

Right From the Start

Universal Design for Preschool

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The principal has hired Ms. Adams to design and implement a new and inclusive preschool program for children with and without disabilities in a local elementary school and has designated a former kindergarten classroom as the new preschool room. Although the room includes some universally designed equipment—such as an accessible bathroom with handrails, lever faucets, low sinks, and child-sized cubbies, Ms. Adams must decide not only what equipment and supplies to order but also the way in which she will organize the class. Ms. Adams feels somewhat overwhelmed at the thought of designing the classroom without knowing the specific types of disabilities that she might encounter. Where can she begin?

Children often come to preschool with varying degrees of physical, social, and cognitive abilities. Yet all children come with the same desire to feel safe, competent, and secure in this new environment. Universal design (UD) is a fundamental model that fosters these feelings of safety, competence, and security. The basis of UD is the premise that all people should be able to use all products, buildings, and exterior spaces to the maximum extent possible (Mace, Hardie, & Place, 1996). Universal design for learning (UDL), an outgrowth of the architectural model, is a

framework for curriculum that extends the principles of UD to the curriculum. This framework optimizes the level of challenge and support to meet the needs of all learners (Center for Applied Special Technology [CAST], 2006). UDL in preschool can create and sustain a healthy and enriching environment that nurtures the growth and development of all children and ensures the inclusion of all children (Horn & Banerjee, 2009). Ms. Adams has an opportunity to create a preschool that uses UDL at the forefront of the curriculum rather than after the fact. Applying the principles of UD in a preschool setting requires that teachers think of all children, both those with disabilities and those without disabilities, when designing the classroom and the curriculum (Horn & Banerjee, 2009). Although educators will always need to modify and adapt the environment to meet the individual needs of some students, a UD model can establish a foundation for likely success from which teachers can later address the particular needs of individual students.

Principles of UDL

UDL began as an outgrowth of UD, which focused on making architectural structures and products accessible to all people (CAST, 2006). Common

examples of UD are cutaway curbs that people with wheelchairs, strollers, shopping carts, and bicycles can use, as well as automatic door openers for use by those with and without disabilities. UD in buildings and infrastructure constitutes the core of design and is cost-efficient and cost-effective for many people (Rydeen, 1999). Similarly, UDL focuses on the goals, methods, materials, and assessments of instruction to make them accessible to the maximum number of students possible (Dolan & Hall, 2001; Pisha & Coyne, 2001; Rose, 2001; Rose & Dolan, 2000; Rose & Gravel, 2010; Rose & Meyer, 2000, 2002; Rose, Sethuraman, & Meo, 2000). UDL encompasses three primary principles:

1. Providing multiple means of representation.
2. Providing multiple means of action and expression.
3. Providing multiple means of engagement (CAST, 2006).

Table 1 gives the definitions of the three principles.

The development of these principles occurred as a result of an extensive review of the research on learning from such fields of study as cognitive sciences and learning theory (Gazzaniga, Ivry, & Mangun, 1998; Vygotsky, 1978, 1986). For our purposes, we apply the



Table 1. Definitions of the Three Principles of UDL

Principle	Definition
Multiple means of representation	Ensure that instruction, questions, expectations, and learning opportunities exist in various formats and at different levels of complexity, addressing a range of ability levels and needs.
Multiple means of expression	Ensure that children have a variety of formats for responding and demonstrating what they know, as well as a variety of formats for expressing ideas, feelings, and preferences. In addition, children have options in their use of materials, thereby addressing individual strengths, preferences, and abilities.
Multiple means of engagement (Blackhurst et al., 1999; CAST, 2006)	Ensure that various opportunities exist for arousing the attention, curiosity, and motivation of children, addressing a wide range of interests, preferences, and learning styles. Levels of scaffolding, repetition, and appropriate challenges then maintain engagement to ensure successful learning.

principles of UDL through a wider lens that includes a focus on children’s independence so we can suggest ways that teachers might design a preschool using the UDL principles and consider how to apply them in the classroom to help children begin to gain a sense of independence and self-direction.

Research suggests that children who demonstrate the capacity to explore freely, engage in novel situations, and adapt to changing environments in healthy ways do so because of a

that leads to a sense of local autonomy. The child keeps some impulses at bay in the beginning of independence and local autonomy (Benson, 2005). Thus, local autonomy is the precursor to building a sense of independence and subsequent reflection on action.

This model of UD for autonomy takes UDL principles and incorporates them within a context of independence. For example, a teacher can design an art center that has multiple tools for painting (i.e., multiple means

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healthy sense of attachment to adults or caregivers (Masterson, 2005). Strong attachments allow children to build local autonomy, that is, the ability to self-govern when performing acts of personal expression (Mullins, 2007). A child who is engaging in pretend play takes on the perspective of others and can begin to practice decision making

of representation), thereby varying ways for refining fine and gross motor skills. She or he can include sponges, brushes of varying widths, watercolor crayons, and markers for wet paper. Moreover, the teacher creates an opportunity for children to individuate from others by offering the children several types of paint. Allowing each

child to choose his or her own supplies creates a sense of individual freedom within the classroom. Enabling the children to choose supplies from a limited array increases the likelihood that each child will become engaged with the materials (i.e., use multiple means of engagement). In this way, children will learn that they are capable of doing whatever is modeled within the environment.

Teachers should therefore offer children limited choices, such as five colors of crayons rather than 10. Even five choices may overwhelm some children, so the teacher can support those children by reducing the number of options for them while still allowing them to make their own choices. Teachers can help children develop independence and local autonomy in other ways by designing a specific curriculum that is flexible enough to meet the children’s sets of abilities and skills. Table 2 suggests ways to arrange the overall classroom environment, as well as considerations and materials for specific centers.

The Universal Design for Preschool Curriculum

Among the teacher’s priorities for the preschool classroom is designing a curriculum that supports all children in their growth and development. A curriculum is the “what” of early education, that is, the content that teachers provide to children and what teachers want them to learn. The curriculum should be intentional and should maintain enough flexibility to accommodate differences among learners. Curriculum is effective when planned before the school year begins rather than after school starts (Lieber, Horn, Palmer, & Fleming, 2008). When the teacher recognizes that one option will not work for all students, he or she can include a range of options that help children access, use, and engage in the curriculum.

Goals and Methods

Given the diverse range of skills and abilities that children in a class may possess, teachers must develop goals and methods for delivering content

that are appropriate and that challenge the children. Goals based on standards and benchmarks reflect the knowledge and skills that children need to acquire, and educators should write these goals with multiple pathways to meet them (Hitchcock, Meyer, Rose, & Jackson, 2002), as described in the box “Case Study: Denny.”

After the teacher has established goals for the class, the next task is developing specific methods to help the children meet the prescribed goals. The teacher uses methods or instructional strategies that help children achieve success in their learning. In keeping with UDL principles, the teacher can present concepts in multiple ways, offer children multiple means of expression, and provide a variety of options for engagement with learning (Hitchcock et al., 2002). The teacher should understand the need for providing verbal, visual, and tactile input for the children and can give children opportunities to engage with the information through music, movement, or dance. For example, during a unit on weather, the teacher may supply scarves for children to manipulate while they represent such concepts as windy (shaking the scarf), sunny (shading themselves with the scarf), or cold (wrapping the scarf around their body). The children can also dance and sing to weather-related songs.

Scaffolding learning, supplying hands-on materials, and accessing children’s background knowledge are all methods that the teacher can incorporate into daily activities (see box, “Cars and Trucks”). Many children can express their understanding of concepts verbally; however, signs and pictures are also valid means for communication. Drawing and painting are ways for children to engage in learning, but other children may choose to construct or perform. When creating a print-rich environment, the teacher should include pictures with labels to expose children to print (Gipe, 2006; McGee & Richgels, 2004). To have UD, the shelf labels should include Braille or the teacher should glue an actual item, like a puzzle piece, on the label

Table 2. General Classroom Setup and Materials

Classroom Area	Materials/Considerations
Overall classroom	<ul style="list-style-type: none"> • Wide walkways, which consider children in wheelchairs or with walkers • Low shelves, labeled bins, and a mobile sink for ease in accessibility for all children • Clearly defined spaces for play and engaging with materials
Art center	<ul style="list-style-type: none"> • Jumbo colored pencils/paintbrushes/stampers for easier grip • Scented markers • Roll-on or dot painters • Wikki Stix • Chunky crayons
Science center	<ul style="list-style-type: none"> • Magnifying glasses and binoculars for closer observation of materials • Prisms and color paddles for color exploration • Touch and feel bags with items related to a theme or interest of the children • Eyedroppers • Magnets of all shapes and sizes • Giant thermometer and fabric measuring tape, both with large numbers for easier viewing
Library center	<ul style="list-style-type: none"> • Books with textures, flaps, or cutouts that encourage exploration • Cardboard books for ease in page turning • Books with sound to read the story or engage the child in the content • Pillows, beanbags, or stuffed animals for comfort and support

Case Study: Denny

Transitioning between activities is a very broad goal and may challenge children who do not have the skills to move easily between activities. For such children, the teacher needs to consider specific supports. Consider the following example.

Denny will be in Ms. Adams’s class, and Ms. Adams has already received information that indicates that Denny has a difficult time stopping and starting activities. When fully engaged with preferred materials or in a preferred activity, he has particular difficulty. If a teacher or parent asks him to put away materials or move from a preferred activity, Denny exhibits such challenging behaviors as throwing objects, defiance, and crying.

Denny may respond to other modifications, for example, additional time or flexibility within transitions; however, Ms. Adams also needs to recognize that she may need to have a different goal for Denny. She should plan a goal for Denny that includes appropriate responses to a given directive, like cleaning up materials, with the hope that transitions will ultimately become more manageable for him.

Cars and Trucks

For an activity specific to a transportation theme, Ms. Adams can furnish a large piece of butcher paper. The children first drive toy cars and trucks through paint and then drive them onto the paper. The teacher can also make available a variety of paints, markers, stencils, and other art materials so that children can add detail to the piece of butcher paper. In the block center, Ms. Adams can mark roadways with raised puff paint or hot glue that children can feel while they "drive" their vehicles. The key is that the teacher needs to be flexible in how he or she allows the children to demonstrate knowledge of the material without weakening the content.

so that children can both see and feel it.

The teacher must consider children's individual needs when planning how to support development. Even a student who does not have an individualized education program might need monitoring because of difficulty following instructions or completing tasks. The teacher can create a communication board with a variety of pictures that students can use to express needs, wants, and preferences. With explicit instruction in social communication, providing prompts or scripts will help children develop social communication

skills. The teacher can also pair a peer with strong social skills with another student to model appropriate communication.

Materials

Educators should select materials that align with UDL principles and should remember that children must have multiple ways to accomplish a goal or learn a skill. Teachers should therefore choose a variety of materials that cater to children's visual, tactile, and auditory needs. Further, teachers should ensure that the materials encourage

children's autonomy as much as possible.

Puzzles are one type of learning material that a teacher might want to have available for the children, so the teacher should select puzzles that have visual and tactile appeal to attract the children's attention. Puzzles with large knobs can help develop children's motor skills or coordination. Children with visual impairments may enjoy puzzles that make noise when children put in or take out pieces. Rubbery non-skid mats can prevent the puzzles from sliding around (Haugen, 2005).

The teacher should provide blocks that are a variety of shapes, sizes, textures, and weights. Using bristle blocks or modifying wooden blocks by adding texture (e.g., fabric, puffy paint, sandpaper) allows the teacher to meet the needs of all children in the classroom. The children can also use alphabet blocks that the teacher has modified with Braille labels or magnets to help children stack them (Day, McDonnell, & Heathfield, 2005; Haugen, 2005). Educators can further modify blocks with shakers or bells inside them for children who need auditory input. Finally, for children who are developing muscle strength, balance, and coordination skills, educators can use blocks of different sizes and fill them with bags of sand or flour to provide varying levels of weight for children to lift and manipulate.

Teachers can find many ways for children to experiment with letters (Clay, 1993) across multiple areas of the classroom, including the library, writing center, and dramatic play center. Magnetic letters come in different sizes; larger ones are sometimes easier for young children to grip. Children can use the magnetic letters on magnetic chalkboards or cookie sheets. In addition, the teacher can use a die-cut machine to make letters from fine-grit sandpaper so children can trace the letters while feeling the texture on their fingers. They can also trace letters in shaving cream, hair gel, or sand. Teachers can also cut letters from different materials—such as sponges, foam, or different textures of fabric or oilcloth to enable children to



Table 3. Suggestions for Free Online Software

Web Links for Free Digital Programs	Description
http://udltechtoolkit.wikispaces.com/Home	Provides learning tools to enhance learning for all children
http://bookbuilder.cast.org/	Enables users to create, share, publish, and read digital books that engage young readers
http://www.bookshare.org/	Provides accessible books and periodicals for readers with print disabilities
http://www.signedstories.com/index.cfm	Provides books that readers can view in sign language and with subtitles. Books are also in audio, and users can easily share them with friends and family
http://www.mothersgooseclub.com/index.php	Furnishes nursery rhymes with child actors who animate the poems
http://www.carnegielibrary.org/kids/storymaker/storymaker.swf	Allows for creating, sharing, and publishing digital books for repeated readings and includes wonderful prompts to help children begin
http://www.naturalreaders.com/index.htm	Provides application software that reads any text on a computer
http://www.wordtalk.org.uk/About/	Provides a text-to-speech plug-in for MS Word

feel, move, and experiment with letters. When the children are ready, they can begin to make the sounds of the letters while touching them or identify words that begin with the letters. By carefully choosing materials that support tactile, visual, and verbal learning, as well as listening skills, Ms. Adams can ensure that all children will be able to grow and develop in a supportive environment that caters to individual needs.

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Technology

The literature describes the benefits of play with information and communications technologies (Marsh et al., 2005; Stephen & Plowman, 2008). UDL, with its emphasis on technology, helps create multiple and flexible ways for teachers to present information for students. Computers not only positively affect children’s learning but can also increase engagement and independence in learning tasks (Pisha & Coyne, 2001). Teachers should con-

sider both hardware and software needs when choosing technology for the classroom.

Hardware. When selecting options for the computer such as the size of the monitor and interface tools such as a mouse or a joystick, the teacher needs to consider the best tools for meeting the needs of preschoolers. Researchers agree that children learn significantly more when they can view video information on a large monitor

(Maniar, Bennett, Hand, & Allan, 2008). A 21- to 26-inch monitor is useful for clearly displaying detailed information without distorting the images and is small enough to be portable within the classroom. Starting with the basic LCD screen that offers a bright display, the teacher can use the control panel to change the settings to make them accessible for different children (see box, “Case Study: Toni”).

Software. Although much software is available for children, the research on effective programs is still under

way. However, one program incorporates the basic emergent literacy concepts noted in the National Reading Panel findings (2000). This software, entitled Clicker 5, systematically sets up word choices for children to use in creating sentences and stories. Clicker 5 increases children’s rhyme awareness, word naming, and simple composition skills (Karemaker, Pitchford, & O’Malley, 2008). However, the software cost may be prohibitive for some classrooms. Therefore, a look at some free online software is a logical approach to building a software library (see Table 3).

Reviewing web sites for appropriate games and learning activities for preschoolers can take hours of research, time, and effort. Because a trial-and-error approach to surfing the web can be so time-consuming, having specific criteria in mind is wise. The principles of UDL can offer guidance in this area; and the teacher should evaluate web sites for flexibility in representing information, engaging children, and allowing children to express themselves in different ways. “My Story-Maker” (<http://www.carnegielibrary.org/kids/storymaker/storymaker.swf>) is a software program that meets these criteria. This program allows young

Case Study: Toni

Toni has difficulty recognizing symbols in print and focusing on main objects in pictures or drawings. To modify computer settings for Toni, Ms. Adams goes to the Appearance and Personalization tab and clicks on Adjust Screen Resolution to change the font size. By clicking on the Ease of Access control button, she can also hide background images and help focus Toni's attention on specific objects. Ms. Adams needs to become familiar with the different settings that already exist on the computer to modify the visual input to meet the needs of the children. She may want to consider further accommodations with Toni, such as the following:

- Some fonts are particularly complicated or decorative, whereas the letters in others are easier for children to understand. She should therefore choose an easy-to-read font.
- Text with close letter spacing can be problematic for children with central visual field deficits. Proportionally spaced text can be more difficult than fonts that allow the same amount of horizontal space for each letter.
- Black text on a white background is most legible for print materials; however in some cases, light letters on a dark background can be more readable. Web sites such as <http://www.lighthouse.org/accessibility/design/accessible-print-design/making-text-legible/> offer suggestions for designing accessible print.

children to create stories with the help and support of the teacher. The support that the teacher offers to the children makes a large contribution to their learning through technology (Siraj-Blatchford & Siraj-Blatchford, 2006). “My StoryMaker” animates concepts of print when the picture book opens and creates a space for the author’s name. Children choose from a

menu of settings, animated figures, and objects to create a story and illustrate it. A story starter such as “Once upon a time . . . ” prompts children, and they can type text onto the page. Preschoolers can dictate the story to a peer or to the teacher. A preview button allows the child to hear the story and then print it. The ability to select characters, choose a plot, and select a

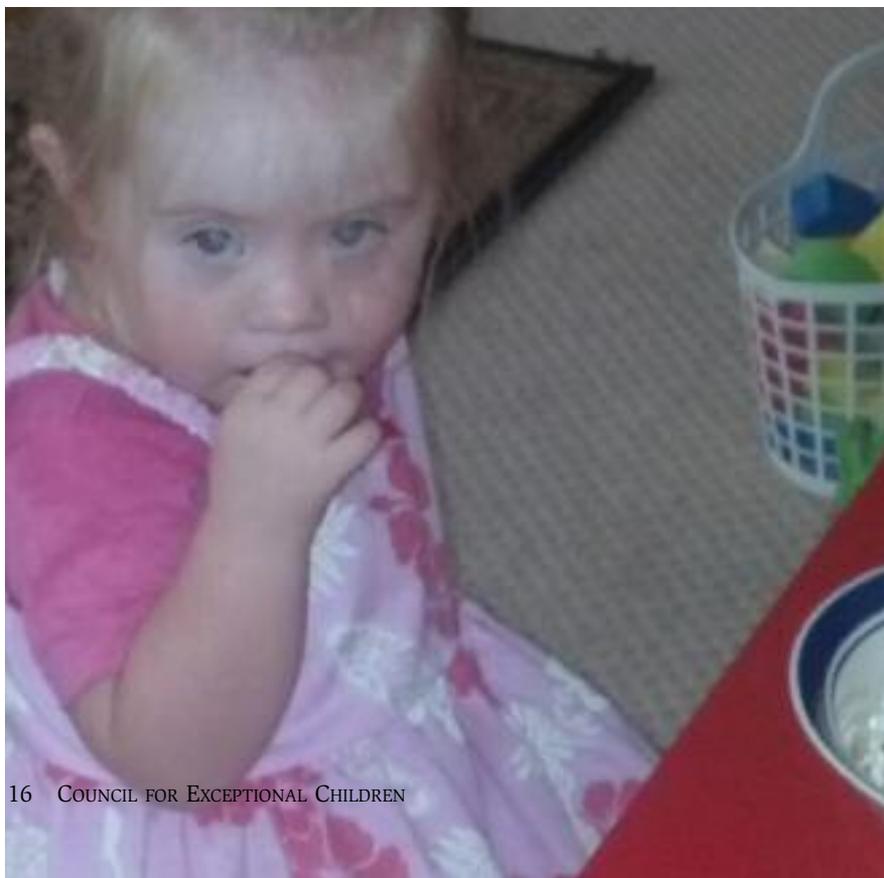
setting gives a child the freedom to create something that is personalized and holds meaning for him or her (Bitter & Pierson, 2005). Other benefits of “My StoryMaker” are that the child can save the text, can read the text along with the voice, and can play it repeatedly. Repeated readings provide the following:

- Opportunities for multiple exposures to words and related concepts.
- Connections between content-area knowledge and/or academic language.
- Assistance in developing a strong oral language foundation (Pollard-Durodola et al., 2011).

Widget’s “Communicate: By Choice” (2005) is interactive software that helps foster independent learning by providing and reading the text aloud to students. It is fully switch-accessible, and children can use it with interactive whiteboards and touch screens. More than 100 activities enhance cognitive and language development, allowing the child to select answers to questions and perform such problem-solving tasks as sequencing, categorizing, and discriminating. An additional benefit is the editor component, which enables the teacher to design activities and personalize them for individual children. Immediate feedback and motivational graphics with sound keep the child interested and engaged in the activities. Research supports the Communicate series of software programs, which holds promise for early literacy development (Judge 2006; Parette, Blum, Boeckmann, & Watts, 2009).

Final Thoughts

Young children come to preschool with varying levels of experiences and needs, and their educational environment must be able to address these needs. A universally designed curriculum and environment provide the foundation for ensuring the inclusion of all children. When children enter a classroom that allows for multiple means of representation, engagement, and expression, they are able to



develop and enhance their physical, social, and cognitive abilities in addition to building their levels of independence and local autonomy.

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