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Effective Strategies
to Support
Engagement, Learning,
and Outcomes

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Maximizing Contextually Relevant Learning Opportunities Through Embedded Instruction

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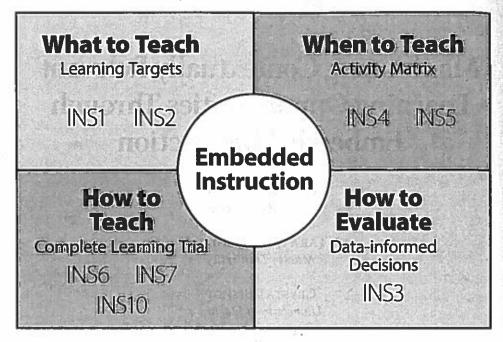
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HILDREN LEARN IN THE CONTEXT OF THEIR EVERYDAY EXPERIENCES and interactions. From the bioecological perspective, this fundamental concept of child development and learning is referred to as proximal processes. These proximal processes are viewed as taking place through the ongoing and progressively more complex and reciprocal interactions between a child and the people, objects, or materials in the child's immediate external environments (Bronfenbrenner & Morris, 2006; Tudge et al., 2016). Examples of proximal processes are a child and caregiver engaging in a peek-a-boo game during diaper change, a child reaching toward a cup and then requesting a drink during snack in the classroom, or a child asking an adult about the colors of leaves on a tree as they are walking through the woods. The nature of proximal processes varies based on the characteristics of the child and the characteristics of the spatial, temporal, and social environments in which reciprocal interactions occur. A behavior analytic view of child development and learning explicates that behavior changes observed over time in a young child are a function of his or her interactions with objective environmental events in various contexts (Schlinger, 1995).

Specific to early intervention/early childhood special education, Wolery and Hemmeter (2011) described learning as relatively enduring changes in behavior resulting from experiences, defined as children's interactions within social and physical environments and their observations of events occurring in these environments. Given that children learn from their everyday experiences and interactions, teaching can be considered "acts of organizing and manipulating environmental structures, entities, and events (including adult behavior) to influence children's experiences and thereby promote learning" (p. 372).

Figure 1 **Embedded Instruction Components**



Four key components of embedded instruction and Instruction recommended practices that align with each component.

Embedded instruction is one approach to teaching that emphasizes the provision of intentional and systematic instruction to young children during familiar activities, routines, and transitions (Snyder et al., 2018). Embedded instruction is distinguished from other forms of instruction given its emphasis on providing contextualized instruction, which means creating and implementing learning experiences that are embedded in children's everyday activities, routines, or transitions. Embedded instruction is an evidence-based practice with both theoretical and empirical support (Snyder et al., 2018; Wolery, 2005). A systematic review of the naturalistic instruction literature included 15 studies that demonstrated embedded instruction was associated with positive effects on children's social, adaptive, and preacademic skills (Snyder et al., 2015). In addition to being an evidence-based practice, embedded instruction is an Instruction recommended practice, INS5: "Practitioners embed instruction within and across routines and activities and environments to provide contextually relevant learning opportunities" (Division for Early Childhood [DEC], 2014, p. 10).

Snyder and colleagues (Snyder, Hemmeter, McLean, Sandall, & McLaughlin, 2013, Snyder et al., 2018) have developed a framework for embedded instruction that organizes key practices under four core components: what to teach, when to teach, how to teach, and how to evaluate. As shown in Figure 1, several of DEC's Instruction recommended practices align with this framework

The purpose of this article is to describe key practices related to the when to teach component of the embedded instruction framework to emphasize a core concept from INS5: contextually relevant learning opportunities. By contextually relevant, we mean understanding children's characteristics and preferences; their everyday learning opportunities; the experiences and observations they are having in familiar activities, routines, and transitions; and the "fit" among these activities and the skills targeted for embedded instruction. To support contextually relevant learning, embedded instruction addresses priority skills for children; uses authentic activities, materials, and partners to teach those skills; and teaches skills within and across activities, routines, and transitions, where and when children need those skills (McLaughlin & Snyder, 2014).

Contextually relevant learning opportunities and "fit" relate to the broader concept of contextual fit. This latter term is used to refer to the match or congruence between the strategies and procedures of an intervention and the values, needs, skills, and resources of those who implement and experience the intervention (Albin, Lucyshyn, Horner, & Flannery, 1996; Horner, Blitz, & Ross, 2014). Fit has been associated with the quality of intervention implementation and whether the intervention produces the desired outcomes (Fixsen, Blase, Naoom, & Wallace, 2009). As an intervention, it is important for the what to teach, when to teach, how to teach, and how to evaluate components of embedded instruction to be implemented consistently and to fit the context in which they will be implemented. The procedures or strategies used to implement these embedded instruction components, however, will be adapted based on the context in which they are applied (e.g., home, classroom) and on the values, needs, skills, and resources of those who implement and experience embedded instruction.

In this article, we emphasize the importance of considering fit as part of the when to teach component of embedded instruction. We describe why high-quality activities are a foundation for embedded instruction. We illustrate why it is important to examine the fit between the characteristics or expectations of familiar activities, routines, and transitions and the skills targeted for instruction. Examining fit will maximize contextually relevant learning opportunities through embedded instruction. We discuss how to use an activity matrix to plan for when and how many embedded learning opportunities will occur. We use a case example throughout the article to illustrate important points.

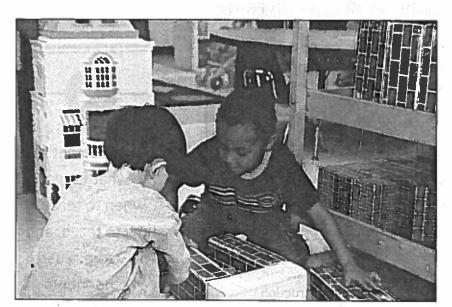
It is Monday morning about 7:30 a.m., and Sean is waking up. He gets out of bed and walks down the hall to his mom's bedroom. He announces, "Up, mom!" His mother kisses his head and says, "Go see your brother and brush your teeth." Sean walks down the hall to the bathroom, gets out his toothbrush and toothpaste, stands on the stepstool near the sink, and looks in the mirror. His older brother ^{Sque}ezes the toothpaste on the brush and models for him to brush up and down. When Sean is done, his older brother hands him a cup of water to rinse his mouth and shows him how to wipe his face. After Sean goes back to his bedroom, his mom comes in to help him get dressed. She invites Sean to pick out what he wants to wear. He selects his "preferred" outfit (navy shorts, grey shirt, and his favorite sandals). The family continues their routines through breakfast and getting the boys off to school.

At preschool, Sean enters the classroom and puts his backpack down. The teacher helps him to put it in his cubby and find a morning activity. When his

It is important for the what to teach. when to teach, how to teach, and how to evaluate components of embedded instruction to be implemented consistently and to fit the context in which they will be implemented.

friend Bryson arrives at school, they play with a fishing game together until it's time for morning circle. At morning circle, Sean learns it is his week to turn on and off the lights ("light helper") when they go in and out of the classroom. Sean gets an opportunity to practice his light helper skills by reaching up to flip the light switch off and then back on. He needs some extra help from the teacher to flip the switch off but is able to switch it back on by himself.

The teacher then asks Sean which learning area he wants to go to for free



play. Pointing to the visual symbol for the block center, he says, "Blocks." The teacher reminds him that blocks are for sharing with all his friends, he can use his words to ask for blocks, and if they build a big tower today, she will come take a picture. In the blocks area, Sean, Bryson, Christina, and Tim are building a big tower. The tower is so tall they can barely reach the top. After taking a picture, the teacher counts to three and children knock over the tower. The children are laughing and having fun. They are going to build another big tower. Soon, it's time to clean up and have a snack. As the children put away the

blocks, the teacher asks them to count how many blocks they each put away. Sean's teacher stands with him a moment and helps count the blocks he is putting away. He repeats the numbers as she says them. It is now about 10:30 am.

Learning Opportunities All Day Long

In just over three hours, Sean, a 4-year-old boy with disabilities and an individualized education program (IEP), experienced many contextually relevant learning opportunities as part of his daily routines and activities. Throughout the day, he will experience hundreds more. Children experience different types and amounts of learning opportunities, depending on the early learning program in which they are enrolled, their family life, their community activities, and the interactions that occur in these contexts. Research has shown that (a) the preferred context for learning is situated in natural and authentic environments with people, activities, and materials that are meaningful to and of interest to the child (Dunst et al., 2001), and (b) use of naturalistic instructional approaches such as embedded instruction, which include following the child's lead and building on a child's interests and preferences, promote child engagement and learning (Rule, Losardo, Dinnebeil, Kaiser, & Rowland, 1998; Snyder et al., 2015).

To ensure embedded instruction is implemented with fidelity and supports desired child learning outcomes, teachers need to do more than simply insert learning opportunities into ongoing activities in ways that are disjointed or artificial. The term embedded is used to refer to using the child's interests,

Figure 2 Context-Based Learning Cycle



Adapted from "Characteristics and Consequences of Everyday Natural Learning Opportunities," by C. J. Dunst, M. B. Bruder, C. M. Trivette, D. Hamby, M. Raab, & M. McLean, 2001, Topics in Early Childhood Special Education, 21, p. 70. Copyright 2001 by Pro-Ed.

preferences, and motivations in ongoing activities that have particular characteristics and performance expectations to create contextually relevant learning opportunities to address priority learning skills. For example, if Sean's teacher had stopped him while he was cleaning up the blocks and asked him to count to 10 with her, Sean might be able to do the skill, but this interaction might not be contextually relevant. In contrast, asking Sean to count blocks as he puts them away during cleanup like the other children are doing is contextually relevant.

Context-Based Learning Cycle

To illustrate how activities are the sources of interest-based and competency-enhancing natural learning opportunities, Dunst and colleagues (2001) proposed alcycle that portrayed the influences of activity settings on children's learning. An adapted version of this cycle is used in this article to illustrate the proximal processes that include children's everyday observations, experiences, and interactions that occur in their activities and routines; children's interests and Preferences; their engagement; their learning opportunities for priority skills; and their mastery of priority skills (see Figure 2).

As the figure shows, children's interests and preferences lead to their

To ensure embedded instruction, teachers need to do more than simply insert learning opportunities into ongoing activities in ways that are disjointed or artificial.

A key aspect of this context-based learning cycle is that the child's everyday activities, routines, and transitions need to have stimuli that interest and motivate children based on their abilities and preferences.

engagement in interactions and experiences that provide opportunities to learn new skills. Repeated skill practice leads to mastery. Increased mastery, in turn, strengthens children's interests and can lead to new interests, and on goes the learning cycle. A key aspect of this context-based learning cycle is that the child's everyday activities, routines, and transitions need to have stimuli that interest and motivate children based on their abilities and preferences.

The context-based learning cycle describes how all children learn. For children who need additional help, teachers embed targeted learning opportunities and use systematic instruction during ongoing activities, routines, and transitions to ensure engagement and additional learning opportunities that lead to acquisition and mastery of priority skills. For example, Sean's teacher might put out one fishing pole for the morning fishing game. This environmental arrangement creates an opportunity for Sean and his peer to share the one fishing pole or for Sean to ask for another fishing pole. In addition, Sean's teacher would like to help him find his name. She knows Sean is motivated by opportunities to look at his picture, so she has paired his picture with his name in several places in the classroom. When Sean enters the classroom in the morning and drops his bag, she might say, "Let's put your bag in the cubby with your name on it. Find your name, Sean." As he is initially learning to find his name, she might remind him that his name is with his picture or hand him a card that has his name on it and say, "This is your name. Find the cubby that has your picture and your name." After he finds the cubby with his name on it, she might say, "You found it! This shows your name, and here's your picture. Now we can hang up your bag in your cubby."

In these examples, Sean's teacher is using the context-based learning cycle, but she also is creating ways to embed instruction on important skills for Sean to ensure optimal learning of his priority learning skills and access to and participation in the general preschool curriculum. To implement embedded instruction as intended, teachers create learning opportunities while considering the context-based learning cycle. Use of this cycle guides decisions and actions about (a) identifying children's preferences, interests, and motivations; (b) promoting their engagement; (c) providing sufficient learning opportunities using intentional and systematic instruction focused on priority skills; and (d) monitoring children's learning, including their acquisition and mastery of priority skills.

Activities, Routines, and Transitions as Contexts for Embedded Instruction

There are many ways to structure activities, routines, and transitions that capture children's interests, motivate them, and lead to their engagement. Teachers should carefully consider how the setup and design of activities, routines, and transitions can help maximize children's observations, experiences, engagement. and learning throughout the day.

High-quality activities are an important foundation for embedded instruction because activities are where proximal processes and contextually relevant learning opportunities occur. It is important to think about the categories or types of high-quality activities that might occur during a day. There are teacher-directed large-group activities (e.g., circle, story), teacher-directed small-group activities

Table 1 Features of High-Quality Activities With Reflective Questions

Statement	Possible reframing response	
Developmentally appropriate	 Is this activity age appropriate? Is this activity individually appropriate? Is this activity culturally relevant? 	
Clear expectations and learning objectives	 Do children know what to do as part of this activity? What do I want children to learn from this activity? 	
Dynamic and flexible	 Does the activity integrate children's use of different skills? How do I adjust the activity depending on the characteristics of and needs of the children? 	
Build on children's interests	 What in this activity is interesting to most children? What in this activity is interesting to specific children? How are children's preferences incorporated? 	
Use authentic materials and interaction partners	 Are the materials used appropriate for the children? Are the materials used familiar to the children? Do the children know their interaction partners? 	
Provide opportunities for social interaction	 Who do children engage with in this activity? Are there opportunities to play/work with peers? 	
Encourage children to make choices	 What choices can children make in this activity? How many opportunities are there for children to make choices? 	
Appropriately challenging, in the "zone of proximal development"	 Is this activity too easy for children? Is this activity too hard for children? How much teacher support is needed for children to be successful and what are the needs for individualization? 	

(e.g., table top activities led by the teacher involving a small group of children), and child-initiated activities (e.g., free choice, center time, outdoor play). Routines are a special type of activity that occur regularly and have predictable sequences such as cleanup, meal times, arrival and departure, toileting, and hand washing. Fransition refers to the movement of children in the classroom from one "activito another. Each of these activity types and experiences and observations that occur within them can be contexts for embedded instruction.

There are several features that are part of a high-quality activity, routine, or transition. Table 1 shows features of high-quality activities. The table includes

guiding questions for teachers to use to prompt their reflection on the activities occurring in their classrooms and to help them evaluate the quality of their activities, routines, and transitions as foundations for embedded instruction.

Sean's teacher decided to evaluate her activities to make sure they were high quality. She started by analyzing whether she offered a balance of different teacher-initiated and child-initiated activities, whether routines were appropriately planned, and whether the flow of the day was smooth for children with unnecessary interruptions and transitions minimized. She also looked closely at her primary teacher- and child-initiated activities and routines. She reflected on quality features shown in Table 1. By asking herself some of the reflective questions, Sean's teacher realized many of her activities were dependent on teacher direction and high levels of support from the teaching team for children to participate. Activities were structured primarily for children to work independently with few opportunities for interactions with peers or working together. She decided it would be preferable to have activities that provide children with more choice and opportunities to work together. Since changing some of her activities, she has seen an increase in children's engagement and increases in the number of learning opportunities available for embedded instruction.

Ensuring a Good Fit Between Activity Characteristics and Embedded Instruction Learning Opportunities

In addition to using high-quality activities as the foundation for embedded instruction, embedded instruction focuses on providing motivating learning opportunities. With motivating learning opportunities, there should be a good "fit" among the characteristics and expectations of the activity (i.e., what children should know or be able to do to participate in the activity), the priority skill that a child with a disability is learning, and the positive consequences that will occur when the child uses the skill in the context of the activity.

The concept of "fit" is essential for ensuring contextually relevant learning opportunities. Figure 3 shows an illustration of fit. Fit can be characterized as natural, logical, or intentional. When the skill the child is learning is a typical part of the activity expectations, we refer to this as a natural fit. For example, the expectations of the snack time routine are a natural fit for Sean's priority skills focused on making two-word requests to obtain food or juice. Sean also has opportunities to practice pouring liquids into a container or a cup when juice in a pitcher is part of having snack in his classroom. In both of these examples, the design of the activity and its associated expectations will influence whether contextually relevant embedded learning opportunities occur naturally for Sean. If Sean's school uses drink boxes instead of pitchers and cups, there will be limited opportunities to pour liquids into containers.

Logical fit involves adding expectations within activities without interrupting the flow of the activity or changing significantly the activity characteristics and demands. For example, during block play, Sean's teacher occasionally asked him to name the color of the block that he was stacking as he built his tower. In this example, color naming is not necessarily a natural expectation of the activity.



The concepts of logical and intentional fit should be applied carefully when identifying activities, routines, or transitions that are a good fit for the embedded instruction learning target.

Figure 3 Illustration of Fit



Illustration of the "fit" between characteristics and expectations of activities, routines, and transitions and the skills that are part of children's embedded instruction learning targets.

Sean could have engaged in building the tower with his friends without naming colors. However, the materials available in this activity (different colored blocks) provided an opportunity for Sean's teacher to embed instruction on a priority skill related to naming colors.

Intentional fit refers to creating new or different expectations within activities. For example, Sean's teacher knows that he likes to place a flag on top of the towers he builds with his friends. She places the flags on a shelf in sight, but out of reach, to create the opportunity for Sean to ask for and obtain the flag he wants.

The concepts of logical and intentional fit should be applied carefully when identifying activities, routines, or transitions that are a good fit for the embedded instruction learning target. It is important not to overdo this type of embedding as instruction might no longer be contextually relevant. For example, if Sean's teacher asked him to identify the color of every block he stacked, this might deter his engagement with peers in the activity. Instead, she distributed a few questions to Sean and his peers about the color of the block they were stacking, which was logical as they built their tower.

Using an Activity Matrix to Plan **Embedded Learning Opportunities**

Feachers plan activities and use intentional teaching to help all children learn a variety of skills related to early childhood standards and curricula. As part of their planning, teachers need to ensure multiple learning opportunities are planned for young children with disabilities to address priority skills associated with their individualized education programs (IEPs) in the context of ongoing

Table 2 Example Activity Matrix for Sean's Learning Targets

Classroom Activities	Find His Name When Written or Printed	Aska Peer to Give Materials or Toys Using a Two-Word Phrase
Arrival and morning activities (8:40–9:00 a.m.)	1 trial	
Morning circle and welcome (9:00–9:15 a.m.)	1 trial	
Free play (9:15–10:00 a.m.)		4 trials
Arrival and morning activities (8:40–9:00 a.m.)		
Morning circle and welcome (9:00–9:15 a.m.)		1 trial
Free play (9:15–10:00 a.m.)	3 trials	2 trials
Arrival and morning activities (8:40–9:00 a.m.)		2 trials
Morning circle and welcome (9:00–9:15 a.m.)	Consideration for the 53	or all properties and the sole.
Free play (9:15–10:00 a.m.)	1 trial	10 10 10 10 10 10 10 10 10 10 10 10 10 1
Arrival and morning activities (8:40–9:00 a.m.)	linger community characters	Show make displayed parties on
Morning circle and welcome (9:00–9:15 a.m.)	1 trial	1 5 m 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Music and movement or art (1:15–1:40 p.m.)	1 trial	
Closing circle (1:40–1:50 p.m.)		1 trial
Packup and dismissal (1:50–2:00 p.m.)	ANTER THE PARTY	
Total opportunities for each learning target	8	10

classroom activities, routines, and transitions. Multiple embedded instruction learning opportunities refer to providing a sufficient number of opportunities for children to practice priority skills within and across activities, routines, and transitions. Sufficient learning opportunities are important to ensure children acquire and master desired skills. As part of planning, teachers need to plan for when to teach by identifying when and how many embedded instruction learning opportunities will be provided.

To plan when to teach, a teacher must specify what it is he or she will be teaching within and across activities, routines, or transitions. Sean's teacher is targeting two priority skills for Sean: (1) Sean will find his name when written or printed on classroom materials after being shown an example of his name, and (2) Sean will ask a peer to give, share, or pass materials and toys to him using a two-word phrase (e.g., block please, give block).

Sean's teacher should plan for embedded opportunities to teach using an activity matrix. An activity matrix has the classroom activities that occur listed down the left side and typically has children's names or a specific child's priority skills or learning targets written across the top. The cells of the matrix identify the learning target and the number of embedded learning opportunities for the target that will be provided during the specific activity. The activity matrix is used to plan how many embedded learning opportunities focused on each learning target will be provided within and across activities, routines, and transitions. Activity matrices can also be used to plan how teachers will deliver embedded instruction learning trials on targeted skills by specifying the planned antecedent, behavior, and planned consequence (Barton, Bishop, & Snyder, 2014).

Table 2 shows an example of an activity matrix Sean's teacher is developing for his learning targets. The numbers in the cells represent the number of times she plans to provide an embedded learning opportunity on the priority skills during the activity. She knows, of course, that Sean is experiencing other learning opportunities during the activity and hundreds of learning opportunities throughout the day. Nevertheless, she wants to be intentional and provide embedded instruction on his targeted skills in the activities she has identified. The activity matrix is her plan to make sure he receives a sufficient number of embedded learning opportunities based on his phase and pace of learning and in activities that are a good "fit" for his priority skills.

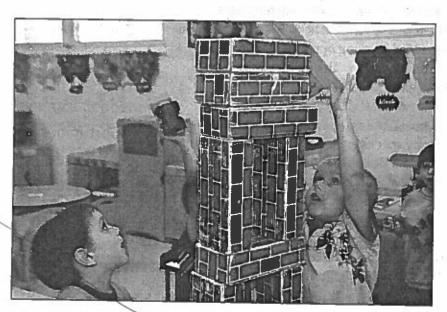
As Sean's teacher is selecting activities that she will use to embed instruction for Sean on his priority learning targets, she is thinking through the key considerations to ensure contextually relevant learning opportunities. First, she Gonsiders Sean's interests and preferences. Second, she considers the design and quality of the ongoing activities. Third, she considers the fit between activities and the skills, remembering that fit might be natural, logical, or intentional. Fimally, Sean's teacher considers how many embedded opportunities to provide. This involves thinking about the fit within an activity so the number of opportunities does not disrupt the logical flow of the activity or result in embedding becoming artificial or losing contextual relevance. It also involves thinking about how much practice Sean needs related to his phase of learning and the pace which he learns. That is, is he just learning the skill (acquisition), does he more practice to build fluency for a skill he has already learned, or does he

The activity matrix is used to plan how many embedded learning opportunities focused on each learning target will be provided within and across activities, routines, and transitions.

need to maintain or generalize the skill across activities? Based on the activity characteristics and expectations, the target skill, Sean's phase of learning (he is just learning both skills), and her knowledge about his pace of learning, Sean's teacher decides to distribute eight opportunities for identifying his name and 10 opportunities for using a two-word phrase to ask a peer to give, share, or pass materials to him throughout the day. If she implements her plan as intended, Sean will have 18 targeted embedded learning opportunities in addition to the hundreds of other learning opportunities he has in his everyday activities at home and at school.

Conclusion

Through a description of Sean and his teacher, we have illustrated how to maximize contextually relevant learning opportunities through embedded instruction. We emphasized the when to teach component of embedded instruction. The



importance of high-quality activities as the foundation for contextually relevant learning was described and questions to facilitate reflection about activity quality were provided. The concept of "fit" between the characteristics of activities and the skills targeted for embedded instruction was discussed and three types of fit were described. We showed how an activity matrix can be used to guide decisions about when instruction will occur and how many embedded-instruction learning opportunities will be provided.

Although not the only approach that can or should be used to provide

instruction to young children with disabilities based on their individual characteristics and learning needs, this approach to instruction is consistent with contemporary perspectives about the importance of contextualized learning experiences. Identifying the fit between the characteristics and expectations of activities and the skills children are being supported to learn through embedded instruction is important for ensuring learning opportunities are contextually relevant.

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