The Effects of the Computer Component of the Headsprout Early Reading Program on the Acquisition of Reading Skills for Elementary Aged Students with Moderate to Intensive Intellectual Disabilities

Thesis

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By
Sarah Blaine, B.S.
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Thesis Committee:
Dr. Sheila Morgan, Advisor
Dr. Ralph Gardner, III
Abstract

This study examined the effects of the computer assisted instruction Internet based program Headsprout Early Reading, specifically the computer component, on the acquisition of early reading skills in students with moderate to intensive intellectual disabilities. Student performance was assessed using materials from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) 6th edition. The participants were first and second graders diagnosed with a moderate to intensive intellectual disability. A multiple-baseline across participants was used to evaluate the effectiveness of the intervention. Findings indicated that there were improvements in acquisition of some early reading skills based on the results of the Initial Sound Fluency assessment and Nonsense Word Fluency, however a functional relation was not demonstrated for any of the DIBELS measures.
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Vita

2007-2011........................................ B.S. Physical Education
The Ohio State University
Columbus, Ohio

2011-Present............................... Substitute Teacher
Various Central Ohio School Districts
Columbus, Ohio

Fields of Study

Major Field: Educational Studies

Area of Emphasis: Special Education, Moderate to Intensive Needs
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Chapter 1: Literature Review

Reading is an essential skill for life. Reading is needed to participate in school activities, such as reading directions on an assignment or the lunch options on a menu. Reading is important for social and leisure activities, including reading posts on social media or for enjoying a book. Reading also is a functional skill needed for activities such as reading aisle signs at the grocery store or street signs when traveling. In short, people use their reading skills on a daily basis.

**Reading Failure.** Statistics show that many of America’s children are not reading on grade level. According to the National Center for Educational Statistics, the 2013 National Assessment of Educational Progress (NAEP) report indicated that about 32% of all fourth grade students and about 22% of all eighth grade students were below the basic level in reading, while only about 35% of fourth grade students and about 36% of eighth grade students were at or above the proficient level (National Center for Educational Statistics, 2013). There were four categories for scoring: below basic, at or above basic, at or above proficient, and at or above advanced. Reading below the basic level means that the student was “unable to demonstrate even partial mastery of fundamental knowledge and skills” and if a student was performing at or above the proficient level this was equivalent to “grade level expectations” (Bursuck & Damer, 2011, p. 3).

**Reading Skills.** The National Reading Panel (NRP) identified the following five areas as components of a reading curriculum: phonemic awareness, phonics, reading fluency, vocabulary, and reading comprehension (Bursuk & Damer, 2011, p. 3).
Although a student could be skilled in one of the areas, a student who is proficient in all five areas will more likely be a skilled reader. Phonemic awareness is defined as “the ability to hear and manipulate the smallest unit of sound in the spoken language” (Bursuck & Damer, 2011, p. 6). A student who has phonemic awareness is able to segment words into the individual phonemes (i.e., sounds) and also blend phonemes together when each phoneme is spoken slowly. Phonics is a teaching strategy that instructs students on the relationship between written letters (graphemes) and the sounds they make (phonemes) (Bursuck & Damer, 2011). This helps develop a student’s alphabetic principle, the understanding that there is a systematic and predictable relationship between graphemes and phonemes (Bursuck & Damer, 2011).

Phonemic awareness and phonics help students become proficient at identifying text by sight and decoding unknown text. Reading fluency is “the ability to read text accurately, quickly, and with expression” (Bursuck & Damer, 2011, p. 9). When students are fluent readers they are able to spend more time comprehending what they are reading rather than focusing on decoding the text. Vocabulary is important to a student’s ability to read and understand text. There are two types of vocabulary, receptive and expressive, and when students have a wider vocabulary they are able to identify words more easily (Bursuck & Damer, 2011). The fifth element, reading comprehension, is the ultimate goal of reading instruction. When students can comprehend what they are reading they interact with the text in more complex ways, like making connections between themselves and the text, making predictions, and summarizing the information presented (Bursuck & Damer, 2011).
Browder et al. (2009) examined literacy skills for students with severe developmental disabilities. The reading skills Browder and the authors identified as needed for this population were also the same for students without disabilities. In addition to the NRP component, students need instruction in concepts of print, which can be defined as an understanding of the forms and functions of print (Browder et al., 2009). These include how to orient a book, the difference between words and nonwords (e.g., pictures), and knowledge that reading is performed from left to right. When concepts of print are developed they can help students interact with all types of text such as identifying highlighted words in a nonfiction text.

Students with disabilities and Reading

A large percentage of non-disabled students fail to reach proficient reading levels, but the results for students with disabilities are even more dismal. The 2013 NAEP reports about 69% of fourth graders with disabilities and about 60% of eighth graders with disabilities score below the basic level while 11% of fourth graders and 9% of eighth graders with disabilities were reading at or above the proficient level (National Center for Educational Statistics, 2013).

Although these findings may seem to suggest reading instruction is not taking place for students with disabilities, research indicates otherwise. However the research is primarily about reading instruction for students with high incidence disabilities (e.g., Learning Disability, ADHD). This may have resulted because research involving students with moderate to intensive intellectual disabilities has not been conducted as often for reading, compared to other areas like functional skills. The research that is available on reading instruction for students with moderate to intensive intellectual disabilities usually
consists of learning sight words and identifying performance on skills necessary for reading.

Ruwe, McLaughlin, Derby, and Johnson (2011) completed a study that evaluated the effectiveness of Direct Instruction (DI) flashcard system. The participants were three middle school boys all with an intellectual disability and the study took place within a self-contained classroom. To establish what sight words were to be instructed, the researchers used the Dolch primer word list for first to third grade and then 20 words were randomly selected from each of the grade levels. The intervention consisted of having each of the 20 selected words from three word sets (i.e., words from each grade level) written on flashcards containing mastered and unmastered words. The student was presented with a word and had two-seconds to respond; if the response was correct the card was placed at the back of the deck. If an incorrect response was given or took longer than two-seconds, the researcher modeled the word, had the student repeat the word, and the card was placed back in the deck two or three cards from the front. Then it was presented again with the described procedure in place till the word was said correctly. As a result of the DI flashcard system, the students showed improvement with isolated sight word knowledge across all three words sets, but improvements with accuracy of transferring knowledge of these sight words to a reading passage were difficult to detect. It was noted that the frequency of substitution errors (i.e., guessing at an unknown word) while reading the passages decreased from baseline to post intervention.

Chanel, Loveall, and Conners (2013) compared the strengths and weaknesses of reading skills for 17 individuals with intellectual disabilities to 17 typically developing peers with a similar level of verbal ability. The students with intellectual disabilities were
in grades sixth through eleventh, while the typically developing peers were in grades second through fourth. The skills that were examined were phonological decoding, orthographic processing, and rapid automatized naming (RAN). Overall the students with intellectual disabilities underperformed in the area of phonological decoding compared to the typically developing peers, but there were no significant differences between the groups for the other two areas, orthographic procession and RAN. As noted by the authors, to help students with intellectual disabilities increase their word recognition skills instruction on phonological decoding is needed.

Browder, Ahlgrim-Delzell, Courtade, Gibbs, and Flowers (2008) evaluated the effectiveness of a curriculum called Early Literacy Skills Builder (ELSB), for students with significant developmental disabilities. The researchers developed the scripted ELSB curriculum after reviewing research on what was needed for effective early literacy instruction along with the components outlined by the National Reading Panel (NRP). To measure the effectiveness of the ELSB curriculum, the following assessments were used: the researcher created assessments Nonverbal Literacy Assessment (NVLA) and Early Literacy Skills Assessment (ELSA), the Peabody Picture Vocabulary Test-III (PPVT-III), and the Woodcock Language Proficiency Battery (WLPB). The design of the study was a randomized control group, with either students assigned to the control or treatment group. All 23 students that participated in the study were enrolled in grades kindergarten to fourth, attended school in a self-contained classroom, and were identified with a severe/profound intellectual disability, moderate intellectual disability, or autism. All students received literacy instruction through a method called story-based lessons; the control group received sight word instruction or picture instruction using the Edmark
curriculum or words/pictures relevant to the student’s needs while the treatment group received the ELSB curriculum. The findings of the study were that the treatment group made significant gains on the ELSA and the NVLA compared to the control group, but no statistical differences were noted for the PPVT-III and the WLPB.

Browder, Wakeman, Spooner, Ahlgrim-Delzell, and Algozzine (2006) completed a review of the literature on reading instruction for individuals with significant cognitive disabilities focusing on the extent current evidence-based practices exist for teaching the NRP components of reading (e.g., phonics, fluency, vocabulary) to this population. Browder et al. reviewed 128 studies that met the following criteria: published in a peer review journal between 1975 and 2003, at least one of the participants in the study had a diagnosis of significant cognitive disability, an intervention that targeted reading instruction or picture identification skills, and use a recognized experimental design. The finding of the review indicated most of the studies targeted increasing vocabulary, primarily sight words and functional words. A small number of the studies focused on phonics instruction (10% or 13 studies) and phonemic awareness (4% or 5 studies). The review also found that the method used most typically to teach students with significant cognitive disabilities is the use of “systematic prompting techniques in a repeated trial format” but the authors noted the need for research to find how to teach phonics and phonemic awareness to this population (Browder et al., 2006, p. 401).

In summary, there are studies on the reading instruction for individuals with intellectual disabilities. However, the research primarily consists of teaching sight words and functional words, rather than in the areas of reading such as phonics or phonemic awareness. The methods that are used for teaching sight words and functional words have
proven effective and now research needs to find how to best teach other areas of reading to these individuals.

**Computer Assisted Instruction**

This section will discuss what Computer Assisted Instruction (CAI) is, why it is used, and studies in which CAI was utilized. In today’s world technology is being used more and more frequently. CAI is a way for teachers and schools to use technology to enhance the learning of students. According to Hall, Hughes, and Filbert (2000), CAI is defined as “the software designed to teach toward a curricular goal, to provide instruction and practice toward the achievement of an immediate learning objective” (p. 117).

Hall et al. (2000) performed a synthesis of 17 studies pertaining to CAI for reading instruction for students with learning disabilities; the objective was to determine which studies demonstrated improvement in reading using CAI. Of the 17 examined studies, 13 demonstrated improvements for decoding or comprehension (2000). The synthesis also reviewed the CAI that demonstrated improvement and found incorporated within the programs were effective teaching strategies, including systematic instructional procedures and elaborate feedback (e.g., corrective feedback) (2000).

Jerome and Barbetta (2005) used an alternating treatment design to examine the effects of ASR conditions of CAI on social studies learning. There were three response conditions, Clicking-ASR, Repeating-ASR, and Listening-OT (on-task) (2005). Clicking ASR and Repeating ASR were when students made a response by clicking the mouse and orally repeating the correct response, respectively, while Listening-OT was when a student made a “response” by listening to what was being read on the computer (Jerome & Barbetta, 2005). The researchers created a CAI based on unknown social studies facts,
which consisted of content not previously taught and based on the results of a pretest. An alternating treatment design was used and by using three types of tests (same-day, next-day, and maintenance tests) to measure effect, it was found that Repeating-ASR was the most effective form of ASR for CAI followed by Clicking-ASR then Listening-OT.

Another study investigated using the computer program Microsoft PowerPoint ® to teach two students with moderate to intensive disabilities basic academic skills (Everhart et al., 2011). The first author of the study, Everhart, was also the students’ teacher and the skills determined were those found in the IEP of each student. These included numbers, letters, letter sounds, and color words. Through this CAI developed using Microsoft PowerPoint ®, which utilized discrete learning trials and provided immediate feedback for each response, the two students were able to acquire the basic academic skills and maintain at least two of the skills over two to four weeks (Everhart et al., 2011).

Lee and Vail (2005) examined the effectiveness of the intervention, Word Wizard, a CAI that was created by the researchers. The Word Wizard program was developed to help increase sight word recognition for four boys with developmental disabilities. The words selected for the study were from the Dolch lists, high frequency words as determined by the school district, review of IEP goals, and consultation with the teacher (Lee & Vail, 2005). After the title and direction page were presented, students were then shown a video segment. Next, students were presented with a screen with four choices (the target word and three distractors) and had to click the target word. A 5-second constant-time-delay was also used with five possible feedback responses from the Word Wizard program (e.g., positive praise for selecting correct answer, corrective
feedback followed by a prompt to try again). Through this intervention students increased their recognition of the sight words instructed on in the study.

CAI has been found to be an effective method of instruction of a variety of academic skills for students with disabilities. For CAI to be successful at instructing students effective teaching strategies, such as ASR and immediate feedback, need to be incorporated into the program. As done by the researchers in many of the studies cited, CAI can be created by classroom teachers which allows for individualized instruction to meet a wide variety of learner needs.

**Students with disabilities and Headsprout**

One type of CAI is the Headsprout Early Reading program. Headsprout Early Reading is a researched-based, Internet reading program that teaches students to read through the use of an interactive game (Headsprout Early Reading, 2015). The program utilizes phonics in each of the episodes to teach reading along with providing multiple opportunities for students to actively respond, such as clicking on the instructed letter sound or word, repeating words allowed, and providing feedback, both corrective and praise. Students using the Headsprout Early Reading program learn individual letter sounds, then words made up of the targeted sounds, and then reading the learned words in sentences and stories. The episodes within the program have various animated themes, such as space, ocean, and dinosaurs, and are presented as a game to interest students.

The Headsprout Early Reading program incorporates the five areas of reading instruction as outlined by the NRP: phonemic awareness, phonics, reading fluency, vocabulary, and reading comprehension (National Institute of Child Health and Human Development, 2013). An example within the program of how phonemic awareness is
instructed is having the student click on the corresponding character that said a targeted sound within a word. There are also activities in which the student is told the sounds of the word slowly and then directed to say the word (blending). Phonics is instructed by having students click on the targeted sound after the narrator speaks the sound. Fluency is targeted in a couple ways, one being a student must click within a certain amount of time. Otherwise a prompt is given to complete the task. The other way is when the student is told to say a word or sound before the narrator says it. Vocabulary is also instructed by using common sight words (e.g., “and” and “the”) in the readings. Finally, reading comprehension is instructed by having students read a story and then click on the picture that corresponds to the sentence they just read.

There are studies involving the use of the Headsprout Early Reading program with students with disabilities. One study conducted by Grindle, Hughes, Saville, Huxley, and Hastings (2013) taught early reading skills to children with autism using Headsprout Early Reading (referred to as Mimiosprout Early Reading, MER, in the study). There were four participants, ages four to six years, all with a diagnosis of autism. The children’s early reading skills were assessed using the Dynamic Indicator of Basic Early Literacy Skills (DIBELS), specifically the assessments of initial sound fluency, phoneme segmentation fluency, word use fluency, letter naming fluency, and nonsense word fluency, and the Word Recognition and Phonics Skills Test (WRAPS). All four participants completed the assessments at pre-intervention, after 40 MER episodes, and after 80 MER episodes, and three completed a follow-up assessment after eight weeks with no intervention. The participants in this study were able to complete all 80 episodes of the MER program either over the course of the academic year or into the following
school year. All of the participants at some point also received modifications to the standard teaching procedure or supplemental instruction (e.g., if a participant had not reached the mastery criterion of 90% on episode within one week using discrete-trial teaching). The participants showed improvements from baseline to the last time they were assessed in all of the DIBELS assessment areas (except one area for one of the participants which decreased) and the WRAPS score for three of the participants also increased compared to baseline (the other participant maintained the baseline score each time assessed).

Clarfield and Stoner (2005) conducted a study that measured the effects of Headsprout Reading Basics on the academic performance of students with ADHD. The students in this study were three males either in Kindergarten or first grade, identified as at-risk for reading difficulties and with a diagnosis of ADHD. For one of the students there was not a diagnosis of ADHD but parents completed the screening activities for the study, i.e., completing a Behavior Assessment System for Children, BASC, and a clinical interview. Both performance in reading and behavior were the dependent measures for this study specifically using DIBELS Oral Reading Fluency (DORF) and Behavior Observation Students in Schools (BOSS) to assess. The students worked on the Headsprout program three times a week for about 20-30 minutes each session, with one student completing 27 episodes, another 24, and the third student 21 episodes. For all of the participants DORF scores increased from baseline and off-task behaviors decreased from baseline. As the authors noted the decrease in off-task behavior cannot necessarily be attributed to the Headsprout program since there were different conditions when
observational data were collected, but can support treatment fidelity as the students were highly engaged with the Headsprout program compared to teacher-led-instruction.

The purpose of the present study was to examine the effects of CAI, specifically the Headsprout Early Reading program, on the acquisition of early reading skills of elementary aged students with moderate to intensive intellectual disabilities. Research suggests that CAI and instruction in reading skills, like phonemic awareness, can improve a student’s ability to read. The Headsprout Early Reading program, which has evidence as both an effective CAI and instruction based in phonics, was selected as the intervention. The goal of this study was to extend the research on the use of CAI, i.e., the Headsprout Early Reading program, in the acquisition of early reading skills of elementary students with moderate to intensive intellectual disabilities. The following research questions were posed:

1. What are the effects of the Headsprout Early Reading program on Initial Sound Fluency for students with moderate to intensive intellectual disabilities?
2. What are the effects of the Headsprout Early Reading program on Phoneme Segmentation Fluency for students with moderate to intensive intellectual disabilities?
3. What are the effects of the Headsprout Early Reading program on Nonsense Word Fluency for students with moderate to intensive intellectual disabilities?
4. What are the students’, classroom teacher’s, and classroom assistant’s opinions of the Headsprout Early Reading program?
Chapter 2: Methods

This chapter presents the methods that were used in this study. Participants, setting, observer, and experimenter are described. Also, the materials used, definitions and measurement of the dependent variables, IOA, procedural reliability, and experimental design are described.

Participants and Setting

The participants in this study were three students enrolled in an elementary multiple disabilities classroom in a public school in a Midwestern suburban school district. All of the students had some form of moderate to intensive intellectual disabilities and were in either first or second grade. Prior to the beginning of the study the classroom teacher identified possible participants who met the following criteria: (a) could communicate verbally, (b) could manipulate and interact with a computer and software programs independently, and (c) needed to improve their early reading skills. Parental consent forms (Appendix A) were sent home with these students. After obtaining parental consent, each student was informed of the study and his or her verbal consent was obtained (Appendix B). Participant demographics can be found in Table 1.

Marcus. Marcus was a second grade boy with a diagnosis of a moderate intellectual disability and Apraxia. The teacher reported Marcus was primarily receiving reading instruction on letter sounds, common sight words from the Dolch sight words K-3 list, and functional sight words (e.g., fork, spoon, plate, eat, and snack). Using flashcards and ASR Marcus would practice/review the teacher selected words. Marcus
also completed activities on the Starfall website to supplement instruction. (Starfall, 2010).

**Tazara.** Tazara was a second grade girl with a diagnosis of severe developmental delay and primordial dwarfism. At the start of the study, Tazara was able to identify only a couple of letters and produce a couple of letter sounds, however her pitch and articulation made it difficult to completely understand her speech. Reading instruction consisted of identifying parts of the book and answering listening comprehension questions, including questions related to sequencing events, identifying main characters, and answering “wh” questions. Reading instruction also targeted the alphabetic principle.

**Hemil.** Hemil, was a first grade boy with an autism diagnosis and an expressive language delay. Hemil had the ability to read, but his behavior impacted how well he could attend to the skill. Hemil’s reading instruction was similar to that of Marcus including instruction on letter sounds and sight words. In addition Hemil practiced isolating phonemes, blending, and segmenting letter sounds in words. Hemil had begun DIBELS assessments just before participating in the study.

As part of their regular reading instruction all three of the students participated in the whole class activity of “calendar time” which included a letter of the day. Prior to learning the new letter and sound students would first review previously learned letters. Students would then learn a new letter name along with the sound for the letter. The students would practice saying the letter sound and then saying the letter sound in words. For example if the letter of the day was “z” the students would practice saying the sound /z/ in words like “zipper” and “zigzag.”
The assessments administered during baseline and following intervention sessions as well as the intervention, the Headsprout Early Reading program, were all conducted in the classroom (Headsprout Early Reading, 2015). The classroom teacher and a classroom assistant were present while students worked on the program. There were two computers with touchscreen monitors. Marcus was able to manipulate the mouse; Hemil and Tazara utilized the touchscreen. Marcus occasionally listened to the program through headphones to minimize classroom distractions.

**Experimenter**

The experimenter was a graduate student at The Ohio State University pursuing a Master’s degree in Special Education. The experimenter received a Bachelor of Science in Physical Education from The Ohio State University and four years of experience substitute teaching in public schools. The experimenter conducted all of the DIBELS assessments. The experimenter also monitored and interacted with students while they used the Headsprout Early Reading program on the days she came to administer the DIBELS assessments.

**Observers**

There were two observers for this study, one was an undergraduate student, the other a doctoral student both studying Special Education at The Ohio State University. Both observers assisted with IOA data collection and one assisted with procedural fidelity.

**Materials**

The materials used in this study included the computer component of the Headsprout Early Reading program (Headsprout Early Reading, 2015), the Headsprout
Early Reading progress map and stickers, the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) 6th edition progress monitoring assessment materials (Good & Kaminski, 2002) and computers with an Internet connection in order to access the Headsprout Early Reading program. Computers with a mouse, external speakers, and an audio headset were used for Marcus, while Hemil and Tazara used external speakers and a monitor with a touchscreen. Based on assessment data collected prior to the study, the Kindergarten level DIBELS 6th edition progress monitoring materials were used. These included Initial Sound Fluency (ISF), Phoneme Segmentation Fluency (PSF), and Nonsense Word Fluency (NWF). These assessments aligned with the Headsprout Early Reading program.

**Definition and Measurement of Dependent Variables**

The dependent variables in this study were student performance on the various DIBELS assessments (i.e., ISF, PSF, and NWF). Dependent measures were defined and calculated as follows:

**ISF:** ISF was defined as the number of correct initial sounds per minute. First the researcher modeled how to correctly answer a question from a sample passage. The student was then presented with a practice question and provided with affirmative or corrective feedback. For example, the researcher presented a picture of a mouse and modeled the initial sound “/m/.” The student was then asked to identify a new picture based on the sound presented by the researcher. Following this question the researcher modeled what sound the word pillow began with (i.e., /p/) and then asked the student what sound the picture of letters (as in mail) began with (i.e., /l/). The student was then presented with pictures for the scoring portion. The researcher pointed to each of the
pictures stating what they were and then asked the first question. The response was either scored correct or incorrect. An answer was scored as correct if the student pointed to the correct picture, named the correct picture, re-named the picture with the correct initial sound (e.g., the target picture was hand for /h/, but the student pointed at road and said “highway”), or said the correct initial consonant or vowel sound(s) within five seconds. A response was scored as incorrect if the student pointed to the wrong picture, re-named the picture with an incorrect initial sound (e.g., saying “house” for the target picture “barn” for /b/), or not responding within five seconds. These scoring procedures were outlined in the DIBELS 6th Edition Administration and Scoring Guide (Good & Kaminski, 2002).

Unlike many DIBELS assessments, the ISF assessment does not use a one-minute timing, but rather it is intermittent. The researcher would state each picture’s name and then ask the first question. As soon as the researcher finished speaking, the stopwatch was started and then stopped either once the student responded or after five seconds. The number of correct responses was multiplied by 60 and then divided by the total time in seconds. In the event that a student did not make a correct response within the first five questions, the assessment was discontinued and scored a zero.

**PSF:** PSF was defined as the number of correct phonemes segmented in a minute. First, the researcher modeled how to segment a word (e.g., “sam” was segmented into /s/ /a/ /m/), and then the student had an opportunity to practice segmenting a word (in the practice portion the word was “mop”). Affirmative or corrective feedback was given based on the student’s response. Following the practice session, students were told a word and were to segment the word into the individual sounds of the word. The response was scored based on how many correct segmentations were said based on the DIBELS
6th Edition Administration and Scoring Guide. Correct segmentations included saying each individual sound, a correct sound segment, or sound elongation with the student providing each sound segment within three seconds (Good & Kaminski, 2002). If a student repeated the word no correct segmentations were scored. If a student did not correctly respond in the first five questions the assessment was discontinued and scored a zero.

**NWF:** NWF was defined in two ways: one, as the number of correct letter sounds provided in minute and two, as the number of correct whole words recoded. The researcher modeled how to read and segment a nonsense word. Students were then provided with a practice word and could either say each letter sound or read the whole word. Affirmative or corrective feedback was provided based on the student’s response. The student was then given a sheet of nonsense words to read in a one-minute timing. Scoring procedures followed the guidelines in the DIBELS 6th Edition Administration and Scoring Guide (Good & Kaminski, 2002). The researcher underlined the letters or words on the scoring document that the student said or read in the correct order. If a response did not match the criteria for correct it was not scored. In the event the student did not have any correct responses in the first five words the assessment was discontinued and scored a zero.

**Inter-observer Agreement (IOA)**

Two trained observers collected data for at least 20% of sessions. IOA was calculated for all dependent variables during both conditions (baseline and intervention). A second observer attended data collection sessions and scored the student’s responses to the DIBELS assessments on an unmarked scoring sheet. IOA was determined by
comparing the scores of the second data collector with the experimenter’s scores. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100.

**Procedural Fidelity**

All of the baseline and intervention assessment sessions were audio recorded. An independent observer measured procedural fidelity for assessments by using the checklist provided in the DIBELS 6th Edition Administration and Scoring Guide for the assessments given (Appendix C, Appendix D, and Appendix E) (Good & Kaminski, 2002). While listening to the audio recording, the independent observer checked either “yes” or “continue practicing” for each step. Procedural fidelity was calculated by dividing the number of steps completed correctly and in order by the total number of steps and then multiplied by 100. Procedural fidelity was taken for 15% of sessions for all three dependent variables and both phases of the study.

Procedural fidelity was not assessed on the implementation of the Headsprout Early Reading program because the program provided consistent sequence of procedures and tracked the students’ progress and time spent completing the program.

**Social Validity**

After the study was completed the teacher and a classroom assistant who had assisted the students with the program were provided with a questionnaire to measure satisfaction with the use of the Headsprout Early Reading program. This questionnaire used a Likert-type Scale (Appendix G). Sample questions from the questionnaire included “how likely are you to implement the Headsprout Early Reading program on your own” and “how effective do you find the Headsprout Early Reading program?” The
students who participated in the study also completed a Likert-type opinion questionnaire (Appendix F). Sample questions for this questionnaire included “how did you feel about the Headsprout Early Reading program” and “how much did you learn from the Headsprout Early Reading program.” Pictures were used on the student questionnaire to aid in student comprehension of the questions and completed with the assistance of the classroom teacher or classroom assistant.

**Experimental Design**

The experimental design used to evaluate the effects the Headsprout Early Reading program on the acquisition of early reading skills was a multiple baseline across participants. The experimental conditions were baseline and intervention.

**Baseline.** During baseline, students continued receiving reading from the classroom teacher. All three students were assessed using the dependent measures for at least three sessions. The experimenter would have a student complete the assessments either in the back of the room at a desk with partitions on two sides or at a student’s work area, which was a desk along one of the classroom walls with two partitions on the sides. The assessments were given in the following order, ISF, PSF, then NWF. The script provided for each of the assessments was followed. Baseline sessions took approximately five to ten minutes to complete for each student. To help maintain student attention/focus, two of the students received incentives they had selected prior to beginning the assessment (e.g., iPad time or candy) in between each of the assessments. After the student completed the three assessments the experimenter provided praise for completing the assessments, thanked them for working, and then instructed the student to check their class schedule for the next task.
**Intervention.** Students began the intervention (i.e., the Headsprout Early Reading program) after at least three sessions of baseline. The Headsprout Early Reading program begins with an activity that does not involve reading instruction to help students practice using the computer. Since all three students could manipulate a mouse or touchscreen the activity was skipped. All of the students began on episode one. The program has several different animated themes (e.g., Space World, Dino World, and Sea World) for how to group episodes. In the first 23 episodes, “Crack the Code,” instruction is on basic concepts of reading like sounds make words, words make sentences, and sentences can make stories, segmenting and blending of the phonemes instructed within the episodes, developing sight word vocabulary, and working on comprehension skills (Headsprout Early Reading, 2015). The first 23 episodes are divided into smaller groupings of about five to seven episodes that target new skills, review and build upon on the skills previously taught. To instruct these concepts the Headsprout Early Reading program uses games involving animated characters related to the themes (e.g., animated aliens in Space World). Some of the games include clicking on the letter that makes the targeted sound that helps an alien reach a space taxi, building words from the onset and rimes instructed on to build a musical instrument, and reading sentences and clicking on the picture of the characters that matches the sentence.

An episode can take about 20 minutes to complete in one sitting. Marcus on average worked on the program for at least 15 minutes before ending the session. Marcus typically was able to complete an episode in one sitting, while Tazara and Hemil took multiple sessions to complete an episode. It was decided for Tazara and Hemil to complete at least 10 minutes of an episode before ending for the session to help maintain
attention on the task and interest in the program. On some sessions Hemil chose to continue working past 10 minutes before ending the session. A feature of the Headsprout Early Reading program is once the student logs into the program it will begin with the activity where the student had stopped previously. This could be either at the beginning of the next episode or the last played game within the present episode.

The students had access to the program whether or not the experimenter was present. On days when the experimenter was present the students would access the program for their specified amount of time. When the experimenter was not present the classroom teacher and classroom assistant would have the students work on the program as part of independent work activities following the time schedule for each student; Marcus worked for at least 15 minutes or to the completion of an episode, while Tazara and Hemil worked for at least 10 minutes. Each student accessed the program on average three times per week. Participation was tracked using the features of the program. The experimenter could log-in to the Headsprout Early Reading program and manage each student’s performance and participation by seeing what episode the student was assigned to, how long it took them to complete an episode, and when the student had last logged in to their account. When a student completed an episode they could place a sticker on the episode number completed on their progress map. After the students had finished their time and/or episode, the students would complete the assessments (ISF, PSF, and NWF) in the same way as outlined in baseline on days when the experimenter was present.

Students could complete some portions of an episode independently while other portions required prompts. The prompting procedure that was put in place followed a least-to-most hierarchy. For example, if a student was not responding to the direction
presented by the narrator, the experimenter would provide a verbal prompt (e.g., “which says /s/” or touch “/s/”), followed by pointing to the correct answer (if needed), and lastly use hand-over-hand to have the student click/touch the correct answer (if needed). There was one session the experimenter used a dry erase board with Tazara. Based on the direction given by the program, the experimenter wrote the correct answer on the dry erase board and Tazara was told to touch the answer (e.g., “touch “/an/”). After Tazara did this the experimenter pointed to the same answer on the monitor. Following three correct performances by Tazara with this method, the experimenter added one distractor that was also located on the monitor and went through the same procedures. Following three correct performances, the final distractor was added to the dry erase board and again the same procedures took place. This method only occurred for one session with Tazara as she seemed to respond well to the prompting procedures thereafter.
Table 1.  
*Participant Demographics*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Grade</th>
<th>Sex</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marcus</td>
<td>8</td>
<td>2</td>
<td>Male</td>
<td>Moderate Intellectual Disability, Apraxia</td>
</tr>
<tr>
<td>Tazara</td>
<td>8</td>
<td>2</td>
<td>Female</td>
<td>Severe Developmental Delay, Primordial Dwarfism</td>
</tr>
<tr>
<td>Hemil</td>
<td>7</td>
<td>1</td>
<td>Male</td>
<td>Autism, Expressive Language Delay</td>
</tr>
</tbody>
</table>
Chapter 3: Results

In this chapter the results of the study are presented. First, IOA and procedural fidelity data are presented, followed by a description of the data for each dependent variable.

**IOA**

There were two trained observers that collected data for at least 20% of the sessions for each of the assessments. IOA was calculated on an item-by-item basis for ISF, PSF, and NWF. IOA was calculated by dividing responses that agreed by responses that agreed plus disagreed and multiplying by 100. One thing to note, ISF IOA was calculated using just the correct and incorrect responses and time was not factored in. The range for IOA percentages was between 33.33% and 100%. The highest agreement for ISF was 100% while the lowest was 91.25%. The highest agreement for PSF was 80% and the lowest was 40%. For NWF-CLS the highest was 60% and the lowest was 33.33%. The highest agreement for NWF-WRC was 100% and the lowest was 53.33%. Average IOA on Marcus’s dependent variables were 100% for ISF, 40% for PSF, 60% for NWF-CLS, and 100% for NWF-WRC. Average IOA on Tazara’s dependent variables were 100% for ISF, 80% for PSF, 33.33% for NWF-CLS, and 100% for NWF-WRC. Finally, average IOA on Hemil’s dependent variables were 91.25% for ISF, 73.33% for PSF, 53.33% for NWF-CLS, and 53.33% for NWF-WRC. Table 2 has the full results for IOA.
Procedural Fidelity

Procedural fidelity of assessments (i.e., dependent variables) was measured by an independent observer using the assessment fidelity checklists from the DIBELS 6th Edition Administration and Scoring Guide (Appendix C, Appendix D, and Appendix E). Not all of the steps listed on the checklist were included in the calculation of procedural fidelity as either they were not applicable to the present study (e.g., Step 14 of ISF) or the step could not be scored using the method to assess procedural fidelity (e.g., Step 1 of all three assessments could not be scored listening to an audio recording). This issue is further discussed in the limitations portion of the discussion chapter. Procedural fidelity was calculated by dividing the number of steps completed accurately in the correct order by the total number of steps and then multiplied by 100. Procedural fidelity was calculated for 15% of sessions for all three assessments and 98% fidelity was found for both ISF and PSF and 100% fidelity was found for NWF.

To summarize the results of the study, improvements were detected for ISF for all three participants in that their average score from baseline to the end of the study increased. PSF scores showed no changes for any of the participants from baseline once they entered intervention. Slight improvements in NWF were found for two of the participants, Marcus and Hemil, but were not seen for Tazara.

Marcus

Marcus completed 21 episodes. The duration of his lessons ranged from 12 minutes (Episode 1 and 19) to 63 minutes (Episode 10), with an average of 25 minutes per episode and a median of 21 minutes. Overall, Marcus spent a total of 8 hours and 45
minutes on the Headsprout Early Reading program. Marcus’s range of scores was a low of 66% (Episode 7) and a high of 98% (Episode 11).

**Initial Sound Fluency (ISF).** Marcus’s results are shown in Figure 1. During baseline Marcus showed a decreasing trend in his responses. His first session, Marcus answered 1.6 correct initial sounds per minute followed in sessions two and three with zero correct initial sounds per minute. The mean response for the three sessions was 0.53. Following implementation of the intervention, Marcus showed an upward trend for the first three sessions of intervention but the data began to show variability in the remaining sessions (i.e., intervention session 4 through intervention session 12). The mean response during intervention was 6.725 correct initial sounds per minute. There was only one overlapping data point between baseline and intervention (i.e., sessions two and three of baseline and intervention session nine). Experimental control was not exhibited as strongly as possible because of the upward trend in baseline for the other two participants for this assessment.

**Phoneme Segmentation Fluency (PSF)** Marcus’s results are shown in Figure 2. During baseline Marcus showed a stable trend in his responses. Across all baseline sessions Marcus had zero correct responses, which resulted in a mean response of zero correct sounds per minute. Following implementation of the intervention, Marcus showed no change in his responses; meaning all of the responses in intervention were scored as zero. Experimental control was exhibited because the other two participants did not show an upward trend in baseline while Marcus was in intervention.

**Nonsense Word Fluency (NWF)** Marcus’s results are shown in Figure 3 (correct letter sounds) and Figure 4 (words recoded correctly). During baseline Marcus showed a
decreasing trend in correct letter sounds. In the first session he correctly said one letter sound but in the second and third session did not have any correct letter sound responses. Based on the three sessions’ responses, the mean response was 0.33. During baseline Marcus showed a stable trend in words recoded correctly. Across all baseline sessions Marcus did not recode any of the words resulting in a score of zero. Following implementation of the Headsprout Early Reading program Marcus showed a stable trend with the exception of one data point (i.e., intervention session 6) for correct letter sounds. In all intervention sessions except session six, Marcus scored a zero for correct letter sounds. In session six Marcus scored a four. The mean correct letter sounds for intervention was 0.583. For words recoded correctly, Marcus showed a stable trend in intervention. All of the responses in intervention scored a zero words recoded correctly.

**Tazara**

Tazara completed two episodes. The overall amount of time it took her to complete ranged from 26 minutes (Episode 1) to 53 minutes (Episode 2), resulting in an average of 39.5 minutes per episode. Overall, Tazara spent a total of 79 minutes on the Headsprout Early Reading program. As mentioned in the methods, Tazara’s sessions (i.e., time spent working on the Headsprout Early Reading program) were about 10 minutes per session. Her lowest performance was episode 2 at 71% and highest performance was episode 1 at 72%.

**Initial Sound Fluency (ISF).** Tazara’s results are shown in Figure 1. During baseline Tazara showed variability in her data. Tazara’s scores ranged from zero initial correct letter sounds (sessions one and five) to 5.45 (session two). The mean ISF score was 2.484. After implementation of the program Tazara’s data showed an upward trend
for the first two sessions of intervention. Beginning the third intervention session there was variability in the data. Tazara’s highest score was 6.66 (intervention session two) and lowest score was zero (intervention sessions five and eight). The mean ISF score was 3.15. Experimental control was not exhibited as well as it could have been as there was an unstable baseline in the third participant’s baseline even after Tazara began intervention. There were also overlapping data points between Tazara’s baseline and intervention sessions.

*Phoneme Segmentation Fluency (PSF)*. Tazara’s results are shown in Figure 2. During baseline Tazara showed a stable trend line with her phoneme segmentation. Across all baseline sessions Tazara had zero correct responses, which resulted in a mean response of zero correct sounds per minute. Following implementation of the intervention, Tazara showed no change in her responses (i.e., Tazara’s responses continued to be scored as zero). Experimental control was exhibited because the third participant did not show an upward trend in baseline while Tazara was in intervention.

*Nonsense Word Fluency (NWF)* Tazara’s results are shown in Figure 3 (correct letter sounds) and Figure 4 (words recoded correctly). For both correct letter sounds and words recoded correctly Tazara showed a stable trend of a score of zero. After implementation of the Headsprout Early Reading program, Tazara still had a stable trend line with a score of zero for both correct letter sounds and words recoded correctly.

**Hemil**

Hemil completed two episodes. The duration of his lessons ranged from 21 minutes (Episode 1) to 28 minutes (Episode 2), with an average of 24.5 minutes. Overall, Hemil spent a total of 49 minutes on the Headsprout Early Reading program. Like
Tazara, Hemil worked on average for 10 minutes per session (i.e., time spent working on the Headsprout Early Reading program). His lowest performance was episode 1 with a score of 87% and his highest performance was episode 2 with a score of 93%.

**Initial Sound Fluency (ISF).** Hemil’s results are shown in Figure 1. During baseline Hemil showed an increasing trend in his responses, with the exception of baseline session seven. Hemil’s highest score was 9.23 correct initial sounds per minute (Session 8) and his lowest score was zero (sessions 1, 2, and 7). The mean response was 3.39. Hemil entered intervention due to time constraints even though there was an upward trend in data. Following implementation of the intervention, Hemil showed an upward trend for the first two sessions of intervention, a slight decrease in the third intervention session followed by an increasing trend in the intervention fourth session, but then a sharp decrease in fifth intervention session. The mean response during intervention was 6.57 correct initial sounds per minute. There was only one data point between baseline and intervention that did not overlap (i.e., intervention session four). Experimental control was not exhibited as strongly as possible because of the upward trend in baseline prior to beginning the intervention.

**Phoneme Segmentation Fluency (PSF).** Hemil’s results are shown in Figure 2. During baseline Hemil showed a stable trend line with his phoneme segmentation. Across all baseline sessions Hemil had zero correct responses, which resulted in a mean response of zero correct sounds per minute. There was one session that data was not able to be collected due to Hemil having a rough day and assessments could not be given. Following implementation of the intervention, Hemil showed no change in responses (i.e., responses continued to be scored as zero). Experimental control was not as strongly
exhibited because after beginning the intervention there was no change in the performance.

**Nonsense Word Fluency (NWF)** Hemil’s results are shown in Figure 3 (correct letter sounds) and Figure 4 (words recoded correctly). During baseline Hemil showed variability in correct letter sounds. There was only one session in which Hemil scored a zero (session seven) and during session six Hemil said 57 correct letter sounds. Based on the seven baseline sessions’ responses, the mean response for correct letter sounds was 17.71. During baseline Hemil also showed variability in words recoded correctly. Hemil’s lowest baseline score for words recoded correctly was zero and the highest was 10. There was one session that data was not able to be collected due to Hemil having a rough day and assessments could not be given.

Following implementation of the Headsprout Early Reading program Hemil showed an increasing trend with the exception of one data point (i.e., intervention session 4) for correct letter sounds. There was only one intervention session with a score of zero, which was also the lowest score. The highest correct letter sounds score was 21. The mean correct letter sounds for intervention was 12.2. For words recoded correctly, Hemil showed an increasing trend in intervention. The lowest score for words recoded correctly was zero (intervention session one) and the highest score for words recoded correctly was seven (intervention session five). Experimental control was exhibited for both correct letter sounds and words recoded correctly as there was not as much variability compared to baseline. However, the data in intervention had overlapping data points with baseline.
Social Validity

The target participants, the classroom teacher, and the classroom assistant completed social validity questionnaires. The results of all who completed a questionnaire are presented in Tables 3 (students) and 4 (classroom teacher and assistant). Based on the responses, the Headsprout Early Reading program was viewed as an effective and a well liked instructional strategy.

**Students.** The students were given a social validity questionnaire with three questions on it. The students had either the classroom teacher or the classroom assistant that helped students access the program complete the questionnaire (i.e., read questions and answer choices). The first question “how did you feel about the Headsprout Early Reading program,” had the possible answers of “liked it,” “it was O.K.,” and “did not like it.” Two of the three students circled “liked it” while one selected “it was O.K.” “How much did you learn from the Headsprout Early Reading program,” was the second question with the possible answers of “nothing,” “a little bit,” “some,” and “a lot.” Two students circled “a lot” and one circled “nothing.” Responses from the three students for the third question “would you like to continue playing the game” covered all three possible responses “no,” “maybe,” and “yes.”

**Classroom teacher and assistant.** The classroom teacher and the classroom assistant also completed a social validity questionnaire. The questionnaire had four questions, each with five possible answers that the classroom teacher and assistant were to circle. The classroom teacher and assistant had agreement on all of their responses with the exception of one, question two. The first question “how satisfied with the Headsprout Early Reading program are you” had the possible answers of “not at all,”
“very little,” “neutral,” “mostly,” and “completely.” Both the classroom teacher and the assistant circled “mostly.” The second question “how likely are you to implement the Headsprout Early Reading program on your own” had the choices of “not at all,” “some of the time,” “neutral,” “most of the time,” and “all of the time.” One response was “neutral” while the other response was “most of the time.” Question three, “what was the ease of implementing the Headsprout Early Reading program” had the possible answers “very easy,” “somewhat easy,” “neutral,” “somewhat difficult,” and “very difficult,” with both teacher and assistant selecting “very easy.” The final question “how effective do you find the Headsprout Early Reading program” had the answer choices “very effective,” “effective,” “neutral,” “somewhat effective,” and “not effective;” both selected “effective.”

In addition these four questions, additional comments could be written on the questionnaire sheet. One of the sheets had the response “most kids enjoyed the program because it was on the computer and was age-appropriate and interactive.”

Note: On the graphs a score of zero (0) is the result of the assessment being discounted because the student did not answer the first five questions correctly.
Figure 1: *Initial Sound Fluency*

- Marcus
  - Baseline
  - Intervention

- Tazara
  - Sessions

- Hemil
  - Sessions
Figure 2: Phoneme Segmentation Fluency

Number of Correct Responses vs. Sessions for Marcus, Tazara, and Hemil.

Baseline vs. Intervention phases are indicated.
Figure 3: Nonsense Word Fluency – Correct Letter Sounds
Figure 4: Nonsense Word Fluency – Words Recoded Correctly

Number of Correct Responses

Sessions

Baseline  Intervention

Marcus

Tazara

Hemil

37
<table>
<thead>
<tr>
<th>Student</th>
<th>Assessment ISF Average IOA</th>
<th>PSF Average IOA</th>
<th>NWF-CLS Average IOA</th>
<th>NWF-WRC Average IOA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marcus</td>
<td>100%</td>
<td>40%</td>
<td>60%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>IOA Sessions 3/15=20%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tazara</td>
<td>100%</td>
<td>80%</td>
<td>33.3%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>IOA Sessions 3/13=23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemil</td>
<td>91.25%</td>
<td>73.33%</td>
<td>53.33%</td>
<td>53.33%</td>
</tr>
<tr>
<td></td>
<td>IOA Sessions 3/13=23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean IOA across students</td>
<td>97.08%</td>
<td>64.44%</td>
<td>48.87%</td>
<td>84.44%</td>
</tr>
</tbody>
</table>
Table 3.  
*Social Validity Results: Student Questionnaire*

<table>
<thead>
<tr>
<th>Question</th>
<th>Liked it</th>
<th>It was O.K.</th>
<th>Did not like it</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did you feel about the Headsprout Early Reading program?</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>How much did you learn from the Headsprout Early Reading program?</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Would you like to continue playing the game?</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: The responses are on a scale from 1 (least) to 3 (most).*
Table 4.
*Social Validity Results: Classroom Teacher and Assistant Questionnaire*

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>Very little</th>
<th>Neutral</th>
<th>Mostly</th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td>How satisfied with the Headsprout Early Reading program are you?</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>How likely are you to implement the Headsprout Early Reading program on your own?</td>
<td>Not at all</td>
<td>Some of the time</td>
<td>Neutral</td>
<td>Most of the time</td>
<td>All of the time</td>
</tr>
<tr>
<td>What was the ease of implementing the Headsprout Early Reading program?</td>
<td>Very easy</td>
<td>Somewhat easy</td>
<td>Neutral</td>
<td>Somewhat difficult</td>
<td>Very difficult</td>
</tr>
<tr>
<td>How effective do you find the Headsprout Early Reading program?</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any additional comments please write below:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most kids enjoyed the program because it was on the computer and was age-appropriate and interactive. (Only one of the questionnaires had additional comments written)
Chapter 4: Discussion

The purpose of this study was to examine the effects of the computer component of the Headsprout Early Reading Program on the reading skills of students with moderate to intensive intellectual disabilities. A multiple baseline across participants was utilized. Results indicate that all three students obtained higher mean scores on the DIBELS ISF assessments during intervention when compared to baseline. However, a functional relation of the Headsprout intervention was not demonstrated for ISF or any of the dependent variables. Although a functional relation was not demonstrated, this research contributes to the literature on the Headsprout Early Reading program by examining its effectiveness for students with moderate to intensive intellectual disabilities. It is possible that Headsprout may be effective for improving the early reading skills of young children with moderate to intensive disabilities, but the DIBELS assessments may not have been sensitive enough to measure changes in their performance. Additionally, the participants only used Headsprout Early Reading for about four to six weeks, and it might take much longer for students with moderate to intensive disabilities to show changes in their performance as a result of doing Headsprout Early Reading lessons.

Research Question 1: What are the effects of Headsprout Early Reading on Initial Sound Fluency for students with moderate to intensive intellectual disabilities?

On the DIBELS Initial Sound Fluency (ISF) assessment, Marcus showed a clear change in performance when comparing his intervention to baseline data. For the other
two participants, there was substantial variability and overlap of data between baseline and intervention indicating no functional relationship of the intervention on ISF.

All three participants showed an increase in their mean ISF score after the intervention. Marcus showed the most improvement from baseline to intervention, as there was only one data point during intervention that was scored a zero. Marcus’s performance on this session (i.e., intervention session nine) may have been affected by his behavior. His teacher commented on how he had been rushing through tasks earlier in the morning and was very energetic which may have made it hard for him to focus. When he had not answered any of the first five questions correctly on the ISF assessment, he was disappointed and asked if he could try it again. Observations on Marcus’s performance included his identifying a picture different than what had been stated in the directions (e.g., a picture of an airplane was used to represent the word toy, but Marcus identified it as an airplane). Marcus would also select or say more than one answer, but this behavior decreased as the study went on. Marcus’s total time to complete the assessment also decreased once intervention began. The longest time during baseline was 94 seconds while during intervention his time 58 seconds.

With the exception of intervention sessions five and eight, Tazara was able to correctly complete all of the other intervention sessions. Tazara was the student who least enjoyed completing the assessments and on the two intervention sessions where she scored a zero, her behavior was noted as distracted (intervention session five) and resistant to complete assessments and being silly to escape from completing the task (intervention session eight). Given that Tazara had a diagnosis of primordial dwarfism there was concern that due to her size she was selecting the picture closest to her (i.e.,
pictures on the bottom of the page) and that her responses were being selected based on the position of the pictures in relation to Tazara’s reach. To minimize that this was not the case, the pictures were placed on an inclined clipboard and Tazara sat in a seat that allowed her to be at the same height as the table. Tazara’s length of time to complete the assessment between baseline and intervention was varied unlike Marcus’s, which had time decreasing as the study went on.

Although Hemil had an upward trend in baseline he did show a more rapid increase in the number of correct responses, with the exception of the last intervention session where he scored a zero. During assessments Hemil’s behavior seemed to impact how well he performed. He could easily be distracted and more focused on what was happening in the classroom or fixated on a previous activity he had been working on. Similar to Tazara, Hemil’s time for completing the assessments was not affected as the study continued.

**Research Question 2: What are the effects of Headsprout Early Reading on Phoneme Segmentation Fluency for students with moderate to intensive intellectual disabilities?**

Phoneme segmentation fluency (PSF) measures a student’s ability to segment the sounds of a word. None of the targeted students showed an improvement or change in data between baseline and intervention because all of the scores across all sessions were zero. Student performance could be contributed to several factors such as not understanding the directions, student’s behavior state (e.g., distracted and fatigued), the assessment not matching instruction received in the Headsprout program (i.e., the students while using the game did more practice with blending rather than segmenting),

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and lack of successful assessment sessions. Even after the demonstration of how to complete the task in the example and the students completing another word, they all still struggled with performing this assessment. Examples of student responses consisted of repeating the word, saying a word that sounded like the targeted word, saying “I don’t know,” or by not giving a response at all. Not being able to successfully complete the assessment may have affected student performance. Marcus on a several occasions expressed dislike for this assessment, which could be a result of having not been successful at completing it.

**Research Question 3: What are the effects of Headsprout Early Reading on Nonsense Word Fluency for students with moderate to intensive intellectual disabilities?**

In regards to nonsense word fluency (NWF) students were scored on correct letter sounds (CLS) and words recoded correctly (WRC). Marcus showed a slight change of 0.253 in his mean score between baseline and intervention while Tazara showed no change in her mean scores between baseline and intervention. Although Hemil decreased in his average score, this may be due to the outlier that occurred in baseline. Marcus’s mean score during baseline was one correct letter sound and in intervention sessions six, seven, and eight he scored four, two, and one, respectively. His scores may have shown more improvement but based on the set-up of the Headsprout Early Reading program only certain sounds are targeted per episode. Therefore, if the sound for a letter in a nonsense word was not known because it had not been instructed, this would decrease the chances of Marcus being able to correctly respond. Marcus did not ever recode a word to accurately read it. For most of the words he either “read” it as a letter (e.g., said “d” for
the nonsense word “liv”), “read” a make believe he created (e.g., read “dac” as “nak”), or “read” an actual word (e.g., read “mab” as “eat”). There also seemed to be a relationship between the number of assessments completed and the number of nonsense words Marcus made up. The more assessments completed the more nonsense words he made up. He also began reading a majority of the words during the assessment as “lut” which was the word he had to read during the instruction/example portion. These last two observations could be related to Marcus becoming fatigued/discouraged by the assessment or reading a nonsense word as a word that he received positive feedback on.

Related to Tazara’s diagnosis of primordial dwarfism, her articulation and volume made her responses difficult to understand. The difficulty to accurately understand Tazara’s response impacted how to score her response. In most of the assessments Tazara did not provide a response. When she did provide a response because of her voice it was hard to understand what she was saying. With words that there were responses it sounded like either /k/, /ba/, or /da/. In addition to this, Tazara’s performance could have also resulted in not fully understanding the directions even after modeling an example by the researcher. There were also sessions in which her behavior impacted her ability to complete the assessment (e.g., acting silly, fatigued, frustrated).

Due to the limited time left in the school year the intervention needed to begin before a stable baseline was achieved. As a result Hemil’s nonsense word fluency baseline data are varied and end on an upward trend, which made it more difficult to show if his improvement in data (i.e., less variation and continued upward trend) was a result of the intervention. However, compared to baseline both Hemil’s correct letter sounds and whole words recoded became less varied and a decisive upward trend
occurred once the intervention was in place. During some of the sessions for a few of the nonsense words, Hemil would say the letter names followed by reading the word rather than saying the letter sounds and then reading the word. Another finding with Hemil was that with some words that ended in j, he dropped this sound or replaced with another letter sound like /s/. This observation could have to do with what language is primarily spoken at home, which was not known by the researcher. Hemil was the only student to recode and/or read the nonsense words.

**Research Question 4: What are the students’, classroom teacher’s, and classroom assistant’s opinions of the Headsprout Early Reading program?**

Social validity was assessed through the use of questionnaires that were given to the targeted students as well as the classroom teacher and one of the teaching assistants (i.e., the assistant who interacted with the targeted students while using the program). Based on the responses, the students, classroom teacher, and teaching assistant found the program to be satisfying and enjoyed using the program. With the exception of one of the targeted students, all the other responses indicated that they found the program to be effective in learning early reading skills. Finally, in general it was indicated that targeted students, classroom teacher, and classroom assistance would implement/continue playing the games in the program.

In addition to this formal mode of collecting social validity, the experimenter also collected anecdotal evidence of social validity by recording participants’ comments. On several occasions, Marcus commented on how he was going to be at a level (i.e., an episode within the Headsprout Early Reading program) and was always eager to show and add stickers to the map. The classroom teacher and teaching assistant commented on
how the students were always excited when the researcher came to work with the students. Marcus would even approach the researcher and ask when it would be his turn to work with the researcher.

**Limitations and Future Directions**

Although this study added to the research on computer-assisted instruction and reading instruction for students with moderate to intensive intellectual disabilities there are some limitations. One limitation to this study was the amount of time the targeted students had to complete the Headsprout Early Reading program. None of the targeted students were able to complete all of the episodes for the Early Reading portion of the program. As discussed in the methods for two of the students attending to the games in the program was an area that needed to be modified. Since these two students only completed about 10 minutes per session with the program, they were not able to get through as many episodes. Had the intervention begun earlier in the year these students would have had more opportunities to use the program. Although it may have benefitted the participants to complete more of the episodes, it may also have been of benefit to have a mastery criterion established before a participant could move on to the next episode. In addition to including a mastery criterion, future research should attempt to examine student outcomes after completing all of the Headsprout Early Reading program.

Another limitation to this study were the materials used for assessment (i.e., the dependent variable). For this study only the computer component was utilized. With the Headsprout Early Reading program there are additional materials that are not accessed on the computer (e.g., Sprout Cards). Not using all of the components the program offers may have impacted how much the students learned. One instance of how the dependent
measure was not as successful at measuring student performance was with Tazara’s speech. Her articulation and volume were difficult to understand which made scoring the assessments in which she was to verbally respond challenging. Another instance of how the dependent measure may have not truly been representative of student performance was that students may not have understood the directions of some of the assessments. For example, for two of the students they might not have understood the directions for the nonsense word fluency and not understanding the directions impacted performance.

Lastly, with the sequencing of the Headsprout Early Reading program episodes a certain number of letter sounds were introduced. As such if the targeted students had not learned a sound that appeared in the assessment (this primarily relates to nonsense word fluency) then they might not have known how to say the letter sound and/or read the nonsense word. Additionally, it is possible that DIBELS assessments were not sensitive enough to capture changes in the participants’ early reading skills. Future research should use all components of the program and researchers should attempt to identify more sensitive assessments or alternative ways to measure early reading skills.

As mentioned in the results chapter, procedural fidelity was not performed on all of the steps within the DIBELS checklist and was not performed for implementation of the independent variable. Although this is a limitation, it is not a significant limitation as the Headsprout Early Reading program presented each lesson consistently, with each type of activity presented in the same order with the same number of response prompts. That is, the program required the participants to follow the same procedures for every lesson. Future research might be strengthened by documenting that the students moved through the procedures of the program.
IOA also posed a limitation for PSF and NWF-CLS as the average percentages across students per assessment were rather low. This was due to the second observer not scoring responses using the procedures/methods outlined in the assessment guide. To avoid making incorrect assumptions regarding the second observer’s scoring, if it did not match the experimenter’s scoring (who was more familiar with the procedures) it was marked as a disagreement. Also, training of the observers should have occurred together to ensure both understood the scoring procedures. For future research, training for IOA should consist of training sessions in which the observer performs at a mastery criterion before being able to collect data and offer retraining as necessary. Also, second observers could be provided with a reference key of scoring marks (e.g., / is a mark to indicate incorrect letter sound) to use while collecting IOA data. These methods would help improve IOA percentages.

Pertaining to this study, generalization and maintenance measures could have been better addressed. For generalization, this could include using the sprout cards or having the targeted students read the sprout stories separate from the episode that were included in the program. In regards to maintenance, a separate measure from the program would be needed since feedback was given to the student by the program and researcher during episodes for all sounds that had been previously taught. Removing the intervention (i.e., the Headsprout Early Reading program) as a way to measure maintenance may be seen as counterproductive and not in the best interest of the student if that student has shown an upward trend in the dependent measures.

One limitation for one of the participants in this study had difficulty with emitting verbal responses required by the program. As seen by the articulation and volume
difficulties with Tazara’s responses, a measure that utilized another response form other than verbalization could have shown a stronger relationship between the Headsprout Early Reading program and the acquisition of early reading skills. Also, using a measure that does not require verbal responses would have allowed students who are nonverbal to participate in this study. Future research should investigate non-verbal ways for students to respond to instruction.

Although students were able to access the program when the experimenter was not present this also posed as a limitation. There was a least-to-most prompt hierarchy in place but it was not recorded to what extent the classroom teacher and assistant followed the prompting procedure. Also, if students needed additional prompting while accessing the program they may not have been consistency in providing the prompts or feedback at all which may have resulted in the students making error responses. Future research should ensure that prompting procedures and appropriate feedback are explicitly explained to all that will interact with students and if possible have the experimenter present during all sessions.

Finally, future research should continue to look at interventions regarding CAI for academic skills, such as reading, for students with moderate to intensive intellectual disabilities. As discussed in the literature review for this study, research regarding academic skills for individuals with moderate to intensive intellectual disabilities is limited and typically pertains to functional skills.

**Suggestions for Headsprout**

The enunciation of the letter sounds was either difficult to understand or incorrect (e.g., some sounds had schwa sound added). Allowing the length of time between the
narrator’s prompt and when a student could respond to be modified by the teacher would be helpful. For some of the targeted students in this study the length of time was too long. The students were ready to respond and clicked the correct answer, but because no feedback was given once the correct answer was selected (because the narrator was still talking) the student then would select an incorrect response. For one of the students in particular (Hemil) and at times for the other two-targeted students the length of time was not long enough and the program would provide the correct response before the student had responded. Some populations, including these targeted students, may benefit from a longer time delay to process the verbal directions that were given.

Another suggestion for the program would be fixing error correction practice. When a student responded incorrectly too many times a separate activity needed to be completed. For example if a student was incorrectly identifying the letter sound /s/ then the program would have a separate activity in which the student needed to identify both the targeted letter sound (in this case /s/) and letters that did not make the targeted sound. The students in this study found this activity to be confusing as in the previous activities they were asked to identify the correct sound and now were being asked to differentiate between the targeted sounds and non-targeted sounds. Headsprout could implement a prompting procedure to correct errors in which the student is presented with only the targeted sound. The targeted letter sound could appear in various locations to ensure the student is actually scanning for the letter rather than just clicking/touching in one spot. After the student correctly selects the targeted letter sound a distractor could be added and varying the location on the screen would continue all the while the prompt would ask the student to select the targeted letter sound. The skill of differentiating is important but
should be done after the student has shown mastery with the correctly identifying the correct letter sounds.

**Implications for Practitioners**

As indicated on the social validity piece, the classroom teacher and teaching assistant found this program very easy to implement. Based on these responses other practitioners could implement this game with very little training, which could appeal to districts looking for easy to use CAI to supplement reading instruction. However, because of the ease of implementing this program, practitioners need to make sure they are not using this as the only method for reading instruction. For students with difficulty in learning early reading skills, like alphabetic principle and phonemic awareness, supervision is needed to ensure that students are learning the targeted sounds correctly and minimizing errors. As stated above the program is easy to implement so adult volunteers and even peers who are skilled readers could work with students using this program. Having peers could also help foster social skills and relationships among the students, a benefit that is not just in academics.

The Headsprout program could also be completed in other settings than school, such as a student’s home or local library. This aspect would allow students to complete the program outside of school for fun or related to absences (e.g., sick) and supplemental reading instruction could continue to take place. The classroom teacher included this program as an activity for one of the student’s independent seatwork. For students that can for the most part complete the games within episodes independently, the program could be incorporated as part of independent stations or as an indoor recess activity option.
Conclusion

Reading is a necessary functional skill as well as a skill utilized in leisure activities. Students with moderate to intensive intellectual disabilities tend to receive only functional reading instruction. By supplementing reading instruction with programs like Headsprout Early Reading, students can develop and learn alphabetic principle and increase their early reading skills. In many of today’s classrooms students are using technology to assist in their instruction. Headsprout Early Reading offers a motivating program with promising results for students.
References


Appendix A: Parental Permission Form
The Ohio State University Parental Permission
For Child’s Participation in Research

Study Title: The Effects of the Headsprout Early Reading on the Acquisition of Reading Skills for Elementary Aged Students with Moderate to Intensive Intellectual Disabilities

Researcher: Dr. Sheila Morgan

Sponsor: n/a

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate.

Your child’s participation is voluntary. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose:
The purpose of this study is to see if students using the Headsprout Early Reading computer program will improve their basic reading skills.

Procedures/Tasks:
Your child will play the Headsprout Early Reading computer games independently 3 times per week. Two days each week, a graduate student in the special education program will administer DIBELS Next early reading assessment. This is a brief one-on-one assessment of phonemic awareness (isolating and saying letter sounds in words) and word identification.

Duration:
The study will take place for approximately 15 to 20 weeks. Your child will participate 3 days per week and each session will last 10 to 20 minutes. Two days each week, a graduate student from The Ohio State University (Sarah Blaine), will assess your child’s progress using brief early reading assessments. The assessment will take approximately 10 minutes to administer.

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.
**Risks and Benefits:**
Benefits may include increased achievement in basic reading skills. The risks associated with this project are no greater than those experienced during normal classroom reading activities. It is possible that a student may become frustrated when completing the computer games. This risk will be minimized by using appropriately leveled games. Additionally, the teacher will provide guided support, feedback, and encouragement if a student begins to struggle. If your child becomes frustrated and is not receptive to the guided support and encouragement, the experimental session will end and the student will be directed to another activity. We expect this research to support and extend previous early reading research and contribute to the field of special education by identifying Headsprout Early Reading as an evidence-based practice.

**Confidentiality:**
Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

**Incentives:**
No incentives will be provided.

**Participant Rights:**
You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status. Deciding whether to take part in the research project or not will have no effect on your relationship or your child’s relationship to the teacher in the classroom.

If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.
Contacts and Questions:
For questions, concerns, or complaints about the study you may contact Sheila Morgan 614-247-8714.

For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If your child is harmed as a result of participating in this study or for questions about a study-related harm, you may contact Dr. Sheila Morgan (614-247-8714; morgan.651@osu.edu).

Signing the parental permission form

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Printed name of subject

Printed name of person authorized to provide permission for subject

Signature of person authorized to provide permission for subject

Relationship to the subject

Date and time

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent

Signature of person obtaining consent

Date and time

AM/PM
Appendix B: Script for Obtaining Student Verbal Assent
Script

• You are being asked to be in a research study. Studies are done to find better ways to help people or to understand things better.

• I am going to tell you a little bit about the study and then ask you if you would like to participate. You should ask any questions you have before making up your mind. You can think about it and discuss it with your family or friends before you decide.

• It is okay to say “No” if you don’t want to be in the study. If you say “Yes” you can change your mind and quit being in the study at any time without getting in trouble.

• If you decide you want to be in the study, an adult (usually a parent) will also need to give permission for you to be in the study.

• The goal of this study is to help students get better at reading. You will play a game on the computer three times per week, and a graduate student will give you a short test one or two times each week.

• You won’t be graded on the weekly tests, they are just for us to see how well the game is teaching you.

• Would you like to participate in the study?
Appendix C: Assessment Fidelity Checklist: ISF
Assessment Fidelity Checklist: DIBELS 6th Initial Sound Fluency

The assessor...

1) ...holds clipboard and stopwatch so the student cannot see what he/she records.

2) ...performs standardized directions verbatim:
   “This is ‘mouse, flowers, pillow, letters.’ ‘Mouse’ begins with the sound /m/. Listen, /m/ mouse. Which one begins with the sound /f/?”
   Correct: “Good. ‘Flowers’ begins with the sounds /f/.”
   Incorrect: “‘Flowers’ begins with the sounds /f/ (point to flowers). Listen, /f/ ‘flowers.’
   Let’s try it again. Which one begins with the sounds /f/?”
   “Pillow begins with the sound /p/. Listen, /p/ ‘pillow.’ What sound does ‘letters’ begin with?”
   Correct: “Good. ‘Letters’ begins with the sound /l/.”
   Incorrect: “‘Letters’ begins with the sound /l/. Listen, /l/ ‘letters.’ Let’s try it again.
   What sound does ‘letters’ begin with?”

3) ...responds to correct and incorrect responses appropriately.

4) ...points to each picture while saying its name.

5) ...starts the stopwatch immediately after presenting the question and stops the stopwatch as soon as the student responds.

6) ...moves through pictures and questions promptly and clearly.

7) ...marks correct responses as 1, incorrect responses as 0.

8) ...scores question as 0 and presents next question if the student does not respond in 5 seconds.

9) ...writes “sc” above an error if self-corrected within 5 seconds and the next item has not been presented.

10) ...uses correction procedure if the studentdid examples correctly but does not answer assessment questions correctly: Remember to point/tell me a picture that begins with the sound (stimulus sound).

11) ...discontinues if the student has a score of 0 after the first 5 questions, and records a score of 0.

12) ...except when the discontinue rule is applied, administers all questions.
The assessor...
13) ...records the correct number of responses, and the cumulative time from the stopwatch in seconds.
14) ...is within 1 point on the number of correct responses and within 2 seconds on the total time, when shadow scoring with an expert examiner.
15) ...calculates score correctly and records it on front cover: ISF = 60 x Number Correct
    Seconds
Appendix D: Assessment Fidelity Checklist: PSF
## Assessment Fidelity Checklist: DIBELS 6th Phoneme Segmentation Fluency

**The assessor...**

1. holds clipboard and stopwatch so student cannot see what he/she records.

2. performs standardized directions verbatim:
   - "I am going to say a word. After I say it, you tell me all the sounds in the word. So, if I say, 'Sam,' you would say /s/ /a/ /m/. Let's try one (one second pause). **Tell me the sounds in 'map.'**"
   - Correct: "Very good. The sounds in 'map' are /m/ /a/ /p/'."
   - Incorrect: "The sounds in 'map' are /m/ /a/ /p/. Your turn. **Tell me the sounds in 'map.'**"
   - "OK. Here is your first word."

3. responds to correct and incorrect responses appropriately.

4. presents the first word then starts stopwatch.

5. reads words from left to right.

6. waits 3 seconds for the student to produce sound segments. After 3 seconds, presents next word.

7. underlines correct segments and slashes incorrect segments according to scoring rules.

8. presents words promptly and clearly.

9. writes "sc" above an error if self-corrected within 3 seconds and the student has not moved on to the next sound.

10. discontinues the assessment if the student does not produce any correct segments in the first five words, and records a score of 0.

11. stops at the end of 1 minute and puts a bracket ([]) after the last response.

12. accurately counts the number of correctly produced phonemes in each row.

13. accurately sums the row scores to produce the total score.

14. records the total number of correctly produced phonemes in 1 minute.

15. shadow scores with an expert examiner and is within 2 points on the final score.
Appendix E: Assessment Fidelity Checklist: NWF
### Assessment Fidelity Checklist: DIBELS 6th Nonsense Word Fluency

**The assessor...**

1) ...holds clipboard and stopwatch so the student cannot see what he/she records.

2) ...performs standardized directions verbatim:
   - *Look at this word* (point to first word on practice sheet). *It’s a make-believe word.*
   - *Watch me read the word: /s/ /l/ /m/ ‘sim’* (point to each letter then run your finger fast beneath the whole word.) *I can say the sounds of the letters, /s/ /l/ /m/ {point to each letter}, or I can read the whole word ‘sim.’*’
   - *Your turn to read a make-believe word. Read this word the best you can. Make sure you say any sounds you know.*
     - Correct: “That’s right. The sounds are /l/ /u/ /t/ or ‘lut.’”
     - Incorrect: “Remember, you can say the sounds or you can say the whole word.
       *Watch me: the sounds are /l/ /u/ /t/ or ‘lut.’ Let’s try again. Read this word the best you can.”
   - *Here are some more make-believe words. Start here and go across the page. When I say, ‘begin,’ read the words the best you can. Point to each letter and tell me the sound or read the whole word. Read the words the best you can. Put your finger on the first word. Ready? Begin.*

3) ...responds to correct and incorrect responses appropriately.

4) ...starts stopwatch after saying “begin.”

5) ...waits 3 seconds for the student to produce letter-sound or word. After 3 seconds, tells the correct sound or word and asks the student to try the next sound or word. If the student does not respond, asks him/her to move on to the next sound or word.

6) ...underlines letter sounds produced correctly alone or in context, and slashes incorrect letter sounds.

7) ...discontinues the assessment if the student does not get any correct letter sounds in first 5 words.

8) ...places a bracket (e.g.,]) after the last letter sound provided and says “stop,” at the end of 1 minute.

9) ...accurately counts the correct letter sounds for each row.

10) ...accurately totals the correct letter sounds for each row, and the correct words.

11) ...records the number of correctly produced letter sounds.

12) ...shadow scores with an expert examiner and is within 2 points on the final score.
Appendix F: Social Validity Questionnaire for Students
Questionnaire

You have played some of the Headsprout Early Reading program. Please use this paper to rate how you feel about the game during the months you played (April and May). Circle the face that best shows how you feel. If you need an adult to help, first point to the face and then have the adult circle the face you pointed to. When finished please return this paper to the folder marked “Social Validity Questionnaire” in the classroom. Thank you!

1. How did you feel about the Headsprout Early Reading program?

   ![Faces]
   - Liked it
   - It was O.K.
   - Did not like it

2. How much did you learn from the Headsprout Early Reading program?

   ![Options]
   - Nothing
   - A little bit
   - Some
   - A lot

3. Would you like to continue playing the game?

   ![Options]
   - No
   - Maybe
   - Yes
Appendix G: Social Validity Questionnaire for Classroom Teacher and Assistant
Questionnaire

The intervention with the program Headsprout Early Reading is wrapping up. Please use this questionnaire to rate your experience over the intervention period (April through May). Circle the answer you feel best aligns with your opinions. When completed please return this questionnaire to the folder marked “Social Validity Questionnaire” in the classroom. Thank you!

1. How satisfied with the Headsprout Early Reading program are you?
   - Not at all
   - Very little
   - Neutral
   - Mostly
   - Completely

2. How likely are you to implement the Headsprout Early Reading program on your own?
   - Not at all
   - Some of the time
   - Neutral
   - Most of the time
   - All of the time

3. What was the ease of implementing the Headsprout Early Reading program?
   - Very easy
   - Somewhat easy
   - Neutral
   - Somewhat difficult
   - Very difficult

4. How effective do you find the Headsprout Early Reading program?
   - Very effective
   - Effective
   - Neutral
   - Somewhat effective
   - Not effective

Any additional comments please write below: