JSET

Technology in Action

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Visual Supports for Individuals with Autism Spectrum Disorders

Visual supports are identified by the National Autism Center (2009), Twachtman (1995), and Myles, Grossman, Aspy, Henry, and Coffin (2007) as an effective evidenced-based strategy for individuals with Autism Spectrum Disorders (ASD). Visual supports is a collective term referring to items that are perceived via the eyes and that increase understanding of a particular environment and/or expectations in that environment and/or contribute to an understanding of communication by making auditory information available in a visual manner (Smith, 2007).

Environmental visual supports are encountered frequently in our everyday lives. Flight schedules on airport monitors direct travelers to the appropriate gate; roped off areas at construction sites convey the message to stay out; and lines on the floor at motor vehicle offices indicate in which line we should stand for service. These are all examples of visual supports provided for the general public. They are understood easily and replace the need for lengthy text-based explanations or oral presentations of the rules or procedures. Environmental visual supports are especially beneficial for individuals with ASD. The use of visual supports has been shown to increase these individuals' ability to complete tasks independently; learn more rapidly; demonstrate decreased levels of frustration, anxiety, and aggression related to task completion; and adjust more readily to changes in their environments (Smith, 2007).

Communication visual supports address the problem of speech and gestures being fleeting (once spoken or demonstrated, they disappear). Visual supports offer a static form of communication that remains present. This static message can remain as long as the individual requires it in order to understand the message or to serve as a reminder of a message that might be forgotten. Visual supports may provide an analysis of a complex task, a label showing where to find or place materials required to complete a task, or a schedule to help a student understand where to go or what to do next. For example, a student who comes home from school and wants to watch TV might benefit from a visual schedule that shows which chores must be completed before having free time to watch TV. The use of a visual schedule can help the student avoid anger and frustration at being told that he cannot watch TV until he completes his chores. The visual schedule also can help to build independence, because in the presence of visual prompts the student will need fewer verbal reminders from adults.

Handheld Assistive Technology for Visual Supports

Traditionally, visual supports have been constructed using photographs, pictures, or line drawings that have been printed on paper; these often are laminated for increased durability. The process of constructing these low-tech visual supports can be time consuming and can result in large notebooks containing pages of printed symbols that may be cumbersome to carry and/or stigmatizing to use. Low-tech visual supports also are difficult to adapt when teachers are faced with sudden unexpected schedule changes,

environments, or social situations. In addition, low-tech visual supports may be too abstract for some students with ASD to process. High-tech visual supports created and presented on handheld devices such as iPhones and iPods are a promising alternative that overcomes the limitations of traditional visual supports.

Visual support apps running on handheld technology have the potential to allow teachers to more effectively and efficiently address the needs of individuals with ASD. These visual supports can be created in less time and with less effort, thereby increasing the likelihood that they will be available and that they will be used. Changes can be made to these supports easily, even at the last minute, to adjust to unexpected circumstances. The portability of handheld devices accommodates the need for using the supports in multiple locations within the educational setting. Multiple types of visual supports can be created and stored on a single handheld device, and they can be customized to meet the individual needs of different students. Additionally, providing visual supports through apps running on a handheld device are less stigmatizing for students with ASD because these mobile devices also are used and valued by their typically functioning peers.

Whether using a handheld Apple device such as an iPhone or a device running the Android operating system, there are a plethora of apps for creating visual supports. Picture schedulers, timers, to-do lists, calendars, and more are readily available for free or a fee. Table 1 provides a sampling of currently available visual support apps.

Despite the ready availability of visual support apps, little has been done to analyze the utility and appropriateness of providing visual supports via high-tech assistive technology. Research has validated the use of low-tech visual supports (National Autism Center, 2009); now, research is needed to determine the feasibility and/or effectiveness of using high-tech, handheld devices to provide visual supports.

Pilot Study Description and Results

To evaluate the feasibility and promise of using handheld technology in authentic educational delivery settings, a pilot study was conducted using the iPrompts v.1.2.1 app on the iPhone. The iPrompts app allowed participants to create and present a variety of customizable visual supports—visual schedules, visual timers, and visual choice-making among objects. Twenty-five certified teachers completing a practicum requirement in the master's level autism concentration at Southern Connecticut State University (SCSU) used the iPrompts app with 88 students with ASD in a Connecticut public school. The students ranged in age from 5 to 16 years of age. Practicum participants, under the supervision of SCSU faculty members, were responsible for providing social skills training and working on functional communication skills for three weeks during the school district's extended year program.

The practicum teachers were grouped into 11 teams of two and one team of three and provided with a 90 minutes of training. The first part of the training focused on how to use the iPhone. The second part of the training focused

Table 1

Visual Support Apps

App	Developer	Available from	Compatible Device(s)
iPrompts	HandHold Adaptive	iTunes, Google Play, BarnesandNoble.com	iPhone, iPod touch, iPad, Android devices, Nook
Picture Scheduler	Petr Jankuj	iTunes	iPhone, iPod touch, iPad,
First Then Visual Schedule	Good Karma Applications	iTunes, Google Play, BarnesandNoble.com	iPhone, iPod touch, iPad, Android devices, Nook
Visules	Dean Huff	iTunes	iPhone, iPad
U-Sync Video Scheduler	Agile Disability Solutions	Google Play	Android devices
TASUC Schedule for Android	Info Lounge	Google Play	Android devices

on how to use specific features of iPrompts. After the training, each team was provided with one iPhone with the iPrompts app preinstalled. The teams were asked to incorporate the use of the iPrompts app with their students.

Multiple measures and data collection techniques (e.g., observation, focus group) were used to evaluate and analyze the teachers' use of the iPrompts app. Data from the focus group revealed that all teachers believed the iPrompts app was not too complicated to set up and that they knew how to use it. A majority of the participants indicated they preferred using high-tech visual supports rather than traditional low-tech methods due to the ease of use, the amount of time and effort that was saved, and the ability to use the application quickly when unexpected needs arose. Several participants commented on the effectiveness of the app's features in helping with group transitions, keeping individual students engaged in their work, and helping individual students stop one activity in order to begin another. In the focus group, additional stories of the positive impact that the app had on their students' behavior were shared, and the majority of teachers indicated they would like to continue using the iPrompts app.

Observational data showed that teachers were able to use the handheld device and the iPrompts app correctly. Teachers were able to use graphics from the picture library within the app, and some used pictures taken with the iPhone to further individualize the visual supports. All the visual supports available in iPrompts—visual schedules, visual timers, and visual choice-making among objects—were used by the teachers; the visual timer was the most widely and frequently used visual support.

Lessons Learned

The results of this pilot study lend support for high-tech options as a feasible and effective method of providing visual supports for students with ASD. The data also helped to identify additional aspects that must be addressed during training to improve the chances that the technology will be implemented effectively and that students will receive the greatest benefits.

Although the teachers felt they had received sufficient training and had the knowledge necessary to use the iPhone and the iPrompts app effectively in their teaching, the observational data and focus group data highlight the need for additional training. Several teachers expressed concern about a problem of the image on the screen disappearing and the screen turning black. One participant commented that she did not realize this happened until she watched a video of herself using the app with her students. She was talking to her students about what they were seeing, and when she saw the video she realized they were not seeing anything but a blank screen. These comments indicated that they thought this was due to the iPrompts app, when in actuality it was due to a screen saver setting on the iPhone. Therefore, instruction related to the general settings and features of the handheld device as well as differentiating between features of the device and features of the app is warranted.

In addition to needing training related to the general implementation of high-tech visual supports, this pilot study revealed that training is needed on how to pair assistive technology uses with specific classroom situations. Observational data reveal that, at times, some teachers opted to use handheld technologies with students even when it was not appropriate to do so. During one observation, a teacher presented choices and encouraged a student to make a selection on the handheld device even though the student already had verbalized his choice clearly. Rather than presenting a visual schedule prior to a transition, another teacher presented the visual schedule while a student was already experiencing a meltdown. Emphasis needs to be placed on the fact that best practices related to the use of visual support strategies must be utilized regardless of whether the visual supports are low-tech or high-tech.

Influencing the Field—A Happy Accident

Teachers' focus group input included numerous comments about the viewing screen needing to be bigger so groups of students could see it better. These comments stemmed from an inappropriate use of the app. The iPrompts application was developed to support individual students; it was not intended to be used for groups of any size. For example, the scheduler tool is designed to help a particular student through a difficult transition from one activity, situation, or environment to another. It was not designed to be used for a group picture schedule. Upon receiving this feedback, however, HandHold Adaptive, Inc., the developer of the iPrompts app, responded by developing iPrompts XL for the iPad, thus providing the bigger view screen and expanding the ways in which the app could be used to support students with ASD.

Looking Forward

The handheld technology presented to the teachers in this pilot study was embraced with enthusiasm, which is not always the case when assistive technology is delivered to teachers' classrooms. In many instances, high-tech assistive technology is not mainstream technology. It often is viewed as more work for the teacher, as it is necessary to either put in extra time at school or lug the technology home to learn how to use it. The iPhone, on the other hand, had a cool factor at a time when smart phones were not yet quite so ubiquitous. The training provided for the teachers before receiving the iPhone with the iPrompts app meant they could immediately start using the assistive technology. If they wanted to explore more on their own or set up visual supports in advance, transporting it was easy due to its small size. The iPhone and iPrompts app were available whenever and wherever the teachers had time to work with them. The question of which of these factors (alone or in combination) or what other factors made the teachers so eager to use the assistive technology was not examined. What factors influence teachers' acceptance and use of handheld technology remains a question worth exploring.

The iPrompts app running on the iPhone allowed teachers to create visual supports more efficiently, to customize them easily to meet the needs of individual students, and to meet the needs of more than one student with the same handheld device and app.

This pilot study demonstrated that training on how to access the iPrompts app on the iPhone and how to use the app is not enough. Teachers need more in-depth training to learn about the settings and features of the device on which visual support apps are running and the strategic use of high-tech visual supports. There may well be other training needs and supports that did not become evident in this short pilot study. This leads to an additional question for future research: What are the supports necessary for successful implementation of visual supports on handheld technology in the school setting?

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