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## KEEPING TRACK

Using  
Routine-Based  
Instruction  
and Monitoring

**M**r. Bing is sitting at the Art Center in the middle of a circular table surrounded by seven four-year-olds. He tells the children they are going to make fire trucks like the one they read about in their story. He holds up a completed fire truck made from a toilet paper roll and colored construction paper. He says, "My fire truck looks like this. You can make yours look any way you want. Fire trucks carry all the equipment that firefighters need to put out fires. Some trucks are red, some are yellow, and I've seen green ones, too." He shows the children four containers with various materials they can use to create their fire trucks (e.g., different colored construction paper, buttons, markers, felt, toilet paper rolls). Most of the children excitedly grab materials. Daven watches a boy across the table grab two buttons. Kendon reaches for a red marker and begins to color Seth's toilet paper roll while ignoring his own. Seth absently picks at a glue bottle

on the table, occasionally glancing at the girl seated next to him. Raylon snatches Mr. Bing's fire truck when he is helping another child and attempts to pull the ladders off.

Young children acquire new skills in many ways. Recommended practices indicate that children with disabilities learn best when they are actively engaged in an activity, when skills are taught using the materials and activities to which the children are attending, and when teaching occurs in the environment where children need the skills (Bredenkamp & Copple, 1997; Sandall, McLean, & Smith, 2000). Although educators know how young children learn, it can still be challenging to create appropriate opportunities for learning and to keep track of how children are progressing.

Monitoring is essential for documenting changes in children over time and in determining the appropriateness of interventions (Wolery, 2000). Yet, teachers always seem to have reasons to avoid monitoring their teaching

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efforts and children's progress. This article reviews routine-based teaching and monitoring and offers guidelines for using these strategies for tracking individual children's progress.

### Planning Routine-Based Instruction and Monitoring

In the opening vignette, Seth, Raylon, Daven, and Kendon attend a community daycare center. They each have developmental disabilities. Their teacher, Mr. Bing, knows that he may need to plan for and provide some additional interventions for these boys to ensure that his class activities are meaningful and support their learning and development. To accomplish this, Mr. Bing uses routine-based teaching. Routine-based instruction (similar to activity-based instruction in the literature) involves utilizing already occurring events and activities (e.g., arrival, circle times, snack, centers, small group activities, toileting, departure) to teach skill acquisition (Bricker, Pretti-Frontczak, & McComas, 1998; Gargiulo & Kilgo, 2000; Rule, Utley, Qian, & Eastmond, 1999). Teachers engineer the physical space and activities to require a

high level of engagement, encourage and support interactions, and minimize "wait time" (Wolery, 2000).

In routine-based instruction, the teaching of individual objectives is embedded into familiar routines (Pretti-Frontczak & Bricker, 2001). That means that individualized child objectives are taught through teacher-child and child-child interactions that occur in familiar routine events, such as circle time and snack. Teachers adjust activities to accommodate the diverse developmental levels and individual learning needs of the children in their program in a way that is meaningful to the activities and to the children participating in the activities. Simply stated, teachers make an activity fit a child, not the child fit an activity. By embedding individual instruction into routine events, and distributing the teaching of those skills across the scheduled day, children with disabilities in inclusive programs can be taught during the same activities as their classmates, eliminating the need for one-on-one sessions. Additionally, these children are taught skills they need to learn as the skills are needed or related to their play within tasks that already have their attention (Wolery, 2001).

Although embedding individualized instruction into routines is the backbone of routine-based instruction, and it is a commonly recognized practice, some research reveals that teachers may not automatically do this in their interactions with children (Horn, Lieber, Li, Sandall, & Schwartz, 2000).

In fact, Pretti-Frontczak and Bricker (2001) found that although teachers reported they were using embedding to teach individual objectives, less than 10% of the teachers observed actually taught targeted objectives during their classroom routines. Perhaps one reason for the low rate of target teaching or embedding in the observed teachers was the absence of systematic methods for keeping track of children's individual skills. Without such a system, teachers can easily overlook many teaching/learning opportunities (Horn, Lieber, Sandall, & Schwartz, 2001).

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## Routine-Based Monitoring and Data Collection

To make routine-based instruction work, teachers need to engage in a good deal of planning. One planning aid is an Individual Activity-Objective Matrix (Horn et al., 2001). This matrix lists a child's targeted objectives and identifies how a teacher will adjust to teach that child a skill or behavior he needs to learn. At first glance, Mr. Bing's art activity may appear to be unraveling. But Mr. Bing planned ahead by developing an Individual Activity-Objective Matrix for each of the four boys with special needs in his class. Because of this, Mr. Bing does not rely on "on-the-spot" decisions about how to engage the boys or what he should be teaching them.

Figure 1 shows Mr. Bing's Individual Activity-Objective Matrix for Seth. As the other children began making their fire trucks, Mr. Bing used Seth's interest in the glue bottle and prompts him to take the bottle to Daven at the other end of the table (see Figure 1, Art Center activity, Gross Motor skill). After Seth returns, he shows Seth a piece of the red construction paper as he hides it in the scissors box with a lid. He asks, "Where's your paper?" prompting Seth to look for his needed supplies.

Another planning aid teachers can use to organize children's targeted skills or behaviors is a Group-Objective Matrix. A Group-Objective Matrix is a

single-page table that identifies targeted skills and behaviors, by domain, for each child with special needs (Raver, 1991; 1999). Unlike the Individual Activity-Objective Matrix, a Group-Objective Matrix indicates the skills or behaviors for each child for which an opportunity needs to be created across activities and routine events. Figure 2 (see p. 16) shows Mr. Bing's Group-Objective Matrix for Seth, Raylon, Daven, and Kendon. Since a Group-Objective Matrix is not aligned with a particular routine or activity, it encourages teachers to teach objectives within planned, as well as unplanned, activities or routines. For example, by glancing at the Group Objective Matrix, Mr. Bing was "cued" to ask Daven to show him who Stevie was when Stevie left the rest room (Personal/Social objective, Figure 2). If Mr. Bing had not used a Group-Objective Matrix, this teaching/learning opportunity for Daven may have been overlooked.

Both the Individual Activity-Objective Matrix and the Group-Objective Matrix give teachers a quick reference of "what to teach" so that routines can be shaped and adapted to better suit each child's individual needs and skills. Both matrices can be used in inclusive or self-contained settings. To teach individual objectives within routines, teachers need to follow five steps: (1) Identify the skill(s) to be taught; (2) Identify the activities and/or routine events in which the skills will be taught; (3) Distribute the teaching of the skill(s) throughout the day; (4) Determine the way progress will be recorded;

and (5) Establish a regular monitoring system and take data (Horn et al., 2001). Each step will be discussed using the vignette from Mr. Bing's class.

**Step 1: Identify the skill(s) to be taught.**

Drawing from multidisciplinary assessments, criterion/curriculum-based assessment tools, checklists, direct observations, and interviews with family and care-providers, Mr. Bing identified the skills and behaviors each child needed to learn in order to support that child's strengths and to remediate weaknesses. Writing objectives on an Individual Activity-Objective Matrix or a Group-Objective Matrix increases the chances of a teacher structuring opportunities for a child to learn and practice target skills with a variety of materials (Horn et al., 2001).

Objectives need to be written so they represent broad competencies that are more easily woven into ongoing activities. For example, one of Seth's cognitive objectives from a criterion-referenced assessment tool read "locates a ball observed hidden." This objective was restated as "shows organized searching behaviors" to make it more compatible with the Center activities in Mr. Bing's room (see Figures 1 and 2). To teach this objective to Seth, Mr. Bing arranged for Seth to search for his cup at snack time after he had seen it hidden, and search for his socks placed under his mat following rest time (see Figure 1).

Figure 1:  
Individual Activity-Objective Matrix for Seth.

Week of: <u>September 16-20</u>					
<b>Seth</b>	Shows organized search behaviors (Cognitive)	Moves with balance (Gross Motor)	Puts small objects in containers (Fine Motor)	Names peers when requested (Expressive Language)	Points to two objects/pictures when requested (Receptive Language)
Opening Group	Uncovers friend's picture <input type="checkbox"/>	Collects carpet squares, puts on shelf <input type="checkbox"/>	Puts own picture in "boy box" <input type="checkbox"/>	Names Josh/Daven when asked <input type="checkbox"/>	Shows rain cloud and song symbols on calendar <input type="checkbox"/>
Snack	Finds cup hidden under mat <input type="checkbox"/>	Moves chair to table <input type="checkbox"/>	Puts spoon in cup to stir chocolate milk <input type="checkbox"/>	Names Raylon/Sarah when requested <input type="checkbox"/>	Shows grape juice can and picture <input type="checkbox"/>
Art Center	Finds hidden supplies <input type="checkbox"/>	Gives material to friend at end of table <input type="checkbox"/>	Puts materials away in containers for clean-up <input type="checkbox"/>	Names whose "product" teacher is holding <input type="checkbox"/>	Shows two parts of "product" when named <input type="checkbox"/>
Construction Center	Finds marbles hidden in block house <input type="checkbox"/>	Climbs stairs to block shelf to put away blocks <input type="checkbox"/>	Loads small beads in truck <input type="checkbox"/>	Names who is playing next to him <input type="checkbox"/>	Shows two materials/products when requested <input type="checkbox"/>
Rest Time	Finds socks hidden under rest mat <input type="checkbox"/>	Helps stack mats under table <input type="checkbox"/>	Puts small books in small book box after rest <input type="checkbox"/>	Names friend next to him <input type="checkbox"/>	Puts foot on blanket and head on pillow when given direction <input type="checkbox"/>
Story Time/ Closing Group	Uncovers picture from story <input type="checkbox"/>	Does the "Hokey Pokey" to closing song <input type="checkbox"/>	Puts activity symbol on template on calendar <input type="checkbox"/>	Names who made selected "product" that day when shown object <input type="checkbox"/>	Points to two activity cards he participated in that day <input type="checkbox"/>

Figure 2:

**Group-Objective Matrix for Individual Target Objectives.**

Week of: <u>September 16-20</u>							
Student	Gross Motor	Fine Motor	Expressive Language	Receptive Language	Personal/Social	Self-Help	Cognitive
Seth	Uses balance, both feet	Puts small objects in containers	Names peers when requested	Points to two objects/pictures when requested	"Gives" object to friend when requested	Drinks from cup with two hands	Organized search behaviors when object seen hidden
					+GMA		+
Raylon	Uses motor imitation, hands and head	Reaches across midline to grasp objects	Describes two qualities about an object/picture	Shows eyelash and wrist when requested, self/picture	Takes two turns with peer in play	Removes shoes and socks	Solves problems with materials and peers
			- M + I				
Daven	Balances three seconds with support	Takes small objects out of containers	Vocalizes/indicates needs when requested /m/ /d/	Shows "big" objects when requested	Points to friend when requested	Drinks from cup (no lid), little assistance	Puts two pieces in single insert puzzle
Kendon	Kicks ball/objects eight feet	Sorts by categories (things we eat, things we play with)	Describes past activities	Points to heavy and light objects/pictures	Uses dramatic play with friend, three minutes	Cleans up (I)	Duplicates four item patterns (paper, beads)

**Legend:**

- GMA = Graduated Manual Assistance
- VA = Verbal Assistance
- M = Model
- I = Independent

**Step 2: Identify the activities and/or routine events in which the skills will be taught.**

Embedding instruction is more likely to occur if teachers identify the activities and routines where each goal/objective can be taught (Horn et al., 2001). The nature of the skill and teacher demands will determine which activities or routines are best for teaching a particular skill (Wolery, 2001). An Individual Activity-Objective Matrix generally focuses on one skill per activity. A Group-Objective Matrix allows teachers to teach multiple skills, across domains, within the same activity or routine. For example, using his Group-Objective Matrix, Mr. Bing was able to teach Seth many skills in the Art Center. In the Cognitive domain, Seth was taught to search for the red marker he watched Mr. Bing hide behind the marker box. In the Personal/Social domain, Seth was taught to give scissors to another child. Mr. Bing named the parts of the fire truck while the children were constructing theirs to encourage Seth's Receptive Language objective. The Group-Objective Matrix focused Mr. Bing's attention on what Seth actually needed to learn, rather than how well he constructed his fire truck.

**Step 3: Distribute the teaching of the skill(s) throughout the day.**

Teachers have to balance carrying out activities and teaching individual objectives (Raver, 1991; 1999).

Distributing instruction throughout the day ensures that sufficient practice occurs (Wolery, 2001). In most cases, just creating the opportunity for learning an objective is not sufficient. In order for routine-based instruction to work, teachers must plan short, intensive instructional sessions within their routines (Horn et al., 2001). To teach individual skills, teachers use naturalistic/incidental teaching strategies, such as focusing on a child's initiations, following a child's lead, interrupting and adapting activities, using language expansion, using a high rate of prompts/cues, using sabotage, and using time-delay to encourage more independent responses (Wolery, 2000).

**Step 4: Determine the way progress will be recorded.**

The Individual Activity-Objective Matrix and the Group-Objective Matrix provide clear listings of each child's objectives, allowing teachers a quick reference for individualizing expectations and prompts. By adding data boxes to each objective (lower right corner of objective boxes in Figures 1 and 2), teachers can also take data on a child's responses to teachers' probes. This naturalistic data reflect a child's performance during ongoing activities when skills are naturally used. It is not as precise as trial-by-trial probes or data taken in one-to-one teaching/testing sessions. However, unlike the latter type of data, naturalistic data evaluate a child's functional use of a skill. For example, when





Seth was able to locate the red marker, he was reinforced (“Yes, Seth, there’s the marker. You found it”). Then, a “cross” was recorded in the Cognitive domain data box on the Group-Objective Matrix (see Figure 2). If Seth had not responded correctly, a dash would have been recorded.

Of course, not all children are able to perform skills they are learning independently. To show improvement in children who learn more slowly or those who need partial or full assistance, the level of support necessary for performing skills or behaviors is noted on the matrices. For example, in Figure 2, “GMA” on Seth’s Personal/Social objective means “graduated manual assistance.” That is, he required some physical assistance to perform the skill. “VA” on the matrices means Seth performed the task/skill when given “verbal assistance,” while “M” means he was able to perform the skill after a model was given. “I” indicates he performed the task independently, without support of the teacher or peer.

In routine-based monitoring, teachers choose toys and objects that motivate a child, and avoid the trap of always requiring a child to respond on command to traditional assessment tasks. This is non-threatening, as children are often unaware they are being assessed (Neisworth & Bagnato, 2000). In this way, teachers are not only monitoring a child’s performance of a skill, but also monitoring whether a child can demonstrate the skill when it is needed.

#### Step 5: Establish a regular monitoring system and take data.

During routine activities, children openly demonstrate their knowledge and skills (Linder, 1993). A child’s response to natural stimuli and his/her generalization of skills to new, unfamiliar activities are the critical concerns of any monitoring teachers conduct. Data need to be taken throughout the day, in planned (e.g., Center activities) as well as unplanned routines (e.g., children putting things in their cubbies during morning arrival). Transitions have been identified as ideal learning opportunities for children (Werts, Wolery, Holcombe, Vassilaros, & Billings, 1992) and also offer a good “context” for data collection.

Generally, it is a good idea to take data at the end of an activity or routine event, to allow at least five minutes between data collection trials, and attempt to evaluate performances when they are most natural to an activity or routine. With data boxes on the matrices, teachers have all the essential information they need in one place. Information may record answers to the following questions:

- What does this child need to learn from the activity?
- What did this child learn?
- What supports/prompts did this child need for success?

Due to the demands placed on teachers in a classroom, most find they are not able-nor is it necessary-to take data every day on every objective. However, teachers must be dedicated to teaching individual objectives daily.

By using the matrices, Mr. Bing was able to monitor Raylon and Seth’s progress. He noticed, for example, that Raylon’s Expressive Language objective was to describe “two qualities about objects/pictures” (see Figure 2). He asked Michael, a typical peer, to describe his fire truck to the group. Michael said, “Red ... it has a ladder. Two of them. Fire trucks have big sirens.”

Mr. Bing then asked Raylon to say two things about Michael’s fire truck. Raylon said, “Red.”

Mr. Bing said, “Yes, the fire truck is red. Tell me something *else* about that fire truck. *Two* things (while holding up two fingers).”

Raylon said, “Little. It little.”

Mr. Bing said, “Yes, Raylon, the fire truck is red *and* little.” Raylon looked at Mr. Bing but did not reply.

Mr. Bing then said, “Raylon, say ‘red’ and ‘little’.” Raylon ran his fire truck across the table, making a siren sound but did not reply. Mr. Bing wrote a “dash” in the Expressive Language data box since Raylon did not perform the task correctly, and an “M” next to it, indicating that Raylon had been given a model.

More than one trial or opportunity can be recorded during an activity. Later during clean-up, Mr. Bing made a similar request. That time Raylon said, “It red ... black (the wheels were black).” This response was recorded on the Group-Objective Matrix (see Figure 2) as a “cross” and an “I” because it was correct and given without supports.

Next, Mr. Bing handed two buttons to Seth while saying, "Please, give these buttons to Michael." Seth did not respond when the request was repeated so Mr. Bing gently moved Seth's hand slightly toward Michael. Seth then gave the buttons to Michael. Mr. Bing wrote a "cross" and "GMA," for graduated manual assistance, in Seth's Personal/Social data box (see Figure 2).

When the Art Center time was finished, Mr. Bing told the children they were going to walk on the balance beam and to get their firefighter hats that were waiting for them on their carpet squares in the Music Corner. By doing this, he gave Seth and Kendon a chance to practice their Gross Motor objectives (see Figure 2), although Mr. Bing was unable to take data on these skills because so many children required help. Teachers, like Mr. Bing, report that placing copies of the matrices strategically around the classroom (e.g., in the Homemaking Corner, Center areas, and snack area) is helpful because they can frequently refer to them without interrupting their ongoing interactions with children.

Opportunities for teaching discrete skills, such as pointing to objects or naming a color, tend to be more easily created and progress more easily recorded than for more nebulously stated objectives, such as "sustain appropriate social interactions with others." By restating this objective to "maintain joint interactions with others, teacher/peer three minutes," a teacher can now efficiently track a child's progress.

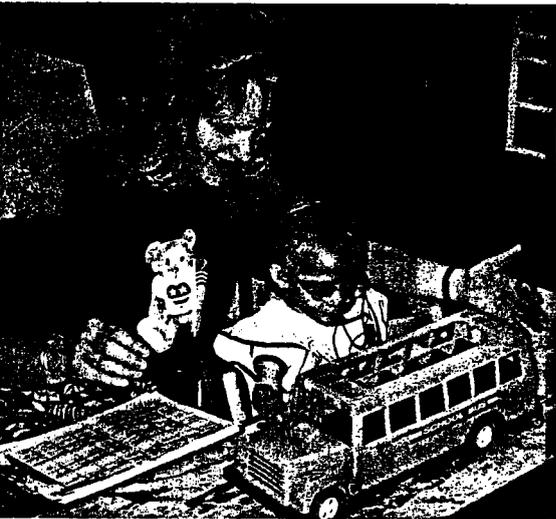
Some critical skills children need to learn may not be found on developmental scales and checklists. Engagement and persistence are not listed on most developmental checklists, but educators universally recognize their importance. Improving engagement can be measured by how long a child stays "appropriately involved" in a task, while persistence can be measured by how many times a child attempts a difficult task.

At the end of the day, data collected on the matrices is transferred to graphs or data sheets/files to give teachers a visual record of each child's performance on targeted objectives. After transfer, data is erased and the matrices are reused the following day. When an objective is mastered, it is erased and a new one is written in its place.

### Summary

Teachers may monitor progress with curriculum/criterion-based tools (McLean, Bailey, & Wolery, 1996), narrative descriptions (e.g., anecdotal records, running records) (Puckett & Black, 2000), work samples/portfolios and/or by using direct observation. Teachers need to select a style and context for monitoring that is compatible, rather than at odds, with the behavior and interests of young children (Neisworth & Bagnato, 2000). When teachers monitor within activities and routine events, they tend to monitor more frequently. Like all worthwhile strategies, routine-based instruction and monitoring require

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practice before most teachers report they are completely comfortable with their use.

To embed targets frequently, teachers need to be organized so they can actively create sufficient "teaching-learning opportunities." Systematically using an Individual Activity-Objective Matrix and/or a Group-Objective Matrix supports the likelihood that opportunities for teaching, practicing, and monitoring are never overlooked.

Monitoring child progress within routines allows teachers to utilize many of the suggested practices identified by Sandall and colleagues (2000) in *DEC Recommended Practices in Early Intervention/Early Childhood Special Education*. First, routine-based monitoring encourages teachers to use materials and procedures that accommodate each child's sensory, physical, communicative, and temperamental differences while showing a child's authentic behaviors (Neisworth & Bagnato, 2000). Second, it permits teachers to assess a child in a setting that is familiar to the child. Third, it allows teachers to assess the mastery of skills under natural conditions. Fourth, it allows teachers to systematically

evaluate the level of support a child requires to perform tasks. And fifth, it encourages teachers to monitor frequently so programs can be adjusted based on data.

Routine-based instruction does not require teachers to modify their existing routines. The only change is how teachers plan and use activities and routine events to teach each child. Routine-based monitoring gives teachers insight into a child's abilities under real, rather than contrived, circumstances while not disrupting a child's engagement (Neisworth & Bagnato, 2000; McLean et al., 1996). Teachers are able to teach skills, and monitor the acquisition of those skills, when it is most meaningful to young children.

#### Note

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