, a reading test, and a reading observation. The interview is to learn about how and when your child learned braille, and how they use it now. It will be audio recorded. For the reading test, your child will read some text out loud. This will be videotaped. The observation will be another text read out loud. This time, your child will answer some questions about what was read.

How will my child and I benefit from participating?
After finishing all three parts, your child will receive from a $25.00 gift certificate for National Braille Press from me.

May we quit if we become uncomfortable?
There are no known risks involved with this study. Participation is voluntary and you are free to cancel your involvement at any time. This will not affect your family's relationship with the researcher or with Texas Tech University. Your decision will not make you lose any benefits you are owed.

How long will the process take?
The interview, reading test, and the observation will last about 3-4 hours. It will either be at your home or at the Education Service Center.

How are you protecting privacy?
A number and false name will be picked for your child. A number will be labeled on the first set of questions completed by the teacher. It will later be replaced with a false name. That name will be used to label the recordings and transcripts. All information linked to

your child will be kept in a secure place. They will be destroyed five years after the study has ended (planned date: June 2020).

Who do I ask if I have more questions?

- If you have any questions, please call me, Bertha Avila Guerrero at 254-661-2056.My e-mail is guerrero.avila@sbcglobal.net.
- Dr. Nora Griffin-Shirley and Dr. Rona Pogrund are my supervisors. Dr. Griffin-Shirley may be reached at 806-834-0225 or n.griffin-shirley@tttu.edu. Dr. Pogrund may be reached at 806-834-3865 or rona.pogrund@ttu.edu.Texas Tech's Human Research Protection Program (HRPP) protects the rights of people who take part in research. Their phone number is 806-742-2064. Their email is hrpp@ttu.edu. Human Research Protection Program, Office of the Vice President for Research, Texas Tech University, Lubbock, Texas, 79409.

_____

Printed Name of Student Participant

_____

Printed Name of Student Participant's Parent/Legal Guardian

_____

Signature of Student Participant's Parent/Legal Guardian

_____

Date

This consent form will expire on (*expiration date*):

Appendix E

Assent Form for Student Participant

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Dear Student,

You are invited to take part in some activities to help me understand your experiences when you were learning braille and learning to read and write. I would like to learn what you have in common with other high school students who are braille readers.

This will take about 3-4 hours of your time, and I will give you a $25.00 gift certificate for National Braille Press when we finish. First, I will visit with you and, with your permission, audio record the conversation. My questions for you will be about how and when you learned braille and how you use braille now. Second, I will give you a reading test, which will be recorded. Then I would like to listen to you reading a short story, and ask you some questions about it. I would like to video record this, too.

Your help will guide teachers when they are making good decisions for other students learning braille. You will be given a false name to make sure your identity is protected. I have already asked your parents for their permission for you to participate, and you can talk about this with them. If you have any questions at any time please ask me.

_____
Printed Name of Student Participant

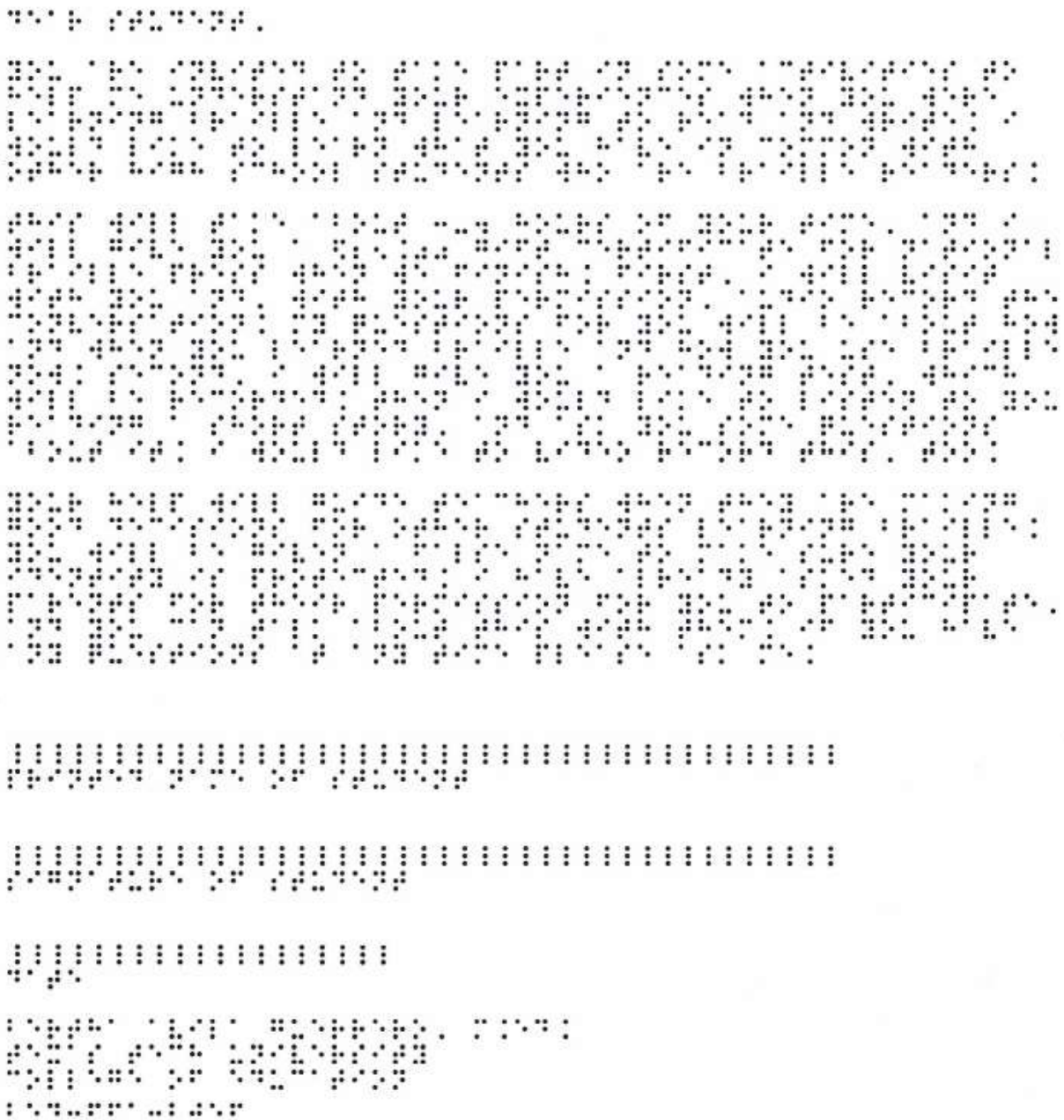
_____
Signature of Student Participant

_____
Date

Bertha Avila Guerrero, M.Ed.
Texas Tech University
College of Education
254-661-2056
guerrero.avila@sbcglobal.net

Appendix F

Assent Form for Student Participant in Braille



Appendix G

Student Participant Interview Protocol

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Name:
Date of Birth:
Grade:
Date:

1. What is your eye condition?
2. When did you start losing your vision?
3. When did you first start learning braille?
4. How much were you able to see when you first started to learn braille?
5. How did you first learn braille?
6. How did your teacher teach you?
7. How often did you receive braille instruction from a TVI at different grade levels?
8. What books or materials were used to help you learn braille (curriculum)?
9. How did you feel when you were learning braille?
10. At what age or grade level do you believe you had learned all of the braille contractions?
11. Did your parents/family help teach you braille?
12. Did your parents/family learn braille? If yes, how did they learn braille?
13. When you first started learning braille, did you have braille books at home? If yes, where did they come from?
14. Do you have braille books at home now? If yes, where do they come from?
15. Are you a member of the State Library, BookShare, or any other library? If yes, which library, and how did you become a member?
16. How did your classroom teacher help you use braille in the classroom?
17. Did you have braille books in the classroom beside textbooks? If yes, where did they come from?
18. How much can you see now?
19. How do you feel about braille now?
20. How has knowing braille helped you?
21. How do you use braille now?
22. Do you use electronic braille or hard copy braille (please explain)?
23. Do you use a Perkins Brailler, braille notetaker, slate and stylus or a combination (please explain)?
24. Do you use braille, audio, print, or a combination of these, most of the time at home and school (please explain)?
25. How do you think you will use braille in the future?
26. Do you enjoy reading braille? If yes, please explain why. If no, please explain why not.
27. What do you feel helped you the most to make you a good braille reader?

28. What suggestions would you give to teachers of students with visual impairments to help their students become good braille readers?

Appendix H

Assessment of Braille Literacy Skills

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Unique Features of Braille Reading

A. Orientation to Braille Books
   1. Holds book correctly (binding to left, braille title face up).
   2. Turns pages right to left.
   3. Scans entire page with one-hand for orientation.
   4. Scans entire page with two-hands for orientation.
   5. Locates:
      a. title page
      b. table of contents
      c. chapter titles/section headings
      d. paragraph indentations
      e. print page numbers
      f. braille page numbers
      g. page breaks
   6) States use of information on first page (publisher & transcriber information)

B. Placement of Braille Book
   1. Holds book face up.
   2. Places book parallel to desk or at slight angle on a consistent basis.
   3. Uses appropriate arm positioning on book.

C. Hand Movements
   1. Displays consistent curvature of fingers.
   2. Uses consistent light touch.
   3. Maintains consistent forward hand movements when reading; no scrubbing or unnecessarily aggressive hand/finger movements.
   4. Uses lead finger (usually pointer finger).
   5. Uses "detective fingers" (middle & ring fingers).
   6. Uses pinky finger to detect the end of a line (if using right hand)

D. Tracking Patterns
   1. Reads with both hands together, retraces lines with hands together, and drops hands to next line together.
   2. Uses left pointer finger as a line marker while the right hand reads the line; right hand returns on same line and both hands drop together.
   3. Uses left pointer finger as a line marker while the right hand reads the line, and then left pointer finger drops to the next line, while the right hand lifts to meet it.
   4. Left hand reads to the middle of the line, the right hand continues to read from there to the end of the line, the left hand drops down to the next line and begins reading (independent two-handed reading).

E. Pictures

1. Understands verbal description of pictures.
2. Understands transcriber's notes.
3. Understands simple line drawings of pictures and illustrations.

Appendix I

Example of Johns Basic Reading Inventory Literacy Evaluation
(Read by student for assessment of speed, accuracy, and fluency)

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

Elizabeth Meets Darcy

Elizabeth watched for the first appearance of Pemberley Woods with some perturbation; and when at length they turned in at the lodge, her spirits were in a high flutter. The park was very large and contained great variety of ground. They entered it in one of its lowest points, and drove for some time through a beautiful wood, stretching over a wide extent.

Elizabeth's mind was too full for conversation, but she saw and admired every remarkable spot and point of view. They gradually ascended for half a mile, and then found themselves at the top of a considerable eminence, where the wood ceased, and the eye was immediately captured by Pemberley House, situated on the opposite side of a valley, into which the road with some abruptness wound. It was a large, handsome stone structure, standing well on rising ground, and backed by a ridge of high woody hills. She had never seen a place for which nature had enhanced more, or where natural beauty had been so little counteracted by an awkward taste. They were all of them warm in their admiration, and at the moment she felt that to be mistress of Pemberley might be something!

They descended the hill, crossed the bridge, and drove to the door; and, while examining the nearer aspect of the house, all her apprehensions of meeting its owner returned. As she walked across the lawn, Elizabeth turned back to look again, and the owner himself suddenly came forward from the road.

Adapted from *Pride and Prejudice* by Jane Austen.

Appendix J

Example of Johns Basic Reading Inventory Comprehension Evaluation
(Read by student for assessment comprehension)

An Investigation into the Commonalities of Students Who are Fluent Contracted Braille Readers, Who Read on or above Grade Level

The Most Beautiful

Of the gods of ancient Greece, Apollo was the most beautiful. His hair was brilliant gold; his eyes were stormy blue. He wore a flowing tunic of golden panther skin, carried a quiver of golden arrows, and used a golden bow. His chariot was beaten gold; his horse was white with a platinum mane and flame-colored eyes. Apollo was always the god of the sun, but later he became patron of music, poetry, mathematics, and medicine. As an adult, Apollo was known for his unparalleled wisdom, but in his youth he was known for his barbarous exploits. Several times he was almost expelled from the company of the gods by Zeus, whom he angered with his youthful folly.

One objectionable folly was Apollo's treatment of a satyr named Marsyas. Marsyas was an excellent musician; Apollo considered this his talent and would allow no rivalry. Hearing
Marsyas praised continually, Apollo invited him to a musical contest. The winner was to choose a penalty to which the loser would have to submit, and the Muses were their judges. Marsyas played his melodious flute, and Apollo played his lyre. They played so exquisitely that the Muses could not choose between them, so Apollo suggested that they play their instruments upside down and sing simultaneously. Apollo turned his lyre upside down, played, and chanted a beautiful poem. Because Marsyas could not play his flute upside down and sing at the same time, the despondent satyr was declared the loser. Consequently, Apollo collected the prize.

Adapted from *The Greek Gods* by Bernard Evslin, Dorothy Evslin, and Ned Hoopes. Reprinted by permission of Scholastic Book Services.

Comprehension:
Background: Read the title to yourself; then tell me what you think will happen.

1. What is this story about? (the god Apollo's rivalry with Marsyas; Apollo)
2. What was the reason Apollo challenged Marsyas to a contest? (to see who was the best musician)
3. Describe what happened at the contest. (Marsyas was to play his flute and Apollo his lyre and the Muses were to judge which was best)
4. What was Apollo god of? (sun; music; poetry; mathematics; medicine [any 3])
5. How would you describe Apollo? [beautiful with golden hair and blue eyes; strong; wise (any 2)]

6. What instrument did Apollo play? (lyre)
7. Who won the contest? (Apollo)
8. What lessons could be learned from this myth? (any logical response)
9. What is your opinion of Apollo's trick? Why? (if necessary, restate trick: to play their instruments upside down and sing at the same time) (any logical response)
10. Explain what "simultaneously" means in this sentence: “Apollo suggested that they play their instruments upside down and sing simultaneously”. (at the same time)

Appendix K

Assessment of Braille Literacy Skills

Unique Features of Braille Reading

A. Orientation to Braille Books				
Participant	Luke	Esther	David	Peter
1. Holds book correctly (binding to left, braille title face up).	+	+	+	+
2. Turns pages right to left.	+	+	+	+
3. Scans entire page with one-hand for orientation.	+	+	+	
4. Scans entire page with two-hands for orientation.				+
5. Locates: a. Title Page b. Table of Contents c. Chapter Titles/section headings d. Paragraph Indentations e. Print Page Numbers f. Braille Page numbers g. Page Breaks	+	+	+	+
6. States use of information on page (publisher & transcriber information)	+	+	+	+
B. Placement of Braille Book				
Participant	Luke	Esther	David	Peter
1. Holds book face up.	+	+	+	+
2. Places book parallel to desk or at slight angle on a consistent basis.	+	+	+	+
3. Uses appropriate arm positioning on book.	+	+	+	+
C. Hand Movements				
Participant	Luke	Esther	David	Peter
1. Displays consistent curvature of fingers.		+	+	
2. Uses consistent light touch.	+	+	+	+
3. Maintains consistent forward hand movements when reading; no scrubbing or unnecessary aggressive hand/finger movements.	+	+	+	+
4. Uses lead finger (usually pointer finger).	+	+	+	+
5. Uses "detective fingers" (middle & ring fingers).		+		+
6. Uses pinky finger to detect the end of a line (if using right hand)		+		
D. Tracking Patterns				

Participant	Luke	Esther	David	Peter
1. Reads with both hands together, retraces lines with hands together, and drops hands to next line together.				
2. Uses left pointer finger as a line marker while the right hand reads the line; right hand returns on same line and both hands drop together.				
3. Uses left pointer finger as a line marker while the right hand reads the line, and then left pointer finger drops to the next line, while the right hand lifts to meet it.				
4. Left hand reads to the middle of the line, the right hand continues to read from there to the end of the line, the left hand drops down to the next line and begins reading (independent two-handed reading).	+	+	+	+

Appendix L

*Summaries of Students' Reading Performance (Modified)**

Participant 1

Student: David **DOB:** 7/3/1997 **Sex:** M **Grade:** 11 **Date of Test:** 6/8/2015

*Word Recognition: Word

Grade	Form	Analysis	Correct Words	Level
Grade 10	C	I don't know	19/20	Independent
Grade 11	C	1 Self-correct 1 Miscue	19/20	Independent
Grade 12	C	2 Self-correct 2 Miscue	18/20	Instructional

*Word Recognition: Passages

Passage	Mis-cues	Reading Level	Comprehension Questions	Comprehension Level	WPM
Grade 10: LN 1047 Elizabeth Meets Darcy	0	Independent	9/10	Independent	53
Grade 10: LE 1047 Earthquakes	1	Independent	10/10	Independent	45
Grade 11: LN 1187 Read or to Weed	2	Independent	10/10	Independent	50
Grade 11: LE 1187 Beating the Bonk	1	Independent	10/10	Independent	46
Grade 12: LN 1296 American in Paris	5	Independent/ Instructional	9/10	Independent	46
Grade 12: LE 1296 Beards	5	Independent/ Instructional	9/10	Independent	54

*Informal Analysis of Oral Reading Behaviors

Oral Reading Behaviors	Frequency of Occurrence	General Impact on Meaning
Substitutions	None	None
Insertions	Seldom	No Change
Omissions	None	None
Reversals	None	None
Repetitions	Sometimes	No Change

Participant 2

Student: Esther **DOB:** 4/23/1998 **Sex:** F **Grade:** 11 **Date of Test:** 5/2/2015

*Word Recognition: Word

Grade	Form	Analysis	Correct Words	Level
Grade 10	C	1 Self-correct 1 don't know	19/20	Independent
Grade 11	C	2 don't know	18/20	Instructional
Grade 12	C		20/20	Independent

*Word Recognition: Passages

Passage	Mis-cues	Reading Level	Comprehension Questions	Comprehension Level	WPM
Grade 10: LN 1047 Elizabeth Meets Darcy	2	Independent	8/10	Independent/ Instructional	138
Grade 10: LE 1047 Earthquakes	1	Independent	9/10	Independent	128
Grade 11: LN 1187 Bookworm or Earthworm	5	Independent / Instructional	10/10	Independent	145
Grade 11: LE 1187 Beating the Bonk	1	Independent	9/10	Independent	134
Grade 12: LN 1296 American in Paris	2	Independent	8/10	Independent/ Instructional	112

Grade 12: LE 1296 Beards	3	Independent	9/10	Independent	128

*Informal Analysis of Oral Reading Behaviors

Oral Reading Behaviors	Frequency of Occurrence	General Impact on Meaning
Substitutions	Seldom	No Change
Insertions	Seldom	No Change
Omissions	Seldom	No Change
Reversals	None	None
Repetitions	Seldom	No Change

Participant 3

Student: Luke **DOB:** 11/1/1998 **Sex:** M **Grade:** 10 **Date of Test:** 6/16/2015

*Word Recognition: Word

Grade	Form	Analysis	Correct Words	Level
Grade 9	C		20/20	Independent
Grade 10	C	2 Self-correct 1 Miscue	19/20	Independent
Grade 11	C	1 Miscue	19/20	Independent

*Word Recognition: Passages

Passage	Mis-cues	Reading Level	Comprehension Questions	Comprehension Level	WPM
Grade 9: LN 4959 The Most Beautiful	1	Independent	8/10	Independent/ Instructional	102
Grade 9: LE 4959 Destruction	3	Independent	10/10	Independent	102
Grade 10: LN 1047 Elizabeth Meets Darcy	3	Independent	8/10	Independent/ Instructional	112
Grade 10: LE 1047 Earthquakes	0	Independent	9/10	Independent	103
Grade 11: LN 1187 Bookworm or Earthworm	1	Independent	9/10	Independent	119
Grade 11: LE	2	Independent	9/10	Independent	103

1187 Beating the Bonk	

*Informal Analysis of Oral Reading Behaviors

Oral Reading Behaviors	Frequency of Occurrence	General Impact on Meaning
Substitutions	Seldom	No Change
Insertions	None	None
Omissions	Seldom	No Change
Reversals	None	None
Repetitions	None	None

Participant 4

Student: Peter **DOB:** 7/2/1998 **Sex:** M **Grade:** 11 **Date of Test:** 5/23/2015

*Word Recognition: Word

Grade	Form	Analysis	Correct Words	Level
Grade 10	C		20/20	Independent
Grade 11	C	1 Miscue (Braille error)	19/20	Independent
Grade 12	C		20/20	Independent

*Word Recognition: Passages

Passage	Mis-cues	Reading Level	Comprehension Questions	Comprehension Level	WPM
Grade 10: LN 1047 Elizabeth Meets Darcy	0	Independent	10/10	Independent	88
Grade 10: LE 1047 Earthquakes	2	Independent	9/10	Independent	88
Grade 11: LN 1187 Read or to Weed	3	Independent	10/10	Independent	103
Grade 11: LE 1187 Beating the Bonk	0	Independent	10/10	Independent	95
Grade 12: LN 1296 American in	2	Independent	9/10	Independent	79

Paris					
Grade 12: LE 1296 Beards	0	Independent	10/10	Independent	97

*Charts are modified from: Basic Reading Inventory Performance Booklet: Tenth Edition Jerry L. Johns, PhD.