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Using a Universal Design for Learning Framework to Provide Multiple Means of Representation in the Early Childhood Classroom

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In order to ensure high quality outcomes for all children in the early childhood classroom, teachers are expected to utilize both the Developmentally Appropriate Practices (DAP) provided by the National Association for the Education of Young Children (NAEYC, 2009), as well as the Division of Early Childhood (DEC) Recommended Practices (DEC, 2014). Both NAEYC's DAP and DEC's Recommended Practices align with the use of Universal Design for Learning (UDL). UDL is a framework that supports the learning needs of all learners through intentional, proactive, and reflective instruction and interactions. This article provides a brief overview of UDL, with a specific focus on multiple means of representation in the early childhood classroom.

Keywords: early childhood, evidence-based instruction, preschool, Universal Design for Learning

In order to ensure high quality outcomes for all children in the early childhood classroom, teachers are challenged to utilize both the Developmentally Appropriate Practices (DAP) provided by the National Association for the Education of Young Children (NAEYC, 2009), as well as the Division of Early Childhood (DEC) Recommended Practices (DEC, 2014). Both NAEYC's DAP and DEC's Recommended Practices align with the use of Universal Design for Learning (UDL), a framework that supports the learning needs of all students through intentional, proactive, and reflective instruction and interactions (CAST, 2018). In fact, the joint position statement released by NAEYC and DEC in 2009 specifically notes the use of UDL for supporting inclusion in the classroom (DEC/NAEYC, 2009). The UDL framework uses flexible curriculum and materials to ensure an accessible learning environment that supports all children, both those with and without disabilities, in becoming expert learners who take charge of their own

learning (Hitchcock, Meyer, Rose, & Jackson, 2002; Rose, Gravel, & Domings, 2010; Rose & Strangman, 2007). Universal Design for Learning includes strategies through three learning networks: multiple means of engagement, multiple means of representation, and multiple means of action and expression (CAST, 2018). Multiple means of engagement reflects the strategies used to ensure that young children are motivated to learn and remain engaged in the learning process (Glass, Meyer, & Rose, 2013; Rose & Strangman, 2007). Multiple means of representation refers to the methods teachers use to present the curriculum content to young children (Glass et al., 2013; Rose & Strangman, 2007). Finally, multiple means of action and expression involves the ways in which young children can show they have understood and mastered the curriculum content (Glass et al., 2013; Meyer & Rose, 2005; National Center on Universal Design for Learning, 2014).

Universal Design for Learning (UDL) naturally aligns with educational philosophies in early childhood education and early childhood special education. The NAEYC's DAP provides a framework for designing classrooms that meet the unique learning needs of young children through five guidelines: (a) creating a caring community of learners, (b) teaching to enhance development and learning, (c) planning curriculum to achieve important goals, (d) assessing children's development and learning, and (e) establishing reciprocal relationships with families (Copple & Bredekamp, 2008). Similarly, DEC's Recommended Practices provide guidelines in seven topic areas to support teachers in designing evidence-based instruction for young children: (a) assessment, (b) environment, (c) family, (d) instruction, (e) interaction, (f) teaming and collaboration, and (g) transition (DEC, 2014). While these organizations provide educators, administrators, parents, and other early childhood stakeholders with valuable guidelines, it can be difficult for providers to translate these recommendations into practice. This article discusses strategies for implementing UDL within ongoing routines and activities in the early childhood classroom.

Multiple Means of Representation in Early Childhood Classrooms

In a previous article (Lohmann, Hovey, & Gauvreau, 2018), we presented practical strategies for implementing multiple means of engagement in the early childhood classroom. This article expands on that article by presenting ideas for implementing multiple means of representation in the early childhood classroom. Specifically, we recommend: (a) pairing verbal instructions with visual representations, (b) home language translation and representation in the classroom, (c) hands-on learning activities, (d) think alouds, and (e) modeling of skills. Each of these strategies, as well as its alignment with the DEC Recommended Practices (DEC, 2014) and NAEYC's DAP (NAEYC, 2009), is outlined in Table 1.

Representation Strategy	Aligned DEC Recommended Practices	Aligned NAEYC DAP Guideline
Pairing verbal instructions with visual	● E2. Practitioners consider Universal Design for Learning principles to	● 3C2. In their planning and follow-through, teachers use the curriculum framework

representations	create accessible environments. ● INS6. Practitioners use systematic instructional strategies with fidelity to teach skills and to promote child engagement and learning.	along with what they know (from their observation and other assessment) about the children's interests, progress, language proficiency, and learning needs. They carefully shape and adapt the experiences they provide children to enable each child to reach the goals outlined in the curriculum.
Foreign language translation	● E2. Practitioners consider Universal Design for Learning principles to create accessible environments. ● INS11. Practitioners provide instructional support for young children with disabilities who are dual language learners to assist them in learning English and in continuing to develop skills through the use of their home language. ● INS12. Practitioners use and adapt specific instructional strategies that are effective for dual language learners when teaching English to children with disabilities.	● 1E4. Children hear and see their home language and culture reflected in the daily interactions and activities of the classroom. ● 2J2. Teachers bring each child's home culture and language into the shared culture of the learning community so that the unique contributions of that home culture and language can be recognized and valued by the other community members, and the child's connection with family and home is supported. ● 5B. Practitioners work in collaborative partnerships with families, establishing and maintaining regular, frequent two-way communication with them (with families who do not speak English, teachers should use the language of the home if they are able or try to enlist the help of bilingual volunteers).
Hands-on learning activities	● E2. Practitioners consider Universal Design for Learning principles to create accessible environments.	● 2E4. Teachers provide experiences, materials, and interactions to enable children to engage in play that allows them to stretch their

		boundaries to the fullest in their imagination, language, interaction, and self-regulation as well as to practice their newly acquired skills.
Think alouds	● E2. Practitioners consider Universal Design for Learning principles to create accessible environments.	● 2F6. To enhance children's conceptual understanding, teachers use various strategies, including intensive interview and conversation, that encourage children to reflect on and "revisit" their experiences.
Modeling	● E2. Practitioners consider Universal Design for Learning principles to create accessible environments.	● 2G2. Scaffolding can take a variety of forms: for example, giving the child a hint, adding a cue, modeling the skill, or adapting the materials and activities. It can be provided in a variety of contexts, not only in planned learning experiences but also in play, daily routines, and outdoor activities. ● 2G3. Teachers can provide the scaffolding or peer can; in either case, it is the teacher who recognizes and plans for each child's need for support and assistance.

Table 1. Representation in Preschool & Alignment with DEC Practices and NAEYC Guidelines.

Pairing Verbal Instructions with Visual Representations

Miss Suzie's preschool class is comprised of a diverse range of young learners. Several children are multilingual, and one family has just immigrated to the US. Several other children have communication delays and impairments, and use speech generating devices or the Picture Exchange Communication System (Bondy & Frost, 2004) to communicate. Given the unique expressive and receptive communication needs of all children in the classroom, the team decides to create large visuals with illustrations of the expectations for each activity. While Miss Suzie already uses a visual schedule during the day, the team notices that many children still struggle to follow directions during transitions. By showing children large visuals with symbols for handwashing, lining up, walking to the bus, and other important daily routines, in addition to the verbal large group directions, the team observes children

following these routines and engaging in on-task behavior much more independently. Visual supports are a useful practice for young children with autism and related disabilities (Meadan, Ostrosky, Triplett, Michna, & Fettig, 2011; Odom et al., 2013) and dual language learners (Espinosa, 2013). Visuals help clarify the meaning of a specific direction, provide additional information, and support executing functioning. These supports can be used across the preschool day, to support play (Ganz & Flores, 2010), social interactions (Arthur-Kelly, Sigafoos, Green, Mathisen, & Arthur-Kelly, 2009; Gauvreau, 2017), and support appropriate behavior (Gauvreau & Schwartz, 2013). See Table 2 for more specific strategies. For some students with disabilities, and others learning English, ensuring directions are provided both verbally and visually is a crucial aspect of UDL within an early childhood classroom. Pairing verbal directions with visual representations is a simple way teachers can promote understanding, participation, and on task behavior for all learners in a classroom.

Routine	Ideas and Strategies for Pairing Verbal Directions with Visual Representations
Arrival	● Visuals illustrating expectations for putting away belongings. ● Visual schedule of the daily events.
Circle	● Visual schedule of the daily events. ● Visuals illustrating circle expectations, such as “keeping a quiet mouth” or “sitting up tall.” ● Use of props during songs and finger plays - corresponding pictures to align with certain songs, such as pictures of monkeys for *10 Little Monkeys Jumping on the Bed,* or images of different aspect of a bus (e.g. driver, horn, windows, etc.) when singing *Wheels on the Bus.* ● Pictures of all children and teachers when reviewing attendance and discussing who is present that day.
Snack	● Visuals of conversation topics, called a “Snack Talk” (Gauvreau, 2017). ● Visuals to depict expectations for cleaning up. ● Communication supports for new vocabulary when introducing new foods.
Free Play	● Play scripts suggesting play themes in each area of the classroom. ● Visuals with toys and the corresponding bins to support with clean up ● Social stories and scripts supporting social interactions. ● A “Problem Solving Box,” with visuals for various solutions that may be useful for children in conflict. ● Poster with visuals depicting classroom rules or expectations. ● “My turn” and “wait” visuals for supporting turn taking. ● Masking tape to illustrate safe areas for building with blocks or other manipulatives.

	● "One more minute" visual paired with a warning before clean up time. ● "Clean Up" visual to support children in putting away toys.
Dismissal	● Visual classroom schedule to review. ● Visuals for methods of transportation home, to daycare, or to another program. Children may ride a bus, be picked up, or attend another program in the school.

Table 2. Strategies for implementing visuals across the day.

Foreign Language Translation

Ms. Maria has just completed beginning of the year home visits with all the families in her classroom. She has visited families in their homes and communities, and had the opportunity to learn about their backgrounds, culture, values, and hopes for their children. There are five different languages spoken in the classroom this year, and Ms. Maria is excited to celebrate this important aspect of families' identities. School begins in one week, and she is busy ensuring that everything is translated into each families' home language, checking out library books in various languages for the classroom book area, printing out translations of "Welcome to Room Five!" in multiple different languages, and looking up children's' songs in various languages for music time. She and her team are working to learn greetings as well, and hope to welcome each child in their home language on the first day of school.

Ensuring all aspects of a child's identity are represented in schools is a critical part of belonging to a classroom community (Style, 1988), and an important way for early childhood providers to incorporate the UDL frameworks. In order for all children and families to feel that classroom are welcoming and safe spaces, teachers must ensure that all families are represented in classroom materials. The lack of diversity within early learning settings is well documented (Johnson, 2002), and protagonists in children's books are significantly more likely to be White than other races or ethnicities (Cooperative Childrens Book Center, 2012). Furthermore, promoting and celebrating a family's home language use is related to better outcomes for both parents and children (Chen, Klein, & Osipova, 2012). Considering this in addition to the importance of UDL, preschool teachers should consider ways of ensuring home languages are representing in the classroom in meaningful ways. While not all preschool children may be reading, providing opportunities for them to see their home language in print around the classroom and ensuring families are able to access all materials sent home is crucial. Strategies for including language translation and representation in the classroom include:

- Color coding different languages within the classroom schedule, visuals, and other topic displays. For example, English is in blue, Tagalog is green, Spanish is red, etc.
- Gathering books in various languages for the book area. Local libraries or resale shops are excellent resources for building your classroom library.
- Environmental print in various languages - teachers can ask families to send in discarded food packages,

commercial products, or magazines in their home languages for classroom use.
- Asking families to share songs, finger plays, and rhymes in their home language.
- Inviting families to come in and read a book during circle, or record themselves reading and play the video at circle time.
- Display family photos, artifacts, and posters at child level. (Oliva-olson, Espinosa, Hayslip, Magruder, 2019).

Hands-on Learning Activities

Mr. Steve and his young learners are midway through a unit on the five senses. Every morning he shares a sense with the class during circle time. Knowing the routine, Sylvia eagerly asks, "Which sense will we learn about today?" Mr. Steve smiles and wiggles his fingers. His students excitedly call out, "Touching!" Mr. Steve chuckles and says, "That's right. Today we are going to learn about the sense of touch." He recognizes the importance of incorporating hands-on activities that allow his students to experience each of the five senses so after introducing key vocabulary using pictures, he has the students begin center rotations. Each center contains a hands-on activity that enhances the children's learning. Mr. Steve understands that by allows his young students to manipulate objects he will be teaching them about touch but also incorporating multiple means of representation.

Hands-on learning activities provide students with experiences, materials, and interactions that enable them to engage in learning through play as they practice new skills. Manipulating objects enhances young children's learning and expertise (Pearson, 2015) and ensures that young children are active learners. Furthermore, providing students with options of how to interact with materials can increase student motivation, and encourage thinking, problem solving, and creativity (Kaltman, 2010). Hands-on active learning instruction provides opportunities for children to physically interact with concrete representations. These interactions help create a bridge from the concrete to the abstract (Carbonneau & Marley, 2015). When incorporating hands-on learning tasks in the classroom, there are some things teachers need to consider. For example, teachers should consider if hands-on tasks will be teacher supervised or if students will work independently or with peers. Careful planning is key to successfully incorporating hands-on activities. Table 3 provides hands-on learning activities that can be used for a variety of subjects.

Subject Area/Lesson	Hands-on Learning Activities
Science/USDA's My Plate Guidelines	● Planning and cooking a nutritious meal in dramatic play. ● Identifying and sorting fruits and vegetables.
Science/Plant life cycles	● Planting a pumpkin seed and caring for the plant as it grows. ● Going on a "nature walk" to observe trees and plants outside the school.

Math/Counting Skills	● Counting blocks as you build a tower ● Make graphs of how many children. like a certain food, character, toy, etc.
Math/Sorting	● Sorting teddy bear counters into color groups. ● Sorting vehicles and figures in the block area.
Math/Shapes	● Wrapping string around the pegs of geoboards to create shapes. ● Walking around the school searching for shapes in the environment.
Phonemic Awareness/Spelling	● Spell words using letter blocks (using phonic or invented spelling). ● Host a "Letter of the Day Scavenger Hunt," where children look around the room for things that begin with certain letters.
Literacy/Letter Recognition	● Use magnetic letters to match upper and lower case letters. ● Include plastic letters in the sensory table.

Table 3. Hands-on learning activities.

Modeling

Mr. Mike is currently teaching the young children in his classroom how to sort objects with similar characteristics. During the weekly cooking project, Mr. Mike begins sorting the ingredients that will later be used to bake cookies. He puts the flour, sugar, and baking soda together because they are white. He puts the cracked egg and melted butter together because they are yellow. Finally, he puts the chocolate chips and vanilla together because the chocolate chips are brown and the vanilla bottle is brown. Then, Mr. Mike asks the children in his classroom to explain to him why he sorted the ingredients in this manner. After modeling this, he asks the children to sort the ingredients again, this time into solids and liquids.

In the early childhood classroom, students often require support in understanding how to think through the steps of a learning activity or for solving a problem. In these cases, the use of modeling can be a valuable teaching tool. The strategy of modeling can be used in a variety of ways, including the teacher showing children what to do, a peer modeling the activity in real-time (Egel, Richman, & Koegel, 1981; Garfinkle & Schwartz, 2002) or the use of recorded video modeling (Green et al., 2017). By

showing children exactly what to do, teachers can ensure that learners have all the information they need to be successful within any task or routine. Modeling is especially useful when teaching new routines or new activities, and can be paired with reinforcement, such as verbal praise or a high-five. As teachers or peers model the activity, we recommend verbalizing the steps they are using to complete the task and using behavior specific praise to reinforce children who are engaging in the steps. Common preschool activities where modeling may be used include (a) having a child demonstrate how to sit on a stool for picture day, (b) showing children how to wash their hands after using the toilet, (c) using video clips to demonstrate social skills, such as taking turns or asking for help, and (d) demonstrating to children how to put toys in the appropriate bins after free play time.

Think-Alouds

Mrs. Janice loves storytime in her classroom; in fact, it is her favorite part of the school day. One of the reasons she loves stories so much is that she can use them to teach the children in her classroom how to think and how to process information. During story time each day, Mrs. Janice uses a think-aloud strategy to guide young children in understanding the text and connecting the new learning to previous knowledge. Mrs. Janice has discovered that her students learn concepts much more quickly when she provides shares what she is thinking as she reads stories. She is also noticing that the children in her classroom are beginning to use the same think-aloud process as they look at books in the classroom library and listen to audiobooks in the listening center.

One form of modeling that can support the learning needs of young children is thinking aloud. The use of think-alouds increases student understanding, especially for literary texts (Morgan & York, 2009) and for writing (Quinn, Gerde, & Bingham, 2016). When using the think-aloud strategy, a teacher verbally explains how she is thinking about the learning material (Ness & Kenny, 2016). Through observing the teacher model the process and with scaffolded instruction, over time, young children will begin using the strategy of think-alouds to process new information. The use of think-alouds requires young children to pause and think about their learning (Ness & Kenny, 2016) and then to verbalize their thinking process (Morgan & York, 2009). The use of think-alouds by the classroom teacher utilizes the UDL principle of representation, while the use of think-alouds by young children meets the principle of action and expression. Morgan and York (2009) recommend a variety of strategies that can be used during think-alouds, including (a) visualizing the text, (b) asking questions, (c) connecting new content to current knowledge, (d) making predictions, (e) paraphrasing the text, and (f) determining the main ideas. The literature indicates that making connections to background knowledge (Cromley & Wills, 2016) and making predictions (Cromley & Wills, 2016; VanKleeck, 2008) are correlated with a better comprehension of the material.

Table 4 provides an example of a teacher think-aloud during classroom storytime. On the left hand-side of the table, you will see a transcription of the teacher's think-aloud as she begins to read the book *Dragons Love Tacos 2* by Adam Rubin to her class. The right-hand column provides information about the strategies the teacher is utilizing. In order to support the use of think-alouds in your story time,

VanKleeck (2008) recommends planning what you will say and leaving notes for yourself in the book.

Think-Aloud Transcription	Strategies Used in the Think-Aloud
"Today's story is *Dragons Love Tacos 2*. Hmmm...I remember when we read *Dragons Love Tacos* last week. I really liked that book. My favorite part was when the dragons blew fire; that was really funny!"	Making connections to previous learning - In this part of the think-aloud, the teacher is modeling how young children can connect new learning to prior knowledge or experiences. In this case, the teacher intentionally chose the sequel to a previously read book.
"I wonder if they will blow fire in this book. If they do, I will laugh!"	Making predictions - At this point, the teacher is modeling how young children can use their prior knowledge to make predictions about what might happen in the book. Because the dragons blew fire in the previous book, it can be assumed that they might do so again in this book.
"Ok. Time to start reading. First, I am going to look at the cover of the book. Remember, children, that we can get a good idea of the main idea of the story by looking at the book cover. Hmm...there are two dragons on the cover. They have their arms linked and are both eating tacos. I wonder why they have their arms like that. Have any of you ever done that with your arms? What does it mean?"	Asking questions - While looking at the book cover, the teacher notes that the dragons have their arms linked together and asks why they might be doing that. By asking questions, young children will be challenged to think more deeply about the text.
"That is interesting. The dragons are crying. I wonder why they are so sad. I cry for lots of reasons; I wonder if dragons cry for the same reasons I do. I cry when I get hurt and when I am tired. I cry when I am away from people I love. Maybe that is why the dragons are crying - maybe they miss someone. Let's go to the next page and find out."	Making connections to previous learning & making predictions - while noting the fact that the dragons are crying and sharing reasons that she might cry, the teacher is modeling for the children how to use previous learning to make predictions about a story.
"Emergency supplies depleted." Hmmm….I wonder what that word means. I have never heard the word 'depleted' before. The	Paraphrasing the text - while discussing the meaning of an unfamiliar word, the teacher is modeling how to derive meaning from

picture shows boards over the opening of the cave. I think that means that nobody can get it, but I am not sure why. I think we should look up the word 'depleted' in the dictionary. Ok, here it is: 'use up the supply." So, that means that the supply of tacos was used up. Oh, that makes sense. I think the dragons are crying because the tacos are all gone. I can't wait to see what happens next!"	unfamiliar texts and words.

Table 4. Sample Teacher Think Aloud.

Conclusion

Providing opportunities for young children to fully participate within any classroom is a goal for all early childhood providers. Universal Design for Learning provides a useful framework when planning for ways that all learners can participate, access, and be included as true members of any classroom community. Multiple Means of Representation refers to the methods teachers use to provide instruction, guidance, and support for *all* children, with and without disabilities.

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