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How to Implement Visual Activity Schedules for Students with Disabilities

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Abstract: Based on recent literature reviews on the use of Visual Activity Schedules (VAS) for students with intellectual disability and autism, the strategy has been deemed an evidence based practice. Using the literature highlighted in the recent reviews, this article provides an overview of VAS and common skills VAS has been used to teach. Additionally, the authors provide guidelines on schedules variations, creating schedules, and implementing the schedules. Finally, several examples of VAS are included.

Visual activity schedules (VAS) have been a common practice used in many classrooms for children with disabilities for decades. Included as a component of the Treatment and Education of Autistic and Communications-Handicapped Children (TEACCH) program, VAS are considered an essential aspect of a structured environment, providing predictability to scheduled activities. Visual activity schedules are visual supports used to show a list or sequence of events. Some schedules, known as between activity schedules, contain transitions between activities for a full day, much like a daily agenda; others only show part of a day (e.g., assignments to do during math class, family’s routine on Saturday morning). Additionally, VAS can illustrate transitions within activities (known as within activity schedules), including the individual steps of a specific activity (e.g. making a sandwich, brushing teeth, solving a math problem). Many people use some type of VAS in their daily lives, such as daily planners, printed directions from an online map service, or when following an instruction manual to assemble a new piece of furniture.

In educational settings, VAS can be beneficial for students that have difficulty with organization, working memory, or changes in routine. Visual activity schedules have been shown to increase a variety of skills for students with intellectual disability (ID) and autism spectrum disorder (ASD) including daily living skills (e.g., Alberto, Cihak, & Gama, 2005), physical activities (e.g., Cannella-Malone, Mizrachi, Sabielny, & Jimenez, 2013); on task behaviors (Bryan & Gast, 2000), vocational skills (e.g., Rouse, Everhart-Sherwood, & Alber-Morgan, 2014), leisure skills (e.g. Blum-Diamaya, Reeve, & Reeve, 2010), academic skills (e.g., Spriggs, Gast, & Ayres, 2007), and navigation skills (e.g., Kelley, Test, & Cooke, 2013) as well as decrease problem behaviors (e.g., Massey & Wheeler, 2000), time to begin a new activity (Dettmer, Simpson, Myles, & Ganz, 2000), and tantrums during transitions (Schmit, Alper, Raschke, & Ryndak, 2000). Students often do not know what will happen during a given day without a schedule, and they usually have no control or choice over daily activities. This lack of control or anticipation can create problems for students during transitions, leading to...
increased reliance on adult prompts, off-task behaviors, and other inappropriate behaviors (Banda & Grimmett, 2008). Visual schedules have also been found to compensate for difficulties in expressive and receptive communication skills, attention, organization, and memory (Quill, 1995).

Generally, transitions at school happen between classes, activities, and environments. Each of these transitions can be demonstrated for students using a VAS. There are several reasons for doing this. First, VAS can help teachers establish and maintain routines. Predictable routines have been shown to increase on-task behaviors and decrease disruptive behaviors (Dettmer et al., 2000). By making the routine visual, it is easier to signify when changes will occur, whether these changes are one time only or long term. For example, some teachers will add a star on an event in the day that is new, or cross out a non-occurrence. Depending on the student, times can be paired with each item on the schedule, letting them know when they can expect the activity to occur. Secondly, VAS can help students see exactly which steps or activities are part of the routine, giving children boundaries in which to maneuver. Setting these parameters can reduce disruptive behaviors related to materials or activities that students want, but are not included in a particular lesson (Waters, Lerman, & Hoyanetz, 2009). Additionally, VAS can include basic Premack principles by letting a preferred activity follow a non-preferred assignment. The Premack principle can increase a student’s motivation, because it shows the reinforcer for completing a hard activity (Rabian, 2005). Showing that visually and honoring it consistently can reduce aberrant behaviors during non-preferred tasks and transitions. Finally, VAS can help students become more independent (e.g., Duttlinger, Ayres, Bevill-Davis, & Douglas, 2013; Kelley et al., 2013; Mechling, Gast, & Seid, 2010; Purrazzella & Mechling, 2013). The visual cue of what comes next reduces reliance on adults, and thus students can increase number of tasks completed independently as well as time on-task.

Recent reviews of literature have identified VAS as evidence-based practices (EBP) for individuals with ASD (Knight, Sartini, & Spriggs, 2015) and ID (Spriggs, Mims, & van Dijk, under review). With current federal legislation dictating the use of EBP when instructing students with disabilities, practitioners need to know how to implement these practices as intended.

Schedule Variations

There are many different types of VAS. Choosing a specific variation depends on the preferences and abilities of the user(s) of the schedule. Considering a students’ level of symbolic communication is very important when identifying the visual representation for the student (Browder, Flowers, & Wakeman, 2008). For example, students with visual impairments and students who are at the pre-symbolic communication level may benefit more from a schedule where each activity corresponds with an object (e.g. a pre-k schedule where a block represents the block center, a fork lunch, and a blanket nap time). Students with concrete symbolic representation abilities could use picture schedules where real pictures are used to represent each activity (e.g., a picture of the classroom calendar is used for calendar time, a picture of a teacher represents working with that specific teacher). Students who communicate at the abstract symbolic level can possibly use line drawings and/or words to delineate what activities are to be completed. An assessment of symbolic level is an appropriate way for teachers to identify the best visual representations to use when working with this population (e.g., objects,
picture symbols). In a study by Browder et al. in 2008 they developed an assessment for teachers to use with students with significant disabilities in order to identify their current symbolic level. Using this type of assessment can provide students with an appropriate format for visual supports. This progression from symbolic to written schedules follows the natural literacy and communication development of children (Browder, Spooner, & Mims, 2011). As such, it is important that picture schedules use a combination of words and pictures or words and objects. Additionally, using strong response and stimulus prompting strategies can help systematically move students from a more concrete symbolic level to a more abstract level versus allowing them to only remain static in their current symbolic level throughout grade bands (Browder et al., 2008; Browder et al., 2011).

Recently, research is also evaluating the use of small video clips modeling activities or steps embedded into the VAS. Spriggs, Knight, and Sherrow (2014), for example, taught high school students to independently complete four functional skills (e.g., entering data into a spreadsheet, writing a paragraph, setting the table) using VAS where each picture could be touched on a touch-screen tablet to activate a short video model (VM) of the skill to be completed. Students in this study could independently follow a static picture schedule of familiar tasks prior to the study; embedding VM allowed each student to complete novel activities in a schedule without adult support. Although VM is different than VAS, it is still a viable option as a variation to VAS to support the needs of students with intellectual disabilities and autism.

Other variations of VAS are often based on teacher and student preferences. For example, a classroom schedule can either hang in a fixed location so it is easy to find for its users, or the student can carry it while moving between activities. Many reasons can influence a decision between the two (e.g., the distance between activities and the schedule, how much space is available in the classroom(s), if the student will transition between classrooms or community environments, the availability of a high-tech portable device). Typically, a mobile VAS is preferred when students are included in several different environments within the school or community.

Creating Schedules
There are several aspects to consider when creating VAS for an individual or a group of students. First, schedules must use age appropriate representations regardless of which type of schedule used. Whereas a preferred bath toy may be used to represent bath time for a toddler, a miniature shampoo bottle would be more appropriate for young adults. Additionally, knowing where, when, and how they will be used can aide in schedule creation. Decisions have to be made as to where they will be used. Will they be used only in the special education classroom? Will they be used at home or in the community? Will they be used across settings? These decisions will affect when they will be used (e.g., if it is decided they will be used across all school environments, then the “when” would be while the child is at school). How the VAS will be used will likely be influenced by the type of schedule being used. For example, if a student is using a stationary object schedule in the classroom, he might check his schedule by going to the schedule and removing an object of the activity just completed and placing it in a finished box on the floor. The next object will illustrate where the child is to go next. For a mobile picture schedule, the student might remove the picture of the
next activity, and transition to that activity, matching the picture to the same picture in that area (e.g., for a student transitioning to math, the picture of math would be on the student’s schedule as well as in the math center; the picture in the math center might have Velcro pieces on it for the schedule pictures to hang). When the activity is complete, the student can check their schedule to see what activity is next. If a student is using a written schedule, he might cross off an activity that has been completed. The following written word will indicate the next activity the child is to complete. Some schedules include a self-monitoring piece. For example, a student might move a picture from the “To Do” side to the “Finished” side and then circle a smiley face (good), straight face (needs some improvement), or a sad face (unacceptable) based on work completion or time on-task. Once you know where, when, and how VAS will be used, the environment has to be set up to facilitate their use. The schedules have to be created in the form needed for the student. Depending on schedule type, a place in a classroom might need to be cleared for the schedule to hang. If students are going to use a picture schedule like the one described above, where they will match their picture to the area in the classroom where the activity is to take place, pictures will need to be made and hung around the classroom.

Making a schedule does not have to be costly. There are many low-cost resources available for practitioners, such as copyright free images on the internet, photos taken with a digital camera or telephone, line drawings taken from BoardMaker® (if available in an educational setting). If a student has constant access to a tablet, for example as an augmentative and alternative communication device, a practitioner can choose the tablet as a platform for the VAS and choose between a variety of applications. The decision between a high tech or low tech schedule will depend mainly on the preferences of the student and the teacher and the availability of materials. Recent research comparing different types of technology suggests that students acquire and maintain skills equally across technology types, but that personal preference can have a slight influence on the results (Alberto et al., 2005; Cihak, Alberto, Taber-Doughty, & Gama, 2006; Mechling et al., 2010; Van Laarhoven, Kraus, Karpman, Nizzi, & Valentino, 2010).

In general, there are two common ways to sequence the events in a VAS, top to bottom or left to right. Even though there is no common rule, top to bottom sequences usually display daily events as a to-do list, whereas left to right sequences are used to show steps within a task according to a task analysis. The left to right order can promote reading readiness since reading is done in the same way. The length of or number of activities on a schedule depends on a student’s ability to work independently. A First-Then schedule will help remind students of a preferred activity after a less desired one. Students can then move towards VAS with three activities at a time, half-day schedules, and ultimately VAS for a full day. Figures 1 – 9 illustrate various types of schedules.
Figure 1. Example of a between Activity Schedule using Boardmaker
Figure 2. Example of a First, Then Visual Activity Schedule using Picture Symbols

Figure 3. Example of a Daily Schedule with a Self-Monitoring Check
Figure 4. Example of a Daily Schedule with a Self-Monitoring Check

Figure 5. Example of Steps to Follow for Transitioning to a New Activity
Figure 6. Example of a Within Activity Schedule

Figure 7. Example of a Within Activity Schedule
Figure 8. *Example of a Between Activity Schedule*

Figure 9. *Example of an Object Visual Activity Schedule*
Implementing the Schedule

While the decisions about the form and function of VAS are tied to their effectiveness, the most important factor for success is the implementation of the VAS. Students have to be taught how to use the schedule. It is therefore crucial to establish a routine based on (1) the type of schedule chosen that students are to follow, (2) the environment where the schedule will be used, and (3) the practicality for teachers and students. As stated above, predictable routines can help diminish disruptive behavior and it is therefore important to be consistent in the implementation of the routines. Some examples of routines for indicating a step has been completed are crossing off pictures or words as steps are completed, much like crossing off items on a to-do list; moving pictures from a to-do column to a finished column; placing pictures in an ‘all done’ folder after completion (e.g. Whatley, Gast, & Hammond, 2009). To smoothen transitions between activities, students can take a picture from their folder and bring it to the corresponding center.

Similar to decisions about form and function of the VAS, decisions about routines and teaching strategies are dependent on the preference of the teacher and the student needs. Research suggests the use of several EBP to teach students how to use their schedules. System of least to most prompts (e.g., Duttlinger et al., 2013; Spriggs et al., 2007), constant time delay (e.g. Whatley et al., 2009), progressive time delay (e.g., Carlile, Reeve, Reeve, & DeBar, 2013) and graduated guidance (Bryan & Gast, 2000) are some of the systematic instructional procedures that have been used to teach VAS use. Others have used reinforcement techniques in combination with other strategies. Examples include using descriptive verbal praise (e.g. Mechling et al., 2010), edible rewards (e.g., Carson et al., 2008), and access to preferred reinforcers (e.g., Cuhadar & Diken, 2011). Some of these strategies have the additional benefit of being able to show students’ progress in detail. For example, a teacher can collect data on prompt levels within or between activities; a student can show increased independence if he moves from needing predominantly physical prompts to mostly gestural prompts (Collins, 2012). Student need and VAS type will determine what data are collected and what system of instruction is used. If transitioning from one task to another takes a long time for a particular student, a teacher could collect latency data from the time the student is finished with one activity and begins another. Decreases in latency could be rewarded with time with a reinforcer. Percent time on-task might be the data collected for a student needing to increase time working on scheduled materials. Constant time delay with a verbal controlling prompt might be used to teach the student how to complete activities depicted on the schedule. Learning a brand new task might be monitored using number steps completed independently on a teacher-created task analysis, teaching the skills via system of least prompts. Collecting this data can also help make instructional decisions, such as extending a schedule, changing the symbolic level of the visual cues, or expanding the use of the VAS to additional environments.

In addition, all adults involved with the student while the schedule is in use will have to be trained. Consistency in schedule implementation is crucial for the schedule to work in increasing desired behaviors as well as decreasing undesired behaviors. To increase consistency of implementation across all those who will be teaching the schedule, a systematic instruction plan (SIP) should be used (Spooner, Browder, & Mims, 30).
A SIP is a prescribed teaching protocol that is very individualized for the target student and skill and designed to include very specific details about instruction to ensure consistency across instructors.

**Conclusion**

Within the current educational climate, teachers need a range of EBP in their repertoire. Two recent literature reviews have indicated that the use of VAS meet the requirements for EBP set by Horner et al. (2005). Knight et al., (2015) found that VAS could be considered EBP for increasing on-task, on-schedule, and transition behaviors for school-age children with ASD. Spriggs et al. (*under review*) found that VAS can also be considered an EBP for adolescents and adults with ID for teaching new skills, as well as facilitating independence and on-task behaviors. Translating this research to practice is crucial when implementing EBP with students with disabilities.

Visual schedules have been used to effectively increase on-task and on-schedule behaviors for students with ASD (e.g., Bryan & Gast, 2000) and ID (e.g., Spriggs et al., 2007). They have also been used to teach new skills such as using a debit card (Alberto et al., 2005; Cihak et al., 2006), cooking (Mechling et al., 2010; Mechling & Gustafson, 2009; Mechling & Stephens, 2009; Morrison, Sainato, Benchabane, & Endo, 2002), navigation skills (Mechling & Seid, 2011; Purrazzella & Mechling, 2013; leisure skills (Blum-Diamaya et al., 2010; Carlile et al., 2013; Chan, Lambdin, Graham, Fragale, & Davis, 2014; Whatley et al., 2009), as well as a variety of daily living (Van Laarhoven et al., 2010), vocational (Carson, Gast, & Ayres, 2008; Duttlinger et al., 2013; Rouse et al., 2014; ), and academic skills (Bryan & Gast, 2000; Cuhadar & Diken, 2011; Dettmer et al., 2000; Duttlinger et al., 2013; Spriggs et al., 2007; Waters et al., 2009). Four younger students, VAS have been used to teach playing skills (Betz, Higbee, & Reagon, 2008). This versatility makes VAS an option when teaching bigger transitions between activities or small transitions within activities.

Social validity research to date indicates that VAS can be easy to implement and cost effective. Regardless of VAS type, teachers report that they are non-intrusive and easily incorporated into daily activities and routines. Schedules made with supplies already available is an option to keep costs down (e.g., using pictures off of the internet, using written words, using software provided by the school system). When VAS were compared to VM (i.e., static vs. video), teacher and student preference varied. When asked, the majority of students preferred VM to static schedules (Mechling et al., 2010; Mechling & Gustafson, 2009; Van Laarhoven et al., 2010). One teacher reported the VM easier, requiring less time to prepare (Alberto et al., 2005). Alternatively, a teacher in another study found the static materials easier to create (Cihak et al., 2006). In one study, teachers reported liking the high-tech option, but the device used was too expensive to sustain (Mechling & Seid, 2011). Van Laarhoven et al. (2010) found that although staff reported better results with videos, they preferred static materials because they were easier to create. Regardless of student and teacher preference, both static schedules and VM were effective in increasing the desired behavior of students with disabilities. Student and teacher preference, availability, and cost should be taken into account when deciding between low-tech and high-tech options.
In conclusion, VAS are a viable strategy that allows a lot of flexibility in form and function and has been shown to be highly effective for individuals across a wide spectrum of ability levels and ages. Careful considerations need to be made when selecting the type of VAS to use as well as instruction for teaching the targeted skill using VAS. Following best practices and implementing these careful considerations, VAS is a durable option for students with autism and intellectual disability.

References


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