

The Benefits of the *Headsprout* Reading Comprehension Program
for Children with Autism

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Abstract

This study took place at a Learning Center in a Midwestern state in the United States, a school geared toward the education of individuals with autism and asperger’s syndrome. The students taking part in this study are between the ages of 10 and 17. The students had to pass a reading fluency test, where they had to read ninety words per minute. Once the students passed the test, they could begin the online “Headsprout Reading Comprehension” program. The purpose of this research was to determine the effectiveness of the online reading comprehension program for individuals with autism.

With the importance of technology and technology use in the classroom, online teaching is becoming more prominent. According to Barbour and Reeves (2009) online education first became popular in the middle 90s and has since grown in popularity. From online games to online classes, even elementary children can complete their kindergarten through twelfth grade education online in the comfort of their own home. One program allows students to gain an education from home and students can complete just a few courses or their entire course of study online. For students who are “kicked” out of school due to behavior problems online programs can potentially be beneficial.

Online curriculum has been introduced into school systems in recent years (Barbour & Reeves, 2009). Computers have been around for the past thirty years, but within the past fifteen years, use of the internet has become very popular in classrooms. With the advent of the internet, information from around the world became readily available to students. As the internet gained in popularity and grew in maturity, the available information grew as well. Schools have switched from keyboards to computers, and computers to Smartboards, with information available at students’ fingertips.

Headsprout is an online computer based reading program designed to help students improve their reading comprehension skills. This program is designed for students who read at the rate of 90 words per minute and need to improve their comprehension skills. The reading program starts by teaching students to look for context clues that are in simple three sentence paragraphs. The program builds upon these basic reading comprehension skills to help improve a student’s comprehension skills.

The *Headsprout* reading comprehension program provides individuals with autism the opportunity to learn better comprehension skills. This research was designed to determine if the

Headsprout reading comprehension program is beneficial for improving reading comprehension for children with autism or mild disabilities.

In the past forty years, the diagnosis of individuals with learning disabilities has increased by nearly 200% since the learning disabled category was established (Vaughn, Linan-Thompson, & Hickman, 2003). It is reported that students who struggle early on with reading are unlikely to improve their reading by the time they reach high school, and fewer than one in eight students who are failing to read at grade level see improvement in their fluency skills (Vaughn, Linan-Thompson, Bryant, Ugel, Hemff, & Hougan, 2000).

For parents who choose to keep their students at home and enroll them instead in home school programs, computers and the Internet have made life easier. There are many home school programs that are taught via the Internet. Northern Virtual School and Middle Virtual School are two online schools that allow students to gain an education from the comforts of their own home (Muirhead, 2000). For higher functioning students with autism, computers and the Internet are to their benefit because computers allow them to work at their own pace, yet learn the same material they would in the classroom.

Review of Literature

Are students who are receiving online educations receiving the knowledge they need to succeed in life? For students who have difficulty functioning in a typical classroom setting due to behavior problems, online curriculum can be helpful. As Buggey (2000) reported, “Online classrooms must offer reasonable accommodations for students with disabilities.” Online curricula must provide the same accommodations that a typical school education would provide.

With an increase in the number of individuals being diagnosed with learning disabilities, there is also a rise in the number of individuals receiving special education services. These

individuals receiving services have the opportunity to receive an online education from the comfort of their own home. With a variety of online schools to choose from, student can satisfy their elementary, middle school, and high school requirements at their own pace.

To help improve education, the Ohio State Department of Education has developed academic content standards to help make sure teachers are addressing the critical content in each subject. This has helped in many ways, but there are still students who are falling through the cracks, like the students who need extra practice or the student who is a kinesthetic learner.

Computer-Based Education

Fisher and Baird (2005) discuss the importance of a positive learning environment and how it is important to make learning a positive experience. They discuss how the online learning community is important and needs to be geared toward the students so they are comfortable in their learning environment.

With an online curriculum, it is important to have deadlines so that students are staying on task and not waiting until the last minute to complete assignments. It is also important to have student-guided discussions to reinforce what the students are learning, as well as to ensure students are maintaining social interaction with their peers. Guidelines help to make online curriculum successful for students, as well as providing a positive learning environment, and a sense of community (Fisher & Baird, 2005).

For students to be successful in an online learning environment, it is important to make sure that all students using the curriculum are literate and have a basic knowledge of how to use a computer. Students must know what they are doing if they are going to be successful. The parent or advisor needs to set clear expectations for the child so that there are clear guidelines.

It is also important to have full participation from all students involved in the curriculum. Masters and Oberprieler (2004) found that by following an approach of “drawing on the methods, philosophy and content of the main stream, ensuring the students were IT literate, asking questions that were important to the students’ course of study and structured in a way to encourage free and open debate, and allowing unhindered debate,” set students up for success (p. 330).

Students with Autism

When many individuals think of children with autism, they think of rocking, screaming, nonverbal, hitting, low intelligence, and low functioning individuals. Autism is a mental disorder with one in 110 children are being diagnosed each year (Strickland, 1997). According to Strickland, “autism is a pervasive developmental disorder that is characterized by severe impairments in social, communicative, cognitive, and behavioral functioning (p. 81).” However, this is not always true, for many individuals with autism are very intelligent and able to function in the regular classroom setting.

In the researcher’s experience, the majority of high functioning students with autism are able to learn the same concepts as neuro-typical students, they just need modifications in their lessons; however, students with autism tend to have difficulty learning at the same pace as neuro-typical students. Applied Behavior Analysis (ABA), is a study of behavior that became popular in the 1960s using the theories of B. F. Skinner (Bailey, 2002, p. ix). With autism, ABA is used to remove a negative behavior and replace it with a positive behavior. The theory is to teach or modify a negative or unwanted behavior to replace it with a more appropriate or socially acceptable behavior (Bailey, p. 10). Autism is a neurological disorder of the brain that has no

known cause, however, there are many theories as to what causes autism but nothing is holding firm.

Students with Autism and Reading Deficits

According to O’Connor and Klein (2004) many high functioning students with autism have good decoding skills but display poor reading comprehension deficits. O’Connor and Klein found that the majority of individuals with high-functioning autism have success in all areas but struggle with reading comprehension skills. Individuals with autism have less impaired cognitive and language abilities unlike children with low functioning autism (O’Connor & Klein). These high-functioning individuals with autism are showing strengths in word identification, and reading but are struggling with comprehending what they are reading (O’Connor & Klein).

Students with Autism and Computer-Based Instruction

For individuals with autism and autism spectrum disorders, the computer is beneficial in the classroom. There are features that are useful in mastering interactions with the real world that individuals can learn using computer-based instruction (Strickland, 1997). These features are controllable input stimuli, modification for generalization, safer learning situations, a primary visual and auditory world, individualized treatment, preferred computer interactions, and trackers (Strickland, p. 82-83). These features allow individuals to participate and interact at their own speed and level and allow individuals to feel as if they are a part of the group without over-stimulation which can lead to adverse behaviors.

One study that looked at typically developing and children diagnosed with autism or autism spectrum disorders concluded that the right computer program could be affective. The program would need to be specifically designed for individuals with autism spectrum disorders

and be able to teach problem solving skills and functional academic skills (Bernard-Opitz, Sriram, & Nakhoda-Sapuan, 2001). The authors discovered that neuro-typical individuals, as well as individuals with autism spectrum disorder can learn the content using computer-based education programs (Bernard-Opitz, Sriram, & Nakhoda-Sapuan).

Headsprout Reading Comprehension Program

The *Headsprout* reading comprehension program is an online program geared toward young students (Unknown, 2010).

Headsprout Reading Comprehension is a supplemental online program that ensures reading comprehension for every learner. The program teaches the essential skills needed for comprehension using adaptive software and text from a mid-2nd up to mid-4th Grade level. Printed stories, suggested ways of extending what is learned online to the classroom, and detailed individualized automated performance reports accompany the program. (Unknown, 2010)

The *Headsprout* program is designed to improve fluency, reading skills, and reading comprehension skills. In order for a student to begin the reading comprehension program, they must pass a fluency test. A student needs to be able to read 90 words per minute to be considered fluent and able to use the comprehension program, where each student will need to read a story with a two-minute time limit. Each student must be able to read, making only a few errors and/or omissions. If a student reads the story with few errors and omissions and at 90 words per minute, then he/she can be introduced to the reading comprehension program.

The program teaches students to look for key words or phrases in sentences and students how to answer who, what, when, where, and how questions. The program also teaches students to look for context clues, vocabulary, and knowledge of words and how to find meanings of

words by looking at the rest of the sentence. Finally, it teaches students to refer back to the story for available information to answer the questions. This study is designed to determine the effectiveness of the *Headsprout* reading comprehension program for individuals with autism.

Method

The students in this study were chosen based on their age and reading level. Participants needed to be able to read at a third grade reading level and they had to be fluent readers. Once students were chosen, they were given a reading fluency test. If the student was able to read fluently at ninety words per minute he/she was able to begin using the *Headsprout* reading comprehension program. The students were given multiple chances to pass the reading fluency portion of the reading comprehension program but it was unnecessary, as all students were able to pass the fluency portion of the program with only one opportunity.

Participants

In this study, five students were chosen based on their age and reading level. The students that were chosen range in age from 9-17 but all read at a third grade reading level. Three boys and two girls participated and all of the students were diagnosed with an autism spectrum disorder. Four of the students were chosen from a group of 17 students at a Learning Centers in a rural community in a Midwestern state. The fifth student was a female student, who attends the Learning Center in an urban area of the same state. This student was suggested from the Learning Center director and was thought to be a good candidate based on the student's performance and reading level.

The *Headsprout* program collects and graphs students' progress on each lesson completed, which is helpful so that the teacher can monitor student' progress and see where the students are struggling. The data collected is accurate because it is based on the number of

correct and incorrect responses the student(s) give. The teacher is able reset a student to a different lesson if a student is struggling on a specific lesson if he or she feels the student has a need to repeat the lesson.

Data Collection

Data was obtained from each lesson the students completed. The program can provide data to determine how many correct and incorrect answers a student has. By examining the student’s overall performance one can determine whether a student is performing at an excellent rate (“E”) or a satisfactory rate (“S”). If a student is performing at a low rate or a non-passing rate, the student would be given a rating of “N,” which means the student needs practice.

If a student receives a “needs practice” rating, this means the student was answering fewer than 50% of the story questions correctly. If a student receives an “E” for excellent they are answering 75% or more of the story questions correctly, where a rating of “S” indicates students are answering 50% to 74% of the story questions correctly the first time.

Procedure

The students were all started on lesson one and received little to no help from the teacher during the time they worked on the *Headsprout* reading comprehension program. The only time the teacher would assist a student is when the computer froze or if students needed help getting started with the program. The students were placed at computers around the classroom facing away from each other. The students were given headphones to reduce the risk of cheating or being disturbed by others.

The students are currently still using the program and they are half way through. The students have been using the program since April 8, 2010 and using it three to four days a week. The students are still currently making progress and completing the 50 lessons. The students

worked on head sprout for thirty to forty minutes a day to complete as many lessons as they could. The lessons tended to be anywhere from fifteen minutes to twenty-five minutes.

Results

The purpose of this research was to determine the benefits of the *Headsprout* reading comprehension program for individuals with autism and autism spectrum disorders. Five individuals were chosen for this research based on their reading level and grade level. The individuals were not forced to complete the lessons, as the program is part of the daily core curriculum. The students completed an average of lessons three days a week for thirty minutes a day. At the time of this writing, it is understood that the students may not be able to finish all fifty lessons by the end of the academic year.

All five students passed the reading fluency tests the first time it was administered. Three students made only two errors, while one student accrued three errors on the reading fluency test. All students began the *Headsprout* reading comprehension program the same day. The students were able to complete a minimum of one or two lessons a day with a maximum of three lessons per day. Observations of the students as they worked indicated that three of the five students were fully engaged in the activity. Two students seem to be guessing at answers as they worked. One student did not want any other students to pass him on the lessons and proceeded to make a ‘race’ of completing the lessons. The other three students worked at a slower pace and were clearly engaged in the lessons.

Students who were earning “Ns” were restarted back to the first lesson where they earned an “N.” Three students needed to be reset back one lesson, with the maximum being reset 10 lessons. The students that had to be reset were students that seemed to be guessing on lessons or rushing through so they could be ahead of the group. One particular student wanted to race and

be the leader of the lessons. Upon reviewing this student’s progress he needed to be reset back ten lessons to the first “N” he received. He was on lesson 26 and was reset back to lesson 16. Another student was reset from lesson 18 to lesson 16 because he was given an “N” on his progress. The 17 year old female student needed to repeat one lesson while the other two students, one male and the other female, did not need to repeat any of their lessons.

Within the program, students are rewarded for their correct answers by earning coins. At the end of the unit, students can use the coins to buy video clips. *Headsprout* has built-in rewards for students and does not punish students by taking away tokens. The students were enjoying the video clips and showed them to other students in the classroom.

Table 1

Student Progress by Lesson

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
Male 11 Years Old	E	S	NA	NA	E	E	S	NA	S	S	E	E	E	S	S	E	E	N	N																		
Female	E	E	NA	NA	E	E	E	NA	E	E	E	E	E	E	E	E	E	E	E																		
Male 13 years old	E	E	NA	NA	S	E	E	NA	E	E	E	E	--	E																							
Male 10 years old	E	E	NA	NA	E	S	E	NA	E	S	E	S	S	S	F																						
Female 17 years old	E	E	NA	NA	E	E	E	NA	E	E	E	E	S	E	E	E	S	E	S	--	E	S	E	E	E	E	S	E	S	S	S	S	S	E	S	--	N

Table 1 shows each student’s progress by lesson. A rating of ‘E’ indicates an excellent score meaning that the student is answering 75% or more of the answers correctly on the first try. A rating of ‘S’ indicates satisfactory performance, indicating the student is answering 50% to 74% of the story questions correctly the first time. Two students currently have a rating of ‘N’ which means that they need practice and will be asked to repeat the lessons.

The first participant, an 11-year old male, has successfully completed 17 lessons. Of those lessons, he earned six ‘satisfactory’ ratings and eight ‘excellent’ ratings. The remaining three lessons were rated ‘NA’ meaning not applicable or that the lesson did not have any comprehension questions associated with the story, so there is no data for that section.

For all students, lessons 3, 4 and 8 all received ‘NA’ scores because there were no comprehension questions associated with that lesson. The first student received two ‘N’ ratings for lesson 18 and 19 so he will need to be reset back to lesson 18 so that he can redo the lessons to achieve a satisfactory rating.

The second participant was a female student who received ‘excellent’ ratings on all lessons. She has not needed to repeat any lessons throughout the study. She has completed 19 lessons successfully. The ‘excellent’ rating means that she is answering 75% or more of the story questions correctly. She has three ‘NA’ scores for lessons 3, 4, and 8 for the reasons indicated above.

The third participant was a 13-year old male.. He is currently on lesson 14 and has received all ‘E’s except for the three lessons that do not have story questions (lessons 3, 4 and 8). The ‘E’ stands for excellent and means that the student is answering 75% or more of the story questions correctly on the first try.

The fourth student is a 10-year old male student who is currently on lesson 15 due to the fact that he had to redo lesson 12 as he received an ‘N’ on the lesson during a previous try. This student has earned seven ‘E’ scores and five ‘S’ scores. This particular student, upon observation, rushes through the lessons and races to be ahead of the other students and has told the researcher on more than one occasion that he needs to win and reach lesson 50 before any of the other students.

The final participant is a 17-year old female who is currently completing lesson 36. Her current score for this lesson is an ‘N’ which means that she needs practice. Since she has scored an ‘N’ she will be asked to repeat the lesson. For the rest of the lessons, she has earned 20 excellent ratings and 10 satisfactory ratings. Again, the excellent ratings mean that she is answering 75% or more of the story questions correctly on the first try, while the satisfactory rating means that she is answering between 50% and 74% of the story questions correctly the first time.

Discussion, Recommendations and Conclusions

The findings from this indicate that students with high functioning autism can benefit from computer-based comprehension programs with minimal assistance using the program. The students that participated in the program needed little assistance, and only required second chances on some of the lessons. Each of the students expressed little to no frustration when using the program, but they only asked for help when logging onto the computer and starting up the program.

When using the program, three of the five students seemed fully engaged in the program, while the other two needed prompting to complete the task at hand. One of the students began to view the program as a race and he wanted to be the leader and stay ahead of everyone. He

needed to be reminded that the program was not a race and that he needed to take his time and answer the questions without guessing.

Through this study it was determined that the *Headsprout* reading comprehension program is beneficial for individuals with autism but these students also need teacher-instructed lessons in small group settings. Students, who are high functioning and have autism, in the researcher’s experience, benefit from teacher-guided lessons. Computer-based lessons are beneficial in many ways because these students are able to interact independently with the computer with minimal distracters. During whole group lessons there are several distracters, from other students’ behaviors to noises outside of the classroom. In addition, the students were able to use the comprehension skills they learned through the *Headsprout* program in other lessons. They were able look for context clues to answer questions during core academic subjects as well.

This research compliments the findings of Bernard-Opitz, Sriram, and Nakhoda-Sapuan (2001) and some of Strickland’s (1997) research that indicated individuals with autism or an autism spectrum disorder can learn at the same levels as their neuro-typical peers. In this researcher’s opinion, individuals with autism may need more modifications and time spent on lessons to make sure they comprehend the content of the lessons.

Implications for Practice

The students were able to benefit from the *Headsprout* and it is recommended that they continue to use the program in addition to teacher-guided instruction. Computer-based learning is beneficial but only to a certain extent. Students need to experience hands-on learning and a computer does not provide that with online education. This research confirmed that online education is beneficial and allows students to work at a pace that suits them, but there are many

positive outcomes students gain from the classroom experience. Students cannot learn appropriate social interactions through a computer, even though they may learn comprehension skills and problem solving skills, but they are not learning the necessary social skills.

Parents and teacher can work together to allow students to participate in online programming a few days a week and the rest of the week have them participate in small group instruction. With these suggestions in the classroom, teachers/parents may begin to see improvements in their students'/children's comprehension skills.

Students with special needs benefit from positive interactions with peers and teachers. These interactions will help students learn how to interact when they encounter new teachers and peers. Social interactions are difficult for individuals with autism and autism spectrum disorders, as are learning comprehension skills. By combining online self-paced learning and teacher-guided instruction, students with autism can experience both academic and social success.

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