Foundations of Autism Spectrum Disorders: An Online Course

Session 6
Instructional Strategies and Learning Environments

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Upon completion of Session 6, participants will:

1. discuss core behavioral instructional strategies that can be used to facilitate learning and development of learners with ASD.
2. identify and describe strategies for promoting communication and problem solving in learners with ASD.
3. describe three strategies for optimizing learning environments.
4. describe three types of visual schedules and strategies for individualizing schedules to meet developmental needs.
5. describe the purposes of visual work/activity systems and strategies for individualizing systems based on developmental needs.

Although a primary mission of the National Professional Development Center on Autism Spectrum Disorders is to promote the use of evidence-based practices (EBP) for infants, toddlers, children and adolescents with ASD, it is helpful for team members to have expertise in instructional strategies that are used across EBP. In addition, the learning environments in which EBP are implemented can be optimized to further support the learning and development of infants, toddlers, children and adolescents with ASD and to make the implementation of EBP more efficient. For that reason, Session 6 includes information about instructional strategies and optimizing learning environments.

Core Instructional Strategies

In the early 1960s and 1970s, educators and researchers began to apply the principles of learning theory (Skinner, 1974) to increase, decrease, or maintain the occurrence of specific behaviors in individuals with disabilities, including learners with ASD (Alberto & Troutman, 1999). These fundamental behavioral instructional procedures continue to provide the foundation for teaching skills and decreasing behaviors that interfere with learning and optimal development. Behavioral procedures can be used in isolation during daily activities (incidental teaching) throughout the day or during planned instructional activities. These evidence-based procedures can be used with learners with varying developmental levels and in a variety of situations (e.g., home, school, community) and include prompting, graduated guidance, time delay, increasing assistance, chaining, shaping, reinforcement, and extinction.

Prompting

Prompting procedures are used to help another person learn and use new skills. Typically, adults provide prompts before or as a learner attempts a new skill. Although a variety of prompting procedures can be used to support learning, all of them have two common elements: (1) procedures are used to help the individual with ASD learn a new skill and (2) prompts are systematically removed as the learner learns the skill (Wolery, 1994). Research indicates that prompting strategies are highly effective in teaching new skills to learners with disabilities including those with ASD (Demchack & Koury, 1990; Wolery, Doyle, Ault, & Gast, 1992). The following five categories are the most commonly used prompting procedures:

- *Verbal prompts*: Statements made by team members that help learners acquire a specific skill (e.g., "Put the red circle in the box."). Consider the extent to which children/youth understand verbal instructions when using this strategy.
- *Gestural prompts*: Movements made by team members to cue learners to use a skill or behavior (e.g., team member points to the puzzle pieces that fit together)
- *Model prompts*: Performing the behavior that the learner is learning to do
- *Physical prompts*: Touching learners to help them engage in the target behavior (e.g., guiding learner's hand to take the pencil from a peer)
- *Visual prompts*: Using visual, or written, cues of a specific event or activity to provide information about how to complete certain actions or sequence of actions (e.g., picture schedule)

These prompting procedures often are used with other instructional procedures such as graduated guidance and time delay to teach new skills. Prompts are gradually withdrawn, or faded as learners with ASD become more proficient at using the target skill and as they begin using the skill more independently, during different activities, and with a variety of adults and peers (Wolery, 1994).

Graduated Guidance

Graduated guidance is used to fade physical prompts. For example, a team member provides the most help needed to complete a task and then gradually reduces assistance as learners become more proficient with the task. This can be accomplished by using spatial fading (i.e., focus of guidance is moved) or a shadowing procedure in which the team member's hand does not touch the learner, but instead follows his movement as he uses the behavior (Alberto & Troutman, 1999).

Time Delay

Time delay also is used to fade the use of prompts; however, it differs from other fading techniques because the form of the prompt does not change. For instance, a team member would wait for the learner to use the behavior before providing a prompt. Delays typically are only a few seconds and can be either constant (delay remains the same length) or progressive (delay before the prompt becomes longer as the learner

becomes more proficient). Time delay can be used with a variety of prompting techniques to support learners' acquisition of skills (Alberto & Troutman, 1999).

Increasing Assistance

The procedure of increasing assistance is sometimes referred to as the system of least prompts or least-to-most prompts. With this technique, a team member provides a stimulus, waits for the learner to respond, then – if the learner does not respond – provides the least intrusive prompt. If the learner still does not respond, a more intrusive prompt is given. For example, at snack time a team member who is holding the pitcher of milk (the stimulus) might first use an expectant look when a verbal child with ASD pushes his cup towards her, rather than immediately filling his cup. If the child does not say "milk," the team member might say, "What do you want?" If the child still does not respond, the team member can then say, "Milk, please." Increasing assistance can be used in combination with a variety of prompting techniques.

Chaining

Chaining is a teaching technique that consists of breaking down a task into small steps and then teaching each specific step within the sequence itself. This technique is helpful when learners need to learn a routine or vocational task that is repetitive. For example, a learner might need to learn all of the steps that are needed to put on a coat. A task analysis often is conducted to identify the steps that are needed to complete a specific task as well as the skills the learner with ASD already possesses. Reinforcement is provided when the learner completes each step of the task successfully (Alberto & Troutman, 1999).

> More information about **chaining** can be found on the Interactive Collaborative Autism Network (ICAN) website at:
> http://www.autismnetwork.org/modules/behavior/chaining/index.html

Shaping

Shaping is a procedure that is used to gradually shift an existing response or behavior to a more skilled or desired behavior. The procedure involves teaching a learner to use a desired behavior by reinforcing increasingly close approximations.

> For more information about **shaping**, please view the online module on the ICAN website at
> http://www.autismnetwork.org/modules/behavior/shaping/index.html

Reinforcement

Reinforcement is used to increase, decrease, or maintain a specific behavior. The systematic use of reinforcement can facilitate learning, the use and generalization of skills, and independence (Henry & Myles, 2007; Wolery, 1994). Positive reinforcement refers to the practice of providing a positive response to a learner's used of a desired behavior. This response increases the probability that individuals will use the behavior again. A wide variety of positive reinforcers can be used, ranging from praise to providing a desired activity. For example, after completing a math sheet, a learner might be able to use the computer. For toddlers and young children who are acquiring spoken language, a prompt response to a request such as "more swing" reinforces the use of language to control environmental events. It is important to recognize that something that is positively reinforcing to one person may be neutral or even aversive to another. Therefore, individual assessment is required to identify potential reinforcers.

Extinction Procedures

Extinction generally is defined as withholding reinforcement for a previously reinforced behavior in order to reduce its occurrence (Alberto & Troutman, 1999). For a challenging behavior that has been maintained by attention, for example, a common extinction procedure is to ignore the challenging behavior. Thus a learner, Phil, who shouts out during instruction – a behavior that typically has led to an annoyed team member asking him to be quiet while showing him what to do – may be ignored when he starts to shout. Withholding of a previously received reinforcer often leads to an escalation in the challenging behavior before it begins to decrease; this is called an "extinction burst."

When extinction procedures are used, it is common to also identify and promote alternative, desirable behaviors, and to reinforce those behaviors. Phil's team member might tape a written reminder on his desk, "Raise your hand when you have a question," ignore him when he shouts out (extinction), and respond quickly when he raises his hand (differential reinforcement).

Visual Prompts

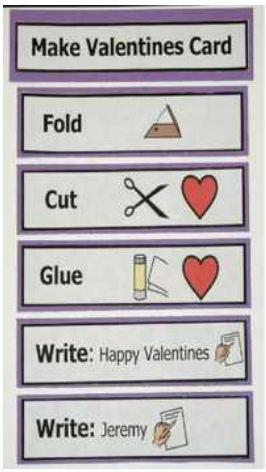
As noted, prompting is a core behavioral teaching strategy. Visual prompting strategies build on relative strengths in visual processing that are observed in many individuals with ASD. Because visual prompts have been found to be helpful for individuals with ASD, they deserve special attention. Visual prompts can be divided into three categories: visual instructions, visual organization, and visual clarity (Schopler, Mesibox, & Hearsey, 1995; Mesibov et al., 2005). It is important to consider the learner's comprehension of visual symbols prior to implementation. In particular, young toddlers may not have yet developed an understanding of the meaning of two dimensional pictures or photographs.

*Visual instructions. V*isual instructions provide information about how to do a task. Sometimes the materials used in a task can be used to show what is to be done. For example, a "product sample" could be placed on the table to show learners what the final product should look like, as illustrated in the pictures below. With learners for whom

pictures are meaningful, photographs or line drawings can provide visual information about the final product.

There are many ways to provide step-by-step instructions. A visual template, or jig, can indicate where pieces are to be placed and the sequencing of the task. Learners place items in or on the template, in appropriately shaped cut-outs or on top of pictures or words that show where items are to be placed. Then they follow a sequence to complete the task, usually in a left-to-right or top-to-bottom sequence. The picture below provides an example of a visual template.

For a reader, written step-by-step instructions can be given, perhaps in an outline or checklist form, as shown in the boxes below. One is for a beginning reader, who is to make a Valentine. Pictures were used as well as words, to support understanding. The learner completes the first step, turns over the strip of paper on which it is written, and moves to the next step.


Make Valentines Card
Fold
Cut
Glue
Write: Happy Valentines
Write: Jeremy

The second example is for an elementary school learner who is a strong student. He is to write a paragraph on the computer, following the written instructions. He can check off each step as he completes it.

You are going to write a four paragraph paper about your trip to California. It will take 4 days. Today, you will write one paragraph.

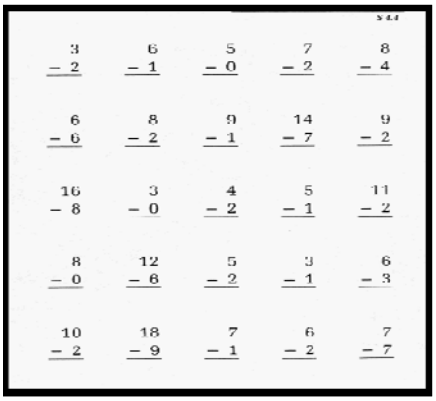
1. Take this instruction sheet to the computer desk
2. Open Microsoft Word
3. Put your title at the top of the page. Center and underline it.
4. Hit 'Enter" and left align the rest of your text
5. Answer these questions: Where did you go? Who went? How did you get there?
6. Save your document by clicking on the disk icon
   - When the 'save' window opens, look for 'save in' and click on the blue down arrow
   - Select the folder that says 'Joey's Work'
   - Select 'Save'
7. Put this sheet in your "Finished Work" folder

Visual organization. Visual organization refers to setting up and organizing work materials and tasks, making it visually apparent how they are organized, and facilitating an organized approach to work. By organizing materials, distractions are also reduced. For tasks with multiple parts, this may include stabilizing and organizing materials so that they are easy to see and reach. Thus, items are not likely to roll off the table, be hidden under other materials, or be a temptation to sift through. At times, it may be helpful to put items in containers such as trays, boxes, and file folders to assist with visual organization and to attach/secure some components of the task using fasteners such as paper clips, tape, and Velcro, as shown in the pictures below.

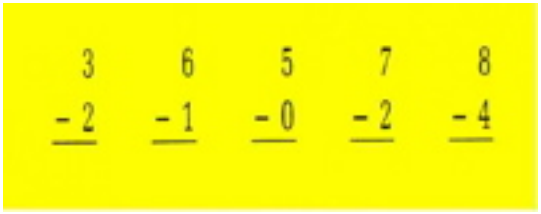
In a learner's notebook, pens and pencils can be kept in a clear zipped pouch that clips into the notebook, so that they are easy to find. On a younger child's desk, a container at the top of the table could hold pencils, markers, and erasers.

Visual cues also can be used to divide tasks into more manageable pieces, making it easier to tackle a large task. For example, a floor to be vacuumed could be divided into sectors using tape, or the twenty problems on a worksheet could be cut out and taped

onto five separate pages. Reducing the number of materials or items can also make the total task less overwhelming and less confusing. Using the example of a math worksheet, some learners might complete all 25 problems on the single page, but others might be overwhelmed and would benefit from having subsets of the problems presented on multiple pages, as shown in the following figures.



3 − 2	6 − 1	5 − 0	7 − 2	8 − 4
6 − 6	8 − 2	9 − 1	14 − 7	9 − 2
16 − 8	3 − 0	4 − 2	5 − 1	11 − 2
8 − 0	12 − 6	5 − 2	3 − 1	6 − 3
10 − 2	18 − 9	7 − 1	6 − 2	7 − 7



3 − 2	6 − 1	5 − 0	7 − 2	8 − 4

Visual clarity. Visual clarity is used to draw attention to the most relevant information. As we know, individuals with ASD often have difficulty identifying the features of a situation or a task that are important. Various means of highlighting important components can be used, such as using large, colorful materials, adding visual emphasis to parts of tasks, and making things to be cleaned more "dirty." To illustrate, notice the highlighting added to the list that follows, and the large colored circles surrounding the holes in the adapted "pegboard" below. Puzzles with full illustrations under the pieces can help toddlers match the pieces to the appropriate place on the board.

DUSTING THE LIVING ROOM

_____ **Take items off table beside couch. Put on PURPLE TOWEL**
_____ **Spray polish**
_____ **Wipe table beside couch with YELLOW RAG**
_____ **Put items back on table beside couch**

_____ **Take items off television table. Put on PURPLE TOWEL**
_____ **Spray polish**
_____ **Wipe television table with YELLOW RAG**
_____ **Spray television screen with WINDOW CLEANER**
_____ **Wipe with paper towel**
_____ **Put items back on television table**

Strategies for Promoting Communication and Problem Solving

In addition to core instructional strategies, team members can use additional strategies to promote communication and problem solving in individuals with ASD. Seven of these strategies are forgetfulness, novelty, visible but unreachable, violation of expectations, piece by piece, assistance, and interruption.

Forgetfulness

Forgetfulness often is used to encourage action, communication, and problem-solving by learners. With this strategy, team members may implement an activity without the materials to complete the tasks involved. For example, preschool children may sit down for a painting activity, but without the paint. Alternatively, a team member might sit down with a group of third graders to play a board game, but not provide the pieces. These types of interactions require learners to recognize the missing materials and communicate this information by asking questions, searching for the materials, or engaging in other appropriate interactions (Bricker, Pretti-Frontczak, & McComas, 1998).

Novelty

Novelty involves introducing new toys, materials, or activities into the daily routine. With learners with ASD, this strategy may be more effective if the novel item is introduced during a familiar routine or activity (Bricker, et al., 1998). For infants and toddlers, storing known items, bringing in new toys and cycling between toys may help to engage child attention as well as build a list of reinforcers. For example, props could be introduced during a familiar song at circle time in an early childhood classroom. With older learners, new peers could be included in a peer support network activity to help the learner with ASD use social skills with other people.

Visible but Unreachable

This strategy usually requires minimal environmental manipulation. With this environmental arrangement strategy, familiar or favorite objects are placed within the learner's sight, but out of reach. A peer or adult always should be available to get the object or activity for the learner. Modifying the environment in this way facilitates the development of social, communication, and problem-solving skills. The visible but unreachable strategy is particularly useful with learners who are just learning to communicate (Bricker, et al., 1998; Duchan & Weitzer-Lin, 1987).

Violation of Expectations

This strategy involves changing or leaving out a familiar step in a well-practiced routine or activity. For example, the team member may try to paint using a cotton swab, or the speech language pathologist may begin writing with scissors during a literacy activity. A mother may start to put a fresh diaper on a toddler without first taking off the child's pants; this kind of silliness may engage the child and encourage communication. The purpose of this strategy is to increase learners' discrimination and memory abilities and to promote communicative and problem-solving responses (Bricker et al., 1998).

Piece by Piece

Piece by piece is a strategy in which the team member or other team member withholds access to all of the pieces of a toy, activity, or food so that the learner with ASD must request materials one at a time. For example, the team member could hold back most of the pieces of a puzzle or Legos. This strategy is best used with activities or toys that

require a lot of pieces. However, it is important to remember that the flow of the activity may be disrupted if too many pieces are withheld (Bricker et al., 1998).

Assistance

Assistance is a strategy that can be used to increase adaptive, fine motor, gross motor, and communication skills. With this approach, children and youth with ASD take part in activities that require peer or adult assistance. For example, a team member could put the lid of the bubble jar very tight so that the learner with ASD will require assistance. With older learners, the team member could place pencils in a container that will require help from another individual to open. Once the learner with ASD retrieves the object inside the container, he can practice fine motor skills by writing (Bricker et al., 1998).

Interruption

This strategy involves the team member or other team member interrupting the child during a chain of behaviors. For instance, if the child is going to wash hands before lunch, the team member could stop him before he grabs the soap and say, “What do you want?” The child needs to communicate what he wants before continuing in the activity (Bricker et al., 1998; Goetz, Gee, & Sailor, 1985).

Learning Environment

To maximize understanding, learning, and performance, the organization of physical learning environments, the activities that will occur within learning environments, and the tasks that will be completed must be considered. In the following sections, we will describe three strategies that can be used to optimize learning environments (1) environmental organization, (2) visual schedules, and (3) visual work/activity systems.

Environmental Organization

Learners with ASD often have difficulty attending to what is important, attributing meaning to activities and events, processing spoken language, and staying organized. They are frequently distracted or disturbed by sensory input because of differences in processing sensory information. By providing information visually, managing distractions, and providing organizational support, the physical environment can promote enhanced learning and performance, and can help reduce anxiety. The type of environmental organization used and extent to which it is needed varies among individuals and settings.

Visual information within a room can provide advance organizers for the activities that are to happen in each space. In a home, for example, an area that has the couch and television is where the family sits and watches TV. In learning environments, visually defined spaces can be used for different activities to help learners with ASD understand what they should be doing in each area (Schopler, Mesibov, & Hearsey, 1995). To enhance this understanding, bookshelves, large pieces of furniture, room dividers, and carefully placed rugs or carpets can be used to accentuate the activities that will occur

in that area. Importantly, they can also help reduce distractions and over-stimulation by limiting noise and blocking lines of vision.

Specific visually defined spaces should be based both on the curriculum and on individual needs that will vary by grade and developmental levels. For younger children and more concrete learners, expectations about different types of “desk work” can be made visually clear by having a specific desk for independent activities, another table or desk for team member-child activities, and yet another for group activities with peers. As learners experience how the different tables are used over time, they will learn to predict the types of activities that occur there (Mesibov et al., 2005). In a home environment for young children, visual clarity could be heightened by always changing diapers in one place, nursing and feeding in another area and so on. Familiar activities in consistent locations may reduce anxiety in individuals with ASD and thus facilitate learning and performance.

Need for individualization. The degree of physical structure provided can be reduced as a learner’s level of understanding and ability to work increases, but the need for physical structure should be continually assessed for each learner. For example, a learner who is included in an elementary school class and who can become distracted by other learners’ movements and chatter may find it helpful to have a specific place to sit and work independently. For this learner, a “study carrel” in a location that minimizes visual and auditory input could be beneficial (e.g., facing a wall or a window with the blinds drawn, perhaps with a bookcase on one or both sides).

Safe havens or home base. An area that should be established for most individuals with ASD is a quiet area, sometimes referred to as a safe haven or home based--a place to where individuals with ASD can go to calm down or relax when stimulation or anxiety levels get too high. Initially, going to this area is initiated by the team member or parent, but over time individuals with ASD should be taught to recognize when they need some quiet time, and to request its use. The quiet place should have a comfortable sitting area and quiet, calming activities that have been chosen for that person. It could be in an infant’s nursery, a tent set up in a playroom, a corner of the classroom, in an area near the class, or even, for older learners, in another part of the building.

Well-organized learning materials. By having visually clear locations for materials, and by having materials that will be used for activities located in, or close to, spaces in which they will be used, learners will be better able to complete activities as independently as possible. Visual labels or other indications of where materials belong are helpful, and should be at the appropriate developmental level. Some individuals understand written words, some prefer color-coding, others will understand photographs better, and some will need object labels (Mesibov et al., 2005).

Importance of Visual Supports

Recognition that children with ASD learn and make progress in structured learning settings has been documented since the 1970s (Rutter & Bartak, 1973; Schopler,

Brehm, Kinsbourne, & Reichler, 1971). Structure is often provided to individuals with ASD through visual supports, including visual prompting that was discussed as a core behavioral instructional strategy. Visual supports have been used successfully to teach tasks to individuals with developmental disabilities, including ASD, and to facilitate generalization and independence (see reviews by Dettmer, Simpson, Myles, & Ganz, 2000; Mesibov, Shea, & Schopler, 2005). As noted earlier, visual instructional strategies are particularly valuable due to the relative strength in visual processing observed in many individuals with ASD. Visual supports can enhance organization, understanding, and independence across the lifespan. Visually structured supports have been found to be effective in helping learners with ASD understand (1) activities that will take place, (2) when the activities will occur, and (3) the order of the activities (Bryan & Gast, 2000; Dettmer et al., 2000; Ganz, 2007; Mesibov et al., 2005; Ozonoff & Cathcart, 1998; Van Bourgondien, Reichle, & Schopler, 2003).

Visual supports can be used in a variety of settings to help children with ASD learn and practice new skills. Visual supports should be individualized and changed as an individual's skills and needs develop. Visual supports also should be individualized to meet the demands of the particular setting or activity (Ganz, 2007) and can and should be used in many contexts.

In the next section, two specific types of visual supports are presented as strategies for optimizing learning environments. They include:

- visual and written schedules to identify the major activities that will occur, in sequential order, and
- visual work/activity systems to display and organize tasks that are to be completed within a block of time.

Visual Schedules

Schedules are constantly used in educational and work settings. For example, many busy adults use daily calendars to stay organized. These calendars may be carried around in the form of little (or big) books, kept on their desks, or accessed with electronic devices (e.g., cell phones). For learners with ASD, schedules serve an important organizational role and assist with difficulties with sequential memory and the understanding of time. Schedules also can be used as a visual way to give instructions about what is and will be happening. This mode of communication is often easier for an individual with ASD to understand and process. Learning the routine of using one's schedule to guide what is to be done next also facilitates transitions and coping with changes. By providing clear information about what will be happening and when, schedule use often leads to decreased anxiety. Motivation to work or to complete less favored activities can be improved by the knowledge that a more enjoyable activity follows. Finally, an added benefit is that as children and youth learn to use schedules, their ability to function independently improves (Dettmer et al., 2000; Earles-Vollrath, Cook, & Ganz, 2006; Ganz, 2007; Hodgdon, 1995; Massey & Wheeler, 2000; Mesibov et al., 2005).

When developing schedules, developmental level must be considered. This is as important in a home or inclusive setting where the daily schedule can change from one day to the next as it is in special education classes. Visual schedules can include objects, pictures, and/or written instructions. A key point about schedules is that they must be designed at the level that individuals can understand, especially when they are upset and not necessarily processing information well. For many, a picture-word combination, rather than a written schedule, may be most beneficial. For others, objects may be the best choice. A brief discussion of object, pictures, and written schedules follows.

For a child who is a concrete learner who has never used a schedule, an *object schedule* is likely to be most successful. Initially, the team member or parent would use objects that clearly indicate what will be happening next, and indicate only one step (the next one) at a time. The following photograph shows some of the objects used for one preschool learner's schedule:

Object Schedule

Lunch box = lunch
Bicycle helmet = ride bike
Back pack = go home
Water bottle = get drink
Keys = play area
Juice can = snack
Toilet paper roll = bathroom
Plastic tub = art table
Bead = work with team member
Ring = work table

When it is time to go to snack, this child would be handed the juice can and guided to the snack table. When it is time to work at the table, he would be handed the ring and guided to the table which has the ring stack on it (see picture below), where he would put the ring on the ring stack and then continue with work activities at the table. To let him know it is time to go the bathroom, he would be given the small roll of toilet paper, which he would take to the bathroom and place in a container attached to a matching roll of paper (see picture below). Once the child learns the routine of taking the object and going with it to the correct location, two objects can be laid out sequentially in a place that is used as that child's "transition area," to show him what he will do first and what will come next. Gradually, the number of objects can be increased.

For children who understand what a photograph of an object or place represents, a *picture schedule* might be used. Instead of using a cup to indicate that it is time to go to snack, a learner could be given a photograph of the cup. He would learn to take that photograph over to the snack table, put the photograph in an envelope or other container that has a matching photograph of the cup on it, and sit down. When he has learned how to use a photograph to make a transition, a schedule with two or more pictures on it – placed sequentially, left-to-right or top-to-bottom – can be made for him to use. This is shown in the next two photographs.

Another learner who understands a further level of abstraction could have line drawings on her schedule cards, instead of photographs. Words should be paired with symbols for learners beginning to read, those that have particular interest in words or to simply support literacy, if the words do not distract the child from the meaning of the picture or photograph.

A picture schedule, using line drawings, organized top to bottom, for part of a day (starting with lunch)

A top-to-bottom schedule using line drawings and words

The number of pictures on the schedule should be individually determined. Some children may have only one or two pictures at a time; others may be ready for a half day or even a full day of pictures at a time. The location of the schedule is also individually determined, based on the child's understanding and skills, as well as the needs of the classroom. Schedules can be hung, for example, in a specific location in the classroom, or kept on the learner's desk, or they can be portable.

Regardless of the length and location of his schedule, each child must be taught how to check the schedule when instructed to do so, and how to interact with it. The preceding examples described children who took the next picture off their schedules, carried them to the correct area, and placed the pictures in containers. For many children with ASD, it is very helpful to hold and carry a card with a picture and/or word to the next activity –

it helps them remember where they are going and to stay focused on the routine of taking the card and placing it in its container. This process also makes it clear which activity on the schedule is next, because the preceding activities' cards are no longer physically on the schedule. Other children may not need to take the picture with them; to keep track of what they have done and what is next, they might do well with turning each picture over, or putting it in an envelope attached to the schedule.

The children using these picture schedule examples took the next pictures off their schedules, carried them to the correct area, and placed the pictures in containers. This illustrates that it may be helpful for some children with ASD to hold and carry a card with a picture and/or word to the next activity. This action can help them remember where they are going and stay focused on the routine. This process also clearly identifies the next activity on the schedule because the preceding activities' cards are no longer physically on the schedule.

Written schedules. Written schedules, for individuals who read well, also can vary in the number of activities represented at once, and can include other types of information. A high school learner, for example, might find it helpful to have his classes listed and also to have the times they start, the room numbers, and the team members' names. His individualized written schedule (below) includes times he should take a bathroom break and when he should go to his locker. His schedule would be carried with him – probably inside his notebook – and he'd check off or cross out each activity when it is over and he is about to move on to the next thing on his schedule.

Time	Class	Teacher	Room
□ 7:50	(Go to locker)		
□ 7:55 - 8:05	Homeroom	Restani	201
□ 8:10 - 9:00	Math	Wilson	103
□ 9:05 - 9:55	Science	Parkins	224
□ 9:55	(Use restroom if needed)		
□10:00 -10:50	History	Hall	124
□10:55 -11:45	PE	Chandler	Gym
□11:50 -12:20	Lunch	Restani	201
□12:20 - 2:00	LA	Munson	116
□ 2:00 - 2:50	German	Restani	201
□ 2:50	(Get BOOKS from LOCKER)		

When this learner was in first grade, however, he might have used a written schedule that was posted on the wall, with each activity written on a card that he carried to the next location. His next step might have been to have a written schedule that was kept on his desk, with a box drawn beside each item on the schedule; each time he went to the schedule, he would place an X in the box of the activity he had just finished and then read and go to or start the activity listed next.

Continuing benefits of visual schedules. Visual schedules will change as learners develop. Continuing to use an individual schedule will assist children and youth when there are changes in the typical routine (e.g., assembly, fire drill, field trip). Perhaps even more important is the long-term benefit of building the routine of schedule use. As learners get older, they will transition to different and more complex school and work environments. Children and youth with ASD may benefit greatly from using schedules in these settings. By maintaining the routine of using a schedule, children's ability to understand and negotiate major transitions and more complex environments will be enhanced. Similarly, work/activity systems might remain powerful tools throughout life, though the means in which they are employed will evolve.

Visual Work/Activity Systems

Visual work/activity systems are another type of visual support that can be used when teaching and working with children and youth with ASD. These systems can be thought of as a type of "to do" list, providing visual information about what is to be done during a specific block of time. As with visual schedules, work or activity systems are individualized according to each child's developmental level, as well as the demands of the intervention setting. Work and activity systems can be used in both self-contained and inclusive classrooms, as well as at home and in the community (Bryan & Gast, 2000; Dauphon, Kinney, & Stromer, 2006; Dettmer et al, 2000; Massey & Wheeler, 2000; Stromer, Kimball, & Kinney, 2006).

Work/activity systems should provide visual information to the learner about what is to be done, answering the following four questions:

1. What tasks or activities is the individual supposed to do?
2. How much work or how many tasks are to be completed?
3. How will it be clear when the work is finished?
4. What happens next after the work is completed? (Mesibov et al., 2005)

To illustrate the concept of the work system, it is helpful to start with an example of a learner in an inclusive classroom, Greg, who uses a checklist to guide his activities in math class. In this example, the checklist is the work system. Note that the checklist provides information that relates to each of the four questions.

Greg's Written Checklist

_____ 1. Turn your homework in
_____ 2. Do problems 3-5 on p. 6 of your math book
_____ 3. Listen and take notes on the teacher's discussion of today's topic
_____ 4. Read page 7 of the math book
_____ 5. Do problems 1-2 on p. 8 of the math book
_____ 6. Read your story book until class is over

Effective work systems decrease anxiety by providing information. They visually organize materials, tasks, and work activities, and promote independent functioning. When they are used to take tasks into new settings or to work on variations in tasks, work/activity systems are also a tool for working on generalization. They can be used in all contexts, including home, academic work, leisure activities, physical education, domestic chores, community activities, and in vocational settings.

As is the case with visual schedules, learners must be taught how to use their work system and practice its use before they will be able to use it on their own. A work/activity system provides information and organization about what is to be done. The following example illustrates a visual work system that has been set up for a concrete learner.

The next illustration is a work system developed to support a teenager who is learning to clean his bedroom independently. Paul is able to dust, clean a mirror, and make his bed, but he has needed to be prompted to start his activity. The work or activity system

Work System for Independent Task Completion

For Paul, his work system for completing this series of tasks might consists of three bins holding items to be used, as in the following picture, and a card with three numbers on it and a "check schedule" card. Paul has learned to take the top number on the card (1), match it to the bin with the same number, putting the number in the matching envelope, and then do the task that is in that bin (in this case, the sheets for making his bed). When he completes making the bed, he takes the next number (2), matches it to the #2 bin, and takes the materials in it to clean the mirror. After he completes this sequence for #3 (dusting), he takes the bottom "check schedule" card, and goes to his schedule to learn about his next activity.

was set up to guide and motivate him to complete a sequence of three tasks on his own.

A Work System for Anne

Anne is a learner who understands what she is to do when it is presented to her very concretely, so her work has been organized on a table to her left. Each activity is in a container so that she will have everything she needs to stay organized. The information requested by the four questions, above, is visible to her. She knows (1) what she is to do and
(2) how much she is to do by looking at the materials on the table. She has learned the routine of taking the first container, doing the task in it, and then putting the completed task in the basket on her right. (The team member can check the work for accuracy later on.) She then takes the next container. (3) When all the containers have been moved from the table on the left, she knows her work is finished. The information for the last question – (4) what happens next? – has been provided as well. When her team member set the work system up, he also put on the table, in the small plastic container at the end of the sequence of tasks, the object that shows her what she will be doing when she completes the work. This might be the headphones she uses to listen to music in the leisure area of the classroom. In addition to providing information, having the headphones visible gives some additional incentive for doing the work.

Summary

Before team members select and implement EBP to achieve the goals and objectives on learners' IEPs, it will be helpful for them to be able to use the instructional strategies described in this session to teach foundational skills and to decrease challenging behaviors. In addition, by using environmental organization, visual schedules, and visual activity/work systems, team members can optimize learning environments to make the implementation of EBP more efficient.

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