Improving Vocabulary Skills Through Assistive Technology: Rick's Story

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Abstract

This case study examines the use of two assistive technologies, the Franklin Language Master 6000b and Microsoft PowerPoint 2003, as visual support systems to aid in the vocabulary acquisition skills of a student with autism spectrum disorder (ASD). The intervention used children's literature and best practices in teaching vocabulary skills in tandem with assistive technology. The intervention proved successful in providing the student with opportunities to interact academically and socially with the target vocabulary and to generalize expression in several formate including interactive games, traditional flashcards,folder games and digital story books.

Keywords

assistive technology, autism, vocabulary, reading, children's literature, visual support systems

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Students' ability to learn and use vocabulary effectively dominates language instruction. For many public school students, especially, those with language and learning disabilities, the ability to remember vocabulary words and use them in context presents a very difficult task (Donaldson & Nash, 2005; Hardman, Drew, Egan & Wolf, 2005). Students with autism spectrum disorders (ASD), often, present special challenges in classroom settings in terms of active engagement in literacy and language instruction, because of deficits in their ability to communicate, understand language, play, develop social skills, and relate to others (Goodman & Williams, 2007). Teachers who provide instruction within inclusive educational settings constantly strive to find strategies that support these children's vocabulary acquisition needs (Rao & Gagie, 2006).

Rick uses technology to greet his "happy, beautiful friend."

Although most experts agree that no one method works for all children, many suggest strategies that are based on concrete and visual support systems, (*e. g.* flash cards, picture cues, icons, etc.), which aid students with special needs to process and use the communication skills necessary for social and academic engagement (Broun, 2004; Kluth & Darmody-Latham, 2003; Pikulski & Templeton, 2004). Therefore, using visual support systems for students with autism may be one effective way to support their vocabulary and literacy skills along with promoting their successful participation in inclusive classroom settings. Effective visual support systems provide all of the following for students with autism: a) visual images hold students' attention; (b) visual supports enable students to focus on the message and thereby, reduce the anxiety often associated with academic learning situations; and (c) visual support systems make abstract concepts more concrete and facilitate students ' ability to express their thoughts coherently (Broun, 2004; Glaeser et al., 2003; Li, 2004; Rao & Gagie, 2006).

Assistive Technology as a Visual Support

Assistive technology (AT), such as digital story books and other computer-supported reading instruction, is coming to the forefront a viable tool for teaching literacy to students with language and learning differences (O'Neill & Dalton, 2002). Digital story telling includes any stories created using multi-media technology such as Microsoft PowerPoint 2003 (Microsoft[a], 2003) or Microsoft Photo Story 3 (Microsoft[b], 2004). The beauty of digital story telling is its flexibility to change in relation to instructional goals and individual learning characteristics. Digital stories, using the students own words, drawings, and photographs, enable students to make progress in all aspects of language and literacy development (i.e., reading, writing, listening and speaking) (Sadik, 2008). Using assistive technology, such as computers, software, and other AT devices, allows students to become actively involved in the reading process as well as encouraging the typically hard to engage student in literacy activities (O'Neill & Dalton, 2002).

The following strategy used best practice in reading instruction (*e.g.* repeated readings, repetition in novel ways, student authored stories), visual support systems, digital story books and games and assistive technology to improve the vocabulary acquisition skills of, Rick, a student with ASD. The

assistive technology devices included the classroom computer, Microsoft's PowerPoint 2003 software and the Franklin Language Master 6000b (FLM-6000b) (Franklin Electronic Publishers, 1991). Rick's vocabulary training experience consisted of 8 weeks of individualized instruction and interaction. The sessions were 30-45 minutes each day and conducted in his self-contained classroom.

Meet Rick

Rick is an 11-year-old student with ASD placed in a primarily self-contained classroom at a rural intermediate school. Rick, like other 11 year olds, fancies computers, movies and video games for leisure recreation. He is handsome, funny, and mischievous. These attributes were constantly demonstrated in his relationship with his teacher. He also had a unique way of de-stressing himself when the intensity of the instruction became too much for him. He would simply say, "Don't worry, Be Happy" to calm himself in very stressful situations. This became the theme song for his literacy sessions. When Rick was ready to disengage with the teacher, he simply said, "bye-bye!".

His teacher, who wanted him to improve his reading skills through word recognition and vocabulary development, chose Rick for the study. His estimated reading level was 3rd grade. He loved movies, computers and other visual images. He appeared to be a visual learner and preferred to communicate with gestures and pictures rather than words. Rick used Picture Exchange Communication (PECS) icons for his daily routine. He was included for some classes,

The Franklin Language Master 6000b and Microsoft PowerPoint 2003 have promise as visual support systems within inclusive environments.

but his academic lessons took place in the self-contained classroom. There was one other student with ASD in the class who had a similar schedule to Rick.

The Technology

Rick's literacy experience included two types of assistive technology, the Franklin Language Master 6000b (FLM-600b) and Microsoft PowerPoint 2003. The FLM-6000b is an inexpensive, hand-held speaking dictionary, thesaurus and grammar guide that allows the teacher and/or student to create an electronic vocabulary file complete with definitions and verbal pronunciation. The FLM-6000b also has a game feature that allows students to play games with their target words . Microsoft PowerPoint 2003 is a software program commonly used in the classroom to create instructional slide show presentations. Most school and business computer have a version of the software available.

Literacy Experiences Combining Visual Supports and Assistive Technology

Because many children with autism do not like surprises or sudden changes in their daily routines (Autism Society of America, 2007), the first step for the teacher was to become a routine part of Rick's reading schedule once per week. For two weeks, the teacher came to the classroom at the same time and read to him and with him, depending on his mood and acceptance level. She also worked with him on his folder games and took field notes about his preferences in activities and reading material. Once the routine was established, she initiated the use of the FLM-6000b

6000b AT device. Initially, Rick was reading a Berenstain *Bears On Vacation* (Berenstain, S., Berenstain J. & Berenstain, M. 2006). As he attempted to read the book orally, the teacher made a list of words that Rick was unable to decode. Target words were chosen from the list and put into the FLM-6000b as the beginning of the electronic word file. During the next reading session, the teacher taught Rick to find the unknown word on the FLM-6000b as he read his book, and to use the voice button so that the word was enunciated for him. After several practice sessions, Rick was able to use the FLM-6000b efficiently to find and enunciate the words and to match the words with a set of flash cards and a folder game created by the teacher as a guided practice activity and visual support system. After three sessions, Rick was able to input the words independently into the FLM-600b and use the voice function to "say" the word he chose.

Figure 1: Franklin Language Master 6000b

Based on field notes and observations, the teacher decided that Rick's vocabulary skills would be increased more efficiently if the reading text had a repetitive rather than a narrative format. Specifically, the *Berenstain Bear* (Berenstain, Berenstain & Berestain, 2006) book didn't contain enough repetition of the target words for generalization. Because Rick enjoyed Disney movies, computers and books about animals, Eric Carle's popular children's books seemed appropriate selection for him. The format was repetitive and often the opportunity for generalization, the functional reading level was appropriate and the book contained compelling visual cues that could be easily replicated in other formats (icons for Microsoft PowerPoint 2003, folder games, etc.)

The Very Quiet Cricket (Carle, 1990) was introduced to Rick as his library book for

the intervention. He was asked to read the first 4 pages of the book as the teacher noted the words that he could not decode. At the end of the oral reading, Rick typed each unknown word into the FLM-6000b's electronic vocabulary file. As he typed, he also used the voice function to say the word. The vocabulary words included nouns such as *spittlebug* and verbs such as *screeched*.

To practice the new vocabulary a second set of flashcards was created with a picture representing the vocabulary word and the word itself on the back. Rick was shown the picture and asked to find the word on his FLM-6000b. He then turned the flashcard over to check his work. In addition to the flashcards, a second set of folder games was created for Rick using the format he had become accustomed to in his classroom. A final visual support system was created in the form of a digital game using Microsoft PowerPoint 2003 software. The game used a cloze procedure where the picture of the insect or picture icon that represented the verb was inserted into a sentence from the book. Three vocabulary words were used as choice icons. Rick had to choose the vocabulary word that matched the picture to go on to the next sentence. If, for example, he chose spittlebug when the correct word was cricket, the presentation would loop back to the original picture, and he was given a second chance to be correct. When he chose the correct response, he was reinforced with music, sound, and animation, and the slide advanced to a new vocabulary word slide.

Figure 2: Rick's vocabulary game format in Microsoft PowerPoint 2003

Once he had practiced a set of words in the various game and flashcard formats, he read the next section in the book. The same process was used for practice as described above. At the end of the story, Rick had accumulated 21 words from the story that included nouns and verbs, typically, the nouns were the insect characters and the verbs were

the sounds made by the insects. When he had completed the story, Rick wanted to add three words to his list. His chosen words were happy, beautiful and friend. Rick's words were added to the list to make a total of 23 words. New digital games were created to review all the words in different sentences, *i.e.,* the insects were mixed with different sounds, new sentences were created, etc.

The final step in the strategy was to create a digital story using Microsoft Power-Point 2003 software. (O'Neill & Dalton, 2002) The digital story was used as a formative assessment to determine if Rick could recognize his 23 words out of the context of the Carle (1990) book and in the new format. Based on Rick's three added words (happy, beautiful, friend), a new story was created using a repetitive format similar to the *Very Quiet Cricket*, but with a new story line. Rick chose the insects and sounds he wanted to include in his story. The teacher created a digital story, *The Little Cricket Makes a Beautiful Sound,* using the photographs and pictures from the practice materials. Rick was able to read the new story with 90% accuracy. He used the FLM-6000b to read the target words for him, but he chose the correct word 100% of the time. He read aloud the other words in the story. The final step, the summative assessment, used a subset of the new words to create a totally new digital story, *Happy Friends,* using Rick and the teacher as characters alongside the characters chosen from the original Carle book. The summative story also used a different configuration of sentences and sentence structure and fewer pictures to assess Rick's ability to identify the words in a different context.

Figure 3: A sample of Rick's summative digital storybook in Microsoft PowerPoint 2003
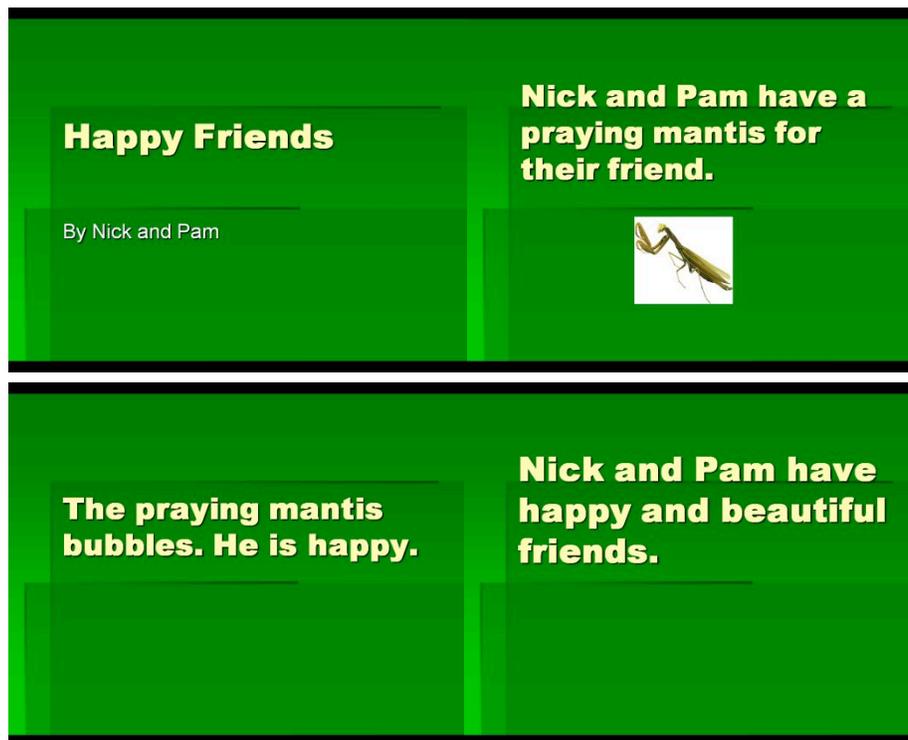
Rick was able to read the new digital story with 100% accuracy. He read aloud and again, at times, used the FLM-6000b to enunciate words in the new story from his electronic word file. In addition to learning the target words in a variety of lesson formats, he created his own social games with the FLM-6000b. His favorite was to choose the incorrect word, give the teacher a sideways glance and a smile, wait for a verbal prompt like "that's not cricket" and then laugh as he made the correct selection. He also occasionally used the FLM-6000b to communicate emotionally with the teacher. Sometimes when she came in for the lessons, he would use his FLM-6000b and choose "happy beautiful friend" as a greeting.

Figure 4: Rick and his teacher communicating with the Franklin Language Master 6000b

An unexpected outcome was that Rick also began to interact more spontaneously with his peers and teachers and used the FLM-6000b as part of his communication system. His teachers reported that he became more social with his classmates in the self-contained and included classrooms.

Final Thoughts

Students with autism often pose a particular set of challenges to their classroom teachers, even those teachers with specific training to meet these students' very special needs. In included settings, students with autism are often excluded from rich and meaning literacy experiences due to the teacher's lack of knowledge about appropriate methodology to engage them in activities such as storytelling, creative writing and play-acting (Kluth & Darmody-Latham, 2003). The use of assistive technology paired with effective teaching strategies using visual support systems such as pictures, icons and digital media, and the student's interests has great

promise as a method to provide students with ASD valuable and active literacy opportunities in the inclusive classroom (Broun, 2004; Kluth & Darmody-Latham, 2003; ONeill & Dalton, 2002). Rick's literacy experience used a combination of methodologies and his personal interests to create for him opportunities to read, play, create a story and social communicate using visual support systems and technology.

Because of its low price, about $149.00, the FLM-6000b is an affordable piece of assistive technology that is easy and convenient to use for reading and other literacy instruction. Its voice, thesaurus, definition and game functions make it a flexible tool for any student who needs AT support for vocabulary development. The drawback to this AT device is the speech quality of the voice. The computerized speech is often hard to understand especially for multisyllabic words. Microsoft PowerPoint 2003, because of its availability and user friendly style, is a powerful tool for creating interactive games, digital stories and other AT visual systems for literacy activities. However, there are also free downloadable software programs, like Microsoft Photo Story 3, that may offer a better venue for digital story telling.

It was clear from Rick's experience that the combination of AT, visual supports and effective reading practices provided a successful literacy experience for him. He learned his 23 vocabulary words and generalized his new vocabulary in a variety of contexts and materials. He became proficient at using the FLM-6000b to expand his electronic word file and enjoyed using the device to read, play games and interact with the teacher and others in his environment. While this method seemed time consuming, the study took place in 8 weeks with a time frame of 30-45 minutes per week. In that context, it seems apparent that this method is feasible for classroom application.

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