Journal of Special Education Technology
2022, Vol. 37(2) 318–326
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0162643420981561
journals.sagepub.com/home/jst
SAGE

Supporting Peer Interactions in the Inclusive Preschool Classroom Using Visual Scene Displays

Emily Laubscher[1], Tracy J Raulston[2], and Ciara Ousley[2]

Abstract

Inclusive preschool classrooms have become increasingly common in recent decades, affording opportunities for children with and without disabilities opportunities to interact and develop positive relationships. Children with disabilities may be unintentionally excluded from these interactions due to communication differences. This paper discusses one assistive technology tool, called visual scene displays (VSDs), for supporting communication and interaction between children. Specifically, the paper aims to: (a) describe VSDs; (b) discuss why VSDs are particularly well-suited for supporting social communication between young children; (c) describe how VSDs are created and introduced to children; and (d) provide examples of how VSDs may be implemented during two common preschool activities: object play and shared storybook reading. Finally, resources for creating VSDs are offered.

Keywords

pre-K/infants and toddlers, inclusive education, speech or language disability, assistive technology, augmentative/alternative communication

Inclusive preschool classrooms have become increasingly common in recent decades, offering new opportunities for children with and without disabilities to experience positive social interactions and form friendships (Lin et al., 2019). Social interactions between children with disabilities and their peers can benefit children regardless of their disability status. For instance, these interactions provide an opportunity for children with disabilities to develop more sophisticated social skills, and they provide an opportunity for their peers to practice adapting their interactions to match partners with different abilities (Wolfberg et al., 2015). For all children, peer interactions during the preschool years can set the stage for social relationships that positively impact health (Cohen, 2004), cognitive and emotional development (Bagwell & Schmidt, 2011), and overall quality of life (Friedman & Rizzolo, 2018).

Children, both with and without disabilities, may not be fully benefitting from inclusive classrooms if they are unable to communicate effectively and socially interact with one another (Boudreau & Harvey, 2013). Children with disabilities may require alternative communication modalities to supplement or replace speech, as well as support for participation (Beukelman & Mirenda, 2013). Children without disabilities may need supports in order to understand how alternative communication modalities can be integrated during social interactions in the classroom. Assistive technologies can help teachers support social interactions between children in inclusive preschool classrooms.

In this paper, we discuss one type of assistive technology tool, called visual scene displays (VSDs), that can be used to support social communication between children with disabilities and their peers, thereby promoting inclusion within the preschool setting. Following a vignette, we (a) describe VSDs; (b) discuss why VSDs are particularly well-suited for supporting social communication between young children; (c) describe how VSDs are created and introduced to children; and (d) provide examples of how VSDs may be implemented during two common preschool activities (object play and shared storybook reading) to support social communication and interaction. Finally, we present resources for creating VSDs.

Ms. Allison is a teacher in an inclusive preschool classroom. As in all classrooms, the children have a variety of needs. Many of the children are typically developing and some have developmental disabilities such as autism spectrum disorder (ASD) and speech delay. The children get along well and interact with

[1] Department of Communication Sciences and Disorders, The Pennsylvania State University, State College, PA, USA
[2] Department of Educational Psychology, Counseling, and Special Education, The Pennsylvania State University, PA, USA

Corresponding Author:
Emily Laubscher, Department of Communication Sciences and Disorders, The Pennsylvania State University, University Park, PA 16802, USA.
Email: emily.laubscher@gmail.com

each other with support during structured, adult-directed activities such as circle time; however, this is not the case during unstructured activities such as free play and choice. During these unstructured times, Ms. Allison has noticed that the children without disabilities tend to interact with each other while the children with disabilities are often unintentionally left out. Her classroom isn't as inclusive as she would like. She believes that some of the children in her class are not sure how to interact with their peers who do not talk as much or who communicate differently. Ms. Allison consults with the speech language pathologist (SLP), Ms. Nicole, to brainstorm strategies that can promote communication and social interaction between children with and without disabilities during unstructured classroom activities. Ms. Nicole mentions an innovative new technology she recently learned about called visual scene displays (VSDs). First, she provides Ms. Allison with a tablet loaded with an application (app) for creating VSDs. Ms. Nicole explains what VSDs are and which children might benefit from them.

Visual Scene Displays (VSDs)

What Are Visual Scene Displays (VSDs)?

Some children benefit from assistive technology to support their communication. For example, speech generating devices and apps with voice output can supplement or replace natural speech as needed (Beukelman & Mirenda, 2013). Visual Scene Displays (VSDs) are one example of a type of communication technology that is particularly developmentally appropriate for young children and individuals at the beginning stages of language development (Light, McNaughton, & Caron, 2019).

Unlike traditional communication technology systems that include rows and columns of symbols representing individual words, VSDs are photographs of scenes from a child's life (Light, McNaughton, & Caron, 2019). These photographs are often presented on a touchscreen tablet. They contain "hotspots" over key people, objects, or events in the scene. Hotspots can be used to communicate about the events depicted by providing relevant language. When activated by touch, these hotspots produce voice output of words or phrases related to the scene. Hotspots can be pre-programmed, or they can be added to VSDs when needed using just-in-time (JIT) programming (Light, McNaughton, & Caron, 2019).

Because VSDs are created using photographs, they capture a single moment in time. In order to better capture the dynamic nature of everyday routines and events (i.e., events in which movement is a critical aspect of the scene), VSDs may also incorporate video (Light et al., 2014). Video visual scene displays (video VSDs) are apps for mobile devices that include short video clips of actions or events such as going down the slide at the playground or hugging a parent. Videos may also depict actions that children can imitate, such as pretend play actions (Laubscher et al., 2019). These videos pause automatically during key moments, and a VSD with hotspots appears. The pause of the VSD and appearance of the hotspots provide children with a prompt to communicate (e.g., activate the hotspot). The embedded hotspots provide access to language via voice output (Light, McNaughton, & Caron, 2019).

Why Use VSDs With Young Children?

There are many types of assistive technologies that are effective in supporting communication for children with disabilities, including those who require alternative means of communication to replace or supplement speech (Beukelman & Mirenda, 2013); however, for young children who are in the beginning stages of language learning, some technologies often impose high learning and cognitive processing demands (Light, McNaughton, & Caron, 2019; Thistle & Wilkinson, 2013). For example, many traditional communication technology systems represent language concepts using graphic symbols that are not intuitive for young children (McCarthy et al., 2018). These symbols are typically arranged in a decontextualized grid layout, often requiring the user to navigate through multiple folders and sub-folders within the grid in order to generate a message. This process places a burden on attention and working memory (Thistle & Wilkinson, 2013). Research has shown that these traditional, grid-based communication systems are difficult for young children to understand and use (Trudeau et al., 2014).

In contrast, VSDs are designed to reduce learning and cognitive processing demands for young children, potentially making it easier for them to use the technology within communicative interactions (Light, McNaughton, & Caron, 2019). By using photographs from a child's life, VSDs capture and present concepts within the context of natural everyday routines, consistent with how young children learn language and socially interact (Light & McNaughton, 2012). VSDs also preserve the visual and conceptual relationships between objects and people within the scene, including proportion, size, and location, providing additional context for communication (Light & McNaughton, 2012; Light, McNaughton, & Caron, 2019). Furthermore, VSDs take advantage of the human ability to rapidly process integrated visual scenes, potentially further reducing the processing demands associated with many traditional communication technologies (Light, Wilkinson, et al., 2019).

Video VSDs have the added benefit of offering video support. Video provides additional context for communication by representing dynamic events as they unfold over time (Light, McNaughton, & Caron, 2019). Video can also be used to demonstrate specific skills or behaviors, similar to traditional video modeling. Video modeling involves a child viewing a short video clip of an action and then imitating that action, and is an evidence-based practice to support a variety of skills in young children with disabilities including play and social-communication skills (Bellini & Akullian, 2007; Fragale, 2014).

VSDs and video VSDs are uniquely well-suited for supporting social interactions. Apps with VSDs are presented on commercially available devices that are commonly utilized in

classrooms (e.g., iPads®). These devices may be more likely to be treated as a shared platform to be used by both children within a dyad, as equals, unlike traditional communication technology systems which are typically viewed as belonging only to the child with a disability (Therrien & Light, 2016). Communication supports that promote equal status relationships rather than singling out the child with a disability are desirable in building early friendships and may be less stigmatizing for the child with a disability (Therrien & Light, 2016).

Empirical evidence supports the use of VSDs and video VSDs for young children. It has been found that typically developing young children are able to locate vocabulary more accurately when using VSDs as compared to traditional communication technology systems with a grid-based layout (Drager et al., 2003). Additionally, there is emerging research suggesting that some young children with disabilities acquire expressive communication skills, such as requesting, more successfully when using communication technology systems with VSDs as compared to traditional, grid-based systems (Gevarter et al., 2014, 2018). Research indicates that VSDs and video VSDs can be effective in supporting communication between young children with disabilities and their classmates without disabilities during interactive, shared activities such as storybook reading (e.g., Therrien & Light, 2016, 2018) and play (Laubscher et al., 2019). Interventions that enable children to become socially connected and engaged and provide supports for communication within natural, inclusive environments are in line with the Division for Early Childhood (DEC, 2014) recommended practices for instruction and interaction. VSDs and video VSDs also support DEC recommended practices for environment, including the creation of universally accessible environments and the identification and implementation of assistive technology to promote participation in learning experiences.

Using VSDs in a Preschool Classroom

First, Ms. Allison and Ms. Nicole work as team to conduct a routines assessment to determine what classroom activities will be best for introducing VSDs. They rule out snack time because it is a busy time of the day with some messes, and they rule out the outdoor recess because of some behavioral challenges with transitions. Together, they determine that a play center (object play with blocks and cars) and shared reading time will be good starting points. There are many opportunities to embed instruction and create contextually relevant learning opportunities into motivating activities in these centers.

Once Ms. Allison and Ms. Nicole have selected activities, they discuss a plan for creating the VSDs and video VSDs. Ms. Nicole informs Ms. Allison that VSDs can be created before the children use them, or during interactions as the need for new vocabulary arises. Together, they decide to pre-program their VSDs due to staffing considerations that might make it difficult to support just-in-time programming. Next, Ms. Nicole describes evidence-based strategies for creating VSDs and video VSDs, and both educators consider how to introduce the new materials within the activities they have chosen.

Creating VSDs

VSDs may be low tech, but are often created and presented within an app on a mobile device that supports voice output (see below for an overview of apps that support VSDs). VSDs are created by capturing a photograph of a scene that is relevant to an individual's life and interests (Light, McNaughton, & Caron, 2019). Hotspots are then added to the scene, typically by drawing directly around a portion of the screen with a finger or stylus. Each hotspot is programmed with a recorded word, phrase, sentence, or sound to produce voice output when touched. This allows children to use the hotspots to communicate about the scene while interacting with each other.

With respect to creating VSDs, current evidence supports the following (Light, Wilkinson, et al., 2019): (a) VSDs should use photographs of familiar, meaningful, and motivating events within a child's life; (b) VSDs should include people to attract visual attention and to capture the social nature of everyday interactions; and (c) VSDs should depict people engaged in a shared activity. Additionally, hotspots should be programmed with language concepts that are developmentally appropriate and relevant to the activity at hand. Professionals may need to consider several factors when determining which language concepts are developmentally appropriate, such as the age of the children using the VSDs as well as any language difficulties or developmental disabilities. While using an app with VSDs, children should have access to photo thumbnails to support navigation between scenes within the app (Light, Wilkinson, et al., 2019).

Creating Video VSDs

Video VSDs are video clips that contain embedded VSDs for communication. To create video VSDs, the teacher begins by capturing a video that is relevant to the child's life. This might include entertaining video clips from television shows or websites that the child particularly enjoys (Chapin, 2019); videos of real-life events (Caron et al., 2018); or videos of an activity, such as joint play, that can serve as a model to support participation in that activity (Laubscher et al., 2019).

When creating video models to support participation in a shared activity, the specific actions captured in each video should be determined by the team. They may be informed by considerations such as: (a) child participation goals; (b) child interests; and (c) the nature of peers' participation in the target activity. For example, video models to support communication during pretend play might depict play actions that the child currently enjoys, or play sequences that peers carry out (Laubscher et al., 2019). Research indicates that video modeling interventions, including those targeting interactive skills, are effective regardless of the model used to create the video (Fragale, 2014; McCoy & Hermanson, 2007). Each team may determine the most appropriate model for their video examples based on child preference, convenience, and other relevant factors.

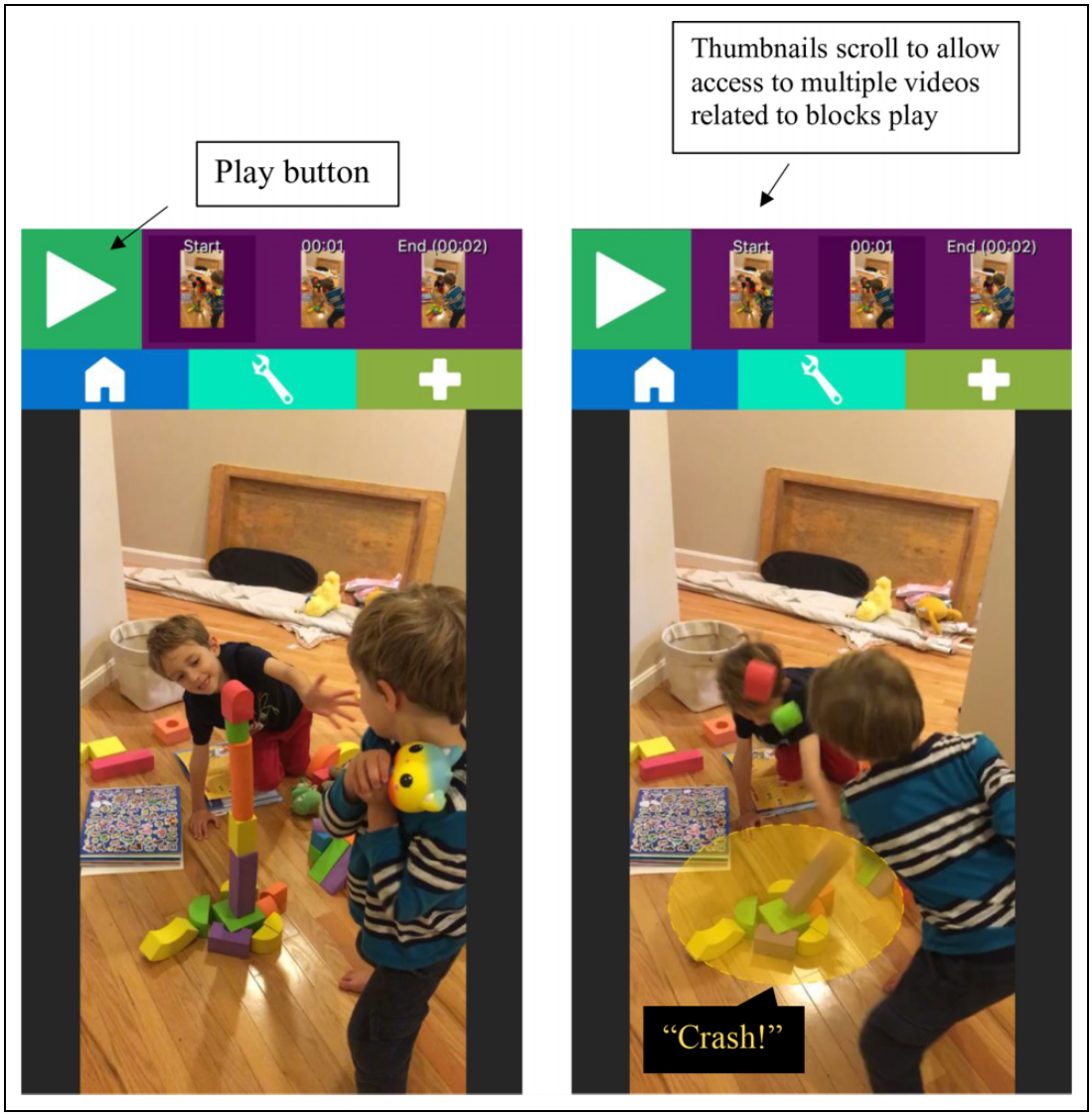

Figure 1. Example of a video VSD, created using the GoVisual™ app, to support playing with blocks. In this example the user selects a thumbnail from the menu bar at the top of the screen. This opens the first frame of the corresponding video, as shown in the left panel. The play button activates the video. The video pauses automatically at a predetermined moment and a VSD, containing pre-programmed hotspots, automatically appears as shown in the panel on the right. The hotspots (shown here in yellow) can be touched to produce words related to the scene (e.g., crash!).

Next, videos are paused at key moments to create a VSD with hotspots. Once hotspots are embedded into the scene, the video will automatically pause to display the identified VSD and hotspots. This pause acts as a visual prompt by making a static photographic scene salient to the child, which provides the child with a signal to interact. Depending on the activity, this interaction might involve imitating the action depicted in the video or activating a communication hotspot.

Providing Instruction to Introduce VSDs and Video VSDs

Evidence suggests that children as young as 24 months can learn to use VSDs with very little instruction (Olin et al., 2010). However, some children may benefit from initial guidance when learning to use the hotspots and/or demonstration of how to imitate video clips as appropriate. To support independence, teachers can incorporate graduated guidance prompting procedures during the beginning stages of learning the VSD or video VSD. Various prompts can be used such as models, gestures, or partial or full physical prompts, depending on the child's needs. A time delay, such as 3–5 seconds of wait time, may also be helpful. For example, when using a video VSD, the video pauses periodically to reveal a static VSD with hotspots, which acts as a visual prompt. Next, the teacher can wait with an expectant look for about 3–5 seconds. If the child does not touch the hotspot, the teacher can implement a model prompt by activating the hotspot, which will play the prerecorded audio (e.g., language, sound effects). For the next

Table 1. Sample Actions, Hotspots, and Video VSDs for Interactive Play Activities.

Toy	Play Actions	Sample Hotspots	Example Video VSD
Babydoll	Put the baby to bed	Sleep, goodnight, shhh	Video shows two children putting a babydoll to bed; video pauses and hotspots appear over the doll ("sleep") and one child's face ("goodnight").
	Wash the baby	Soap, wash, splash	Video shows one child holding the babydoll while another washes it; video pauses and hotspots appear over the soap ("soap") and the child's hands as they wash ("wash").
	Feed the baby	Yum, eat, bottle	Video shows one child holding the baby while the other feeds it a bottle; video pauses and hotspots appear over the baby's mouth ("eat") and the bottle ("bottle").
	Hug the baby	Hug, baby, I love you	Video shows one child handing the babydoll to the other, who hugs it; video pauses and hotspots appear over the child's arms ("hug") and the child's face ("I love you").
Kitchen	Make pancakes	Stir, flip, oops	Video shows one child holding a frying pan while the other uses a spatula to flip the pancake, which flips too high and falls to the floor; video pauses and hotspots appear over the pancake ("flip") and the second child's face ("oops!").
	Share food with a friend	Here, thanks, yum	Video shows one child placing food onto a plate and handing it to a second child, who takes a bite; video pauses and hotspots appear over the first child's face ("here") and the second child's mouth mid-bite ("yum").
	Wash dishes	Dish, bubbles, scrub	Video shows two children washing dishes; video pauses and hotspots appear over the suds ("bubbles") and one child's hands holding a dish and sponge ("scrub").
	Clean up	Messy, trash, sweep	Video shows one child sweeping a messy kitchen floor while the other holds the dustpan; video pauses and hotspots appear over the broom ("Sweep") and the dustpan with trash ("messy").
Cars	Park in toy garage	Ramp, up, park	Video shows one child opening the gate in a play garage and another driving a car up the ramp and parking it; video pauses and hotspots appear over the ramp ("ramp") and the parked car ("park").
	Race cars	Go, vroom, winner	Video shows two children racing toy cars; video pauses and hotspots appear over one of the cars ("vroom") and the winning child ("winner").
	Crash cars	Watch out, crash, oh no	Video shows two children driving cars that crash into each other; video pauses and hotspots appear over the cars ("crash") and one child's face ("oh no").
	Pump gas	Pump, glug glug	Video shows one child driving a car up to a toy gas pump. Another child pretends to pump gas. The video pauses and hotspots appear over the pump ("pump") and the nozzle ("glug glug").
Blocks	Make a tower	More, on, tall	Video shows two children building a block tower; video pauses and hotspots appear over the tower ("tall") and the hand of one child placing a block on top ("on").
	Knock tower down	Go, crash, awesome	Video shows two children counting to three and knocking down a block tower; video pauses and hotspots appear over the fallen blocks ("crash") and one child's smiling face ("awesome!").
	Clean up/sort blocks	Clean up, in, all done	Video shows children placing blocks in a bin; video pauses and hotspots appear over the bin ("all done") and one child's hand placing a block in the bin ("in").

learning opportunity (i.e., the next time the video pauses), the teacher can move to a more intrusive prompt if needed such as providing partial or full physical guidance to help the child activate the hotspot (i.e., touch the screen). These decisions will need to be individualized for each child with input from the entire team (e.g., caregivers and related service practitioners). Children should be supported as needed to help them independently select videos, perform the actions in the videos if appropriate, and use the hotspots on the embedded VSDs to communicate.

How Do Ms. Allison and Ms. Nicole Implement VSDs to Support Social Interaction?

Object play with blocks. Video VSDs may be particularly well-suited for supporting object play between children with disabilities and their peers; the video gives the children a model of what to do together while the VSD with hotspots supports the children to communicate as they play. During play with blocks, for example, a video might demonstrate two children placing blocks on a tower. The tower grows increasingly wobbly as they build. The video then pauses and a VSD appears. The VSD contains one hotspot over the tower that, when touched, results in voice output saying "tall;" a second hotspot over the hand of the child putting a block on the tower says, "watch out!" The video then continues to play. Eventually the tower falls down, and a VSD appears containing a hotspot that says, "crash!"

Figure 1 provides an example of a video VSD that could be used to communicate about object play with blocks. The video demonstrates two children knocking down a block tower they have built. As the children watch the video, it automatically pauses to reveal the VSD with a hotspot that the children can touch to comment, "crash!"

Table 1 includes examples for additional play actions and language that could serve as the basis for creating video VSDs to support object play (blocks and cars) and imaginary play (babydoll and play kitchen).

Jack is a 4-year-old with ASD in Ms. Allison's class. Jack loves object play with blocks. He especially enjoys building block towers and making them crash down. He typically plays alone or parallel to other children. Ms. Allison and Ms. Nicole decide to create video VSDs to help Jack imitate actions of

Figure 2. VSD, created using the GoVisual™ app, to support interaction between children with and without disabilities during shared storybook reading. Photographs of each page from a book about animals have been captured and are available as thumbnails at the top of the screen. Once a thumbnail is selected, the VSD fills the screen and hotspots appear (shown here in yellow). When touched, hotspots produce pre-programmed voice output (e.g., *roar*).

children and share his blocks. Ms. Allison captures a short video clip in which another child, Jude, knocks down a tall block tower. She and Ms. Nicole decide to program a hotspot that says, "crash!" because that seems to be the most enjoyable aspect of the activity for Jack. During free play the following day, they introduce the app to Jack. Ms. Allison says, "Jude knocked the blocks down" as she points to Jack's peer in the video. Next, they model how to activate the hotspot so it says "crash!" as both children watch. The boys play the video and Jack touches the hotspot independently as Jude begins to build a block tower. The boys take turns knocking down the tower. Both children love the app and use the hotspot repeatedly as they build block towers and knock them down, laughing together as they play. Ms. Allison and Ms. Nicole decide to add video VSDs with hotspots for additional activities related to blocks and cars, such as building a block ramp for toy cars to race down.

Shared storybook reading. Therrien and Light (2016, 2018) demonstrated that VSDs can be used to support communication for children with disabilities during book reading interactions with peers. To support interactive book reading, teachers may work with children and their families to identify books that the children enjoy. Next, the teacher captures a photograph of each page of the book. These photographs are imported into (or captured directly within) an app that supports VSDs. Hotspots are then added by circling characters, actions, events, or other parts of each photograph; this turns the photographs of the book pages into interactive VSDs. Children can look at the interactive pages together, using thumbnails to navigate from one VSD to the next directly on a tablet and using the hotspots to communicate about the story. In this case, the tablet becomes a platform for the shared activity (book reading) and communication supports are embedded directly within that activity via hotspots (Therrien & Light, 2016, 2018).

Figure 2 provides an example of a VSD that can be used to talk about a book similar to those that may be found in a preschool classroom. In this example, children reading together can use thumbnails to navigate through the pages of the book at their own pace, depending on interest. When a thumbnail is selected, the corresponding VSD fills the screen and hotspots appear (depicted here as yellow regions). When touched, each hotspot produces voice output of words or phrases related to the book (e.g., *roar*). Vocabulary can be customized to reflect learner interests and language abilities.

When VSDs are used to support shared storybook reading, there is no video component and teachers will not need to provide instruction to support activation or imitation of video clips as they might when using video VSDs. In this case, instruction might focus on use of the hotspots and turn-taking when selecting books and reading the pages together.

Hannah is a 3-year old in Ms. Allison's class. Hannah has a speech impairment, which affects her articulation. Hannah's favorite free time activity is the library nook. She loves to share her favorite books with her friends by pointing to the pictures. At the last Individualized Family Service Plan meeting, Hannah's parents reported that she also enjoys reading books at home, and her new favorite book is Brown Bear, Brown Bear, What Do You See? (Martin, 1967). Ms. Allison was excited to hear this as she also has a copy of this book at school.

Table 2. Apps That Support VSDs.

App	Developer	Platforms	Cost	Features				Hotspots	
				Custom Photos	Video VSDs	Animated Text	Thumbnail Navigation	Recorded Audio	Additional Actions
ChatAble	Therapy Box Limited	iOS	$99.99	+				+	+
GoTalk NOW	Attainment Company	iOS	$79.99	+				+	+
GoVisual™	Attainment Company	iOS	$50.00	+	+	+	+	+	+
Scene and Heard	Therapy Box Limited	iOS	$84.99	+				+	+
Snap "n" Speak	Speech Abilities, LLC	iOS, Android	$9.99	+		+		+	+
Snap Scene	Tobii Dynavox	iOS Windows T series/I series devices	$49.99	+		+	+	+	
Scene Speak	Good Karma Applications, Inc.	iOS	$9.99	+		+		+	+

Note. Table is not intended to be an exhaustive list of available VSD apps. Apps may contain other unique features not highlighted here. All apps listed were commercially available at the time that this paper was submitted for publication.

In the library nook, Hannah is motivated to communicate about books with her peers; however, her classmates have trouble understanding her. As a result, her classmates are not sure how to respond to her in the library nook. Ms. Allison and Ms. Nicole decide to create VSDs that will allow Hannah to talk about her favorite stories and characters as she reads with her friends. They begin with the book Brown Bear, Brown Bear, What Do You See? (Martin, 1967) because it is a favorite of hers. Ms. Nicole takes pictures of each page in the book. Then, she consults with Ms. Allison about hotspots. Ms. Allison says that Hannah loves animals and the sounds they make, so Ms. Nicole programs two hotspots on each page: one that produces the name of the animal and one that makes its sound (e.g., "yellow duck" and "quack, quack"). The next day, Ms. Allison shows Hannah and her friend, Oliver, how to read the book on the tablet, using the hotspots to talk as they look at the VSDs for each book page. Hannah loves to label the animals, and Oliver loves to use the hotspots that make animal sounds. Sometimes, he also imitates the sounds and this makes Hannah laugh!

What Tools Can be Used to Create VSDs and Video VSDs?

There are several commercially available apps that support the creation of VSDs and video VSDs. Each app has unique features and programming steps. Many of these apps allow the user to capture or import a personalized photograph or video into the app, then add hotspots (i.e., the practitioner draws around a part of the photograph to define the edges of the hotspot and then records short words or phrases using the microphone of the tablet) based on the interests and needs of the learner. Children can also participate in the process of creating hotspots (e.g., by helping to draw the hotspot; Holyfield et al., 2017). Table 2 presents examples of VSD and video VSD apps, a brief checklist of features, and the current price point.

Conclusion

VSDs and video VSDs are assistive technology tools that are scientifically supported to be appropriate and effective in supporting social interactions between young children. These supports, now accessible through several commercially available apps, can promote communication and social interactions between children with and without disabilities in inclusive preschool classroom environments. The information and examples presented throughout this paper may serve as a starting point to help practitioners seeking to increase social interactions between their students by introducing VSDs and video VSDs into their classrooms.

Authors' Note

This paper is submitted by the first author in partial fulfillment of PhD requirements at The Pennsylvania State University, Department of Communication Sciences and Disorders.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project was supported, in part, by funding received by the first author from (a) the Kligman Graduate Fellowship in the College of Health and Human Development at the Pennsylvania State University; and (b) the Penn State AAC Doctoral Leadership grant from the U.S. Department of Education (grant #H325D170024). The contents do not necessarily

represent the policy of the U. S. Department of Education and you should not assume endorsement.

ORCID iD

Emily Laubscher https://orcid.org/0000-0002-9441-759X

Note

1. GoVisual™ is available from Attainment Company, 504 Commerce Parkway, Verona, WI 53593, USA. www.attainmentcompany.com/govisual

References

Bagwell, C. L., & Schmidt, M. E. (2011). *Friendships in childhood and adolescence*. Guilford Press.

Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video self-modeling interventions for children and adolescents with autism spectrum disorders. *Exceptional Children*, *73*(3), 264–287. https://doi.org/10.1177/001440290707300301

Beukelman, D., & Mirenda, P. (2013). *Augmentative and alternative communication: Supporting children and adults with complex communication needs*. Paul H. Brookes Publishing.

Boudreau, J., & Harvey, M. T. (2013). Increasing recreational initiations for children who have ASD using video self modeling. *Education and Treatment of Children*, *36*(1), 49–60. https://doi.org/10.1353/etc.2013.0006

Caron, J., Holyfield, C., Light, J., & McNaughton, D. (2018). "What have you been doing?": Supporting displaced talk through augmentative and alternative communication video visual scene display technology. *Perspectives of the ASHA Special Interest Groups, SIG 12*, *3*(3), 123–135. https://doi.org/10.1044/persp3.SIG12.123

Chapin, S. (2019). *The effects of AAC video visual scene display technology on the communication of preschoolers with autism spectrum disorder*. [Doctoral dissertation, The Pennsylvania State University]. Penn State Digital Archive. https://etda.libraries.psu.edu/catalog/17210sec5146

Cohen, S. (2004). Social relationships and health. *American Psychologist*, *59*, 676–684. https://doi.org/10.1037/0003-066X.59.8.676

Division for Early Childhood (2014). *DEC recommended practices in early intervention/early childhood special education 2014*. https://www.dec-sped.org/dec-recommended-practices

Drager, K., Light, J., Curran-Speltz, J., Fallon, K., & Jeffries, L. (2003). The performance of typically developing 2½-year-olds on dynamic display AAC technologies with different system layouts and language organizations. *Journal of Speech, Language and Hearing Research*, *46*, 298–312. https://doi.org/10.1044/1092-4388(2003/024)

Fragale, C. (2014). Video modeling interventions to improve play skills of children with autism spectrum disorders: A systematic literature review. *Review Journal of Autism and Developmental Disorders*, *1*(3), 165–178. https://doi.org/10.1007/s40489-014-0019-4

Friedman, C., & Rizzolo, M. C. (2018). Friendship, quality of life, and people with intellectual and developmental disabilities. *Journal of Developmental and Physical Disabilities*, *30*, 39–54. https://doi.org/10.1007/s10882-017-9576-7

Gevarter, C., O'Reilly, M., Rojeski, J., Sammarco, N., Sigafoos, J., Lancioni, G., & Lang, R. (2014). Comparing acquisition of AAC-based bands in three young children with autism spectrum disorder using iPad® applications with different display and design elements. *Journal of Autism and Developmental Disorders*, *44*(10), 2464–2474. https://doi.org/10.1007/s10803-014-2115-9

Gevarter, C., O'Reilly, M., Sammarco, N., Watkins, L., Kuhn, M., & Sigafoos, J. (2018). Comparison of schematic and taxonomic speech generating devices for children with ASD. *Education and Training in Autism and Developmental Disabilities*, *53*(2), 222–238.

Holyfield, C., Drager, K., Light, J., & Caron, J. G. (2017). Typical toddlers' participation in "just-in-time" programming of vocabulary for visual scene display augmentative and alternative communication apps on mobile technology: A descriptive study. *American Journal of Speech-Language Pathology*, *26*(3), 737–749. https://doi.org/10.1044/2017_AJSLP-15-0197

Laubscher, E., Light, J., & McNaughton, D. (2019). Effect of an application with video visual scene displays on communication during play: Pilot study of a child with autism spectrum disorder and a peer. *Augmentative and Alternative Communication*, *35*(4), 299–308. https://doi.org/10.1080/07434618.2019.1699160

Light, J., & McNaughton, D. (2012). Supporting the communication, language, and literacy development of children with complex communication needs: State of the science and future research priorities. *Assistive Technology*, *24*(1), 34–44. https://doi.org/10.1080/10400435.2011.648717

Light, J., McNaughton, D., & Jakobs, T. (2014). *Developing AAC technology to support interactive video visual scene displays*. RERC on AAC: Rehabilitation Engineering Research Center on Augmentative and Alternative Communication. https://tinyurl.com/rerc-on-aac-vVSD

Light, J., McNaughton, D., & Caron, J. (2019). New and emerging AAC technology supports for children with complex communication needs and their communication partners: State of the science and future research directions. *Augmentative and Alternative Communication*, *35*(1), 26–41. https://doi.org/10.1080/07434618.2018.1557251

Light, J., Wilkinson, K. M., Thiessen, A., Beukelman, D. R., & Fager, S. K. (2019). Designing effective AAC displays for individuals with developmental or acquired disabilities: State of the science and future research directions. *Augmentative and Alternative Communication*, *35*(1), 42–55. https://doi.org/10.1080/07434618.2018.1558283

Lin, T., Chen, J., Justice, L. M., & Sawyer, B. (2019). Peer interactions in preschool inclusive classrooms: The roles of pragmatic language and self-regulation. *Exceptional Children*, *85*(4), 432–452. https://doi.org/10.1177/0014402919828364

Martin, B. (1967). *Brown bear, brown bear, what do you see?* Henry Holt and Company.

McCarthy, J., Benigno, J., Broach, J., Boster, J., & Wright, B. (2018). Identification and drawing of early concepts in children with autism spectrum disorder and children without disability. *Augmentative and Alternative Communication*, *34*(2), 155–165. https://doi.org/10.1080/07434618.2018.1457716

McCoy, K., & Hermanson, E. (2007). Video modeling for individuals with autism: A review of model types and effects. *Education and Treatment of Children*, *30*(4), 183–213.

Olin, A. R., Reichle, J., Johnson, L., & Monn, E. (2010). Examining dynamic visual scene displays: Implications for arranging and teaching symbol selection. *American Journal of Speech Language Pathology*, *19*(4), 284–297. https://doi.org/10.1044/1058-0360(2010/09-0001)

Therrien, M., & Light, J. (2016). Using the iPad to facilitate interaction between preschool children who use AAC and their peers. *Augmentative and Alternative Communication*, *32*(3), 163–174. https://doi.org/10.1080/07434618.2016.1205133

Therrien, M., & Light, J. (2018). Promoting peer interaction for preschool children with complex communication needs and autism spectrum disorders. *American Journal of Speech Language Pathology*, *27*(1), 201–221. https://doi.org/10.1044/2017_AJSLP-17-0104

Thistle, J. J., & Wilkinson, K. M. (2013). Working memory demands of aided augmentative and alternative communication for individuals with developmental disabilities. *Augmentative and Alternative Communication*, *29*(3), 235–245. https://doi.org/10.3109/07434618.2013.815800

Trudeau, N., Sutton, A., & Morford, J. (2014). A study of developmental changes in interpretation and construction of graphic AAC symbol sequences through systematic combination of input and output modalities. *Augmentative and Alternative Communication*, *30*(3), 187–199. https://doi.org/10.3109/07434618.2014.940465

Wolfberg, P., DeWitt, M., Young, G. S., & Nguyen, T. (2015). Integrated play groups: Promoting symbolic play and social engagement with typical peers in children with ASD across settings. *Journal of Autism and Developmental Disorders*, *45*(3), 830–845. https://doi.org/10.1007/s10803-014-2245-0

Author Biographies

Emily Laubscher is a doctoral candidate in Communication Sciences and Disorders at the Pennsylvania State University, and a speech language pathologist. Her research interests center around augmentative and alternative communication for beginning communicators, with a particular interest in individuals with autism spectrum disorder.

Tracy J Raulston is an assistant professor of Special Education at Penn State University. She researches behavioral interventions for social skills and behavioral flexibility in young children with autism as well as methods to support families.

Ciara Ousley is a doctoral candidate in Special Education and former special education teacher. Her primary research interests include naturalistic behavioral interventions that target the social communication skills of young children with autism spectrum disorder and other developmental disabilities. She is interested in collaborating with families of children with developmental disabilities to increase uptake of evidence-based practices in the home.