Cierra attends an inclusive preschool classroom with her typical peers and enjoys participating in the adopted curriculum. Her teacher, Mrs. Jones, has planned a technology-supported emergent literacy activity that presents differing demands to students for participation, including independently transitioning to different activities, collecting materials, drawing, and using response cards and a computer. However, Cierra’s disabilities present challenges to her participation: She has cerebral palsy and demonstrates fine-motor difficulties, and she cannot independently use her wheelchair or speak. Mrs. Jones is presented with a dilemma—how does she include Cierra in these steps of her planned, technology-supported activity so that Cierra is an active participant?

Special Educator Roles

Such scenarios are prevalent in today’s early childhood classroom settings, given that technology integration and inclusion of young learners with disabilities both are now recognized as developmentally appropriate practice (Division for Early Childhood & National Association for the Education of Young Children, 2009; National Association for the Education of Young Children and Fred Rogers Center, 2012). Including young children with disabilities may present challenges when developing planned activities, though barriers to inclusion can be minimized by (a) using readily available instructional technologies (Blum & Parette, 2013); (b) applying universal design for learning (UDL) principles to accommodate the widest range of learning strategies, preferences, and student characteristics (Stockall, Dennis, & Miller, 2012); and (c) using assistive technology (AT; Sadao & Robinson, 2010).

Today’s preschool teachers increasingly use an array of technologies to deliver their curricula. Computers, interactive whiteboards, hand-held devices, and other tools are often used to support classroom instruction for all children. To be used effectively, planned preschool activities that incorporate technology should (a) be connected to curriculum standards and learning objectives or benchmarks, (b) use technology that specifically addresses these learning objectives or benchmarks, (c) identify instructional methods, and (d) include assessment to document outcomes of the activity (Parette & Blum, 2013). In each of these elements, UDL principles have a role.

What Is Universal Design for Learning?

Couched in basic and applied brain research, UDL provides a framework enabling teachers to design and deliver planned classroom activities that maximize both accessibility and learning outcomes (Hall, Meyer, & Rose, 2012). There are three essential guiding principles in UDL—representation, action and expression, and engagement—and each requires multiple means of expression, presentation, or delivery (see CAST, http://www.cast.org/udl/index.html). In planning classroom activities, teachers should consider how to incorporate multiple instances for each of these principles when selecting and using technology, instruc-
tional strategies, and assessment methods.

**Multiple Means of Representation**

*Representation* refers to how the teacher presents information and content during the planned activity. Multiple instances of representing content using technology include use of auditory features (e.g., enhancement of auditory perception, sound and voice production, decoding of text and symbols, clarification of vocabulary and symbols), visual features (e.g., enhancement of text and picture perception, illustration using multiple media to connect background knowledge), kinesthetic (e.g., iPad apps that respond to movement), and tactile modes (e.g., drawing applications using a finger swipe or stylus).

**Multiple Means of Action and Expression**

*Action and expression* refers to varying the ways in which young children can express what they have learned during a planned classroom activity or through participation. Multiple instances using technology can include modes of communication used by children (e.g., pointing to a picture on a printed symbol array, using an electronic communication device, use of an eye gaze board, capturing a video or audio recording to present understanding); physical manipulation of tools used for expression (e.g., pencil grips to make it easier to hold a pencil for drawing; adapted iPad stylus; apps that allow video capture of drawing movements on the screen while recording audio as the child comments on a drawing; options for drawing, such as varying lines, colors, shape, and stamps); and varying settings (small vs. large group), each allowing different opportunities for action and expression.

**Multiple Means of Engagement**

*Engagement* refers to how the teacher designs and delivers a planned classroom activity that (a) recruits interest in the activity, (b) provides students with multiple options for maintaining their effort and diligence toward learning, and (c) enhances self-regulatory behavior. Multiple instances related to technology selection include varying degrees of child-directed versus teacher-directed learning opportunities (e.g., choice in whether an e-book reads for the student, options for games and ancillary activities when engaging content, connections that are relevant and authentic), varying formats for instruction (differing levels of challenge, providing opportunities for mastery-oriented feedback, varying screen presentations to elicit interest), and different sizes and formats for groups (large-screen presentation using a SMART Board or LCD projector; small computer or hand-held device screen presentation used by individual children, or in small/large group setting; opportunities for individual work or collaboration).

When considering each of these principles in the design and delivery of a planned classroom activity, the teacher should consider communicating with other school professionals who provide services to children with disabilities to ensure that targeted planned classroom activity strategies can be implemented in other service settings as well. For example, in making decisions about technologies having UDL features, an occupational therapist (OT) might be consulted regarding the physical demands presented by page-turning features on electronic books designed for hand-held devices. The OT might be able to recommend specific arm and body postures, and might be able to incorporate practice with electronic books (and the recommended strategy) into the child’s OT session. Similarly, when considering use of various voice output devices to provide an alternate means of expression for a particular child, consulting the speech-language pathologist may result in helpful strategies for effectively using targeted UDL tools and strategies in planned activities, and which support the child’s speech and language goals.

**What Is Flexible Participation?**

All early childhood teachers are challenged to ensure that young children with disabilities—particularly those with the most severe disabilities...
(physical, cognitive, and sensory)—receive an educational benefit from inclusion in regular classroom settings (Downing, 2010). The support provided to these children should be individualized to meet their unique learning needs and to ensure their participation in planned, technology-supported classroom activities.

Decades ago partial participation was described as an inclusion practice for children having more severe disabilities (Baumgart et al., 1982; Ferguson & Baumgart, 1991). This practice allowed children to acquire skills enabling them to participate partially across least restrictive environments and activities. Partial participation in a planned technology-supported activity assumes that when children with severe disabilities do not completely perform one or more steps in the activity in the same way as typical peers, they still have had the opportunity to participate and engage in learning that is challenging. In this approach, complete participation is not requisite for inclusion in the class or planned activity. If a student cannot participate in all or part of an activity in the same way as typical peers, then specialized supports and services, AT, and alternate or modified activities may be provided to maximize full participation (Downing, 2010). When teachers use partial participation correctly they do not exclude children from participation with others in an activity. Partial participation can lead to fuller participation for preschool children with disabilities when the target UDL-enhanced tools or strategies are incorporated in inclusive activities. For example, if a preschool child has physical challenges and cannot go to a storage shelf and retrieve an iPad, the child can choose a peer “helper” by pointing to a classmate’s picture presented on a chart (a visual strategy). The chosen peer help can then either retrieve the iPad for the student, or provide physical assistance to the child in retrieving the iPad. This permits the child to participate and avoids arbitrary exclusion from meaningful learning activities.

UDL and partial participation may appear to be opposing educational concepts: Whereas UDL assumes proactive design of the curriculum to create maximum access and outcomes for all children, partial participation focuses on individualized modifications and meaningful participation. However, both educational concepts can be harmoniously combined to enable flexible participation; that is, sharing a flexible approach to meaningful participation framework, thereby providing access to the planned, technology-supported classroom activity and enhancing outcomes.

**Creating Opportunities for Flexible Participation Using Technology**

Early work on partial participation (Baumgart et al., 1982) presented five types of strategies: use or create materials or use devices, use personal assistance, adapt skill sequences, adapt rules, and foster social and attitudinal adaptations. These strategies can be reinterpreted within the framework of flexibility provided through application of UDL principles as:

- Flexible curriculum and technology use.
- Flexible use of peer or adult assistance.
- Flexible skill sequences.
- Flexible rules.

Table 1 presents classroom examples of each of these. However, what is of particular importance to preschool educators is how to apply these flexibility principles to planned classroom activities.

**Steps in Planning Technology-Supported Activities**

Any planned, technology-supported preschool activity has a sequence of steps that allow the lesson to be taught and flow in a predictable sequence. Every activity begins with a transition, includes various participation steps, and concludes with another transition to some other activity. Considering UDL principles when planning an activity presents opportunities for flexible participation at each of these stages. Depending on the performance expectation of each step, varying “do/say/remember” demands (Petersen-Karlan, Parette, & Blum, 2013; see Table 2) supports all children in effectively and efficiently participating.

To understand how flexible participation can be used for young children with disabilities, consider the steps and demands present in Mrs. Jones’s technology-supported activity. Her learning...
Her planned activity has four steps:
1. Transition to SMART Board area.
2. Participate in an introductory online activity (Starfall), using response cards.
3. Draw and talk about pictures using art materials and a web-based application (VoiceThread).
4. Transition to centers.

In teaching the planned activity, Mrs. Jones must consider how Cierra can participate in each step of the activity. To ensure that Cierra can participate as fully as her peers, Mrs. Jones analyzes each step of the process, identifies how Cierra’s challenges might affect her involvement, and selects AT and other solutions (see Table 3).

Step 1: Transition to SMART Board Area

Given Cierra’s use of a wheelchair and difficulty seeing from a distance, a simple flexible participation solution would be to have another student push Cierra in her wheelchair to the SMART Board area (peer assistance). However, UDL principles compel teachers to afford opportunities for choice; a peer helper “choice board” (i.e., a chart with digital pictures of her classmates) allows Cierra to select her peer helper, by pointing to a picture of the classmate. This AT-supported solution helps Cierra complete a task she could not do “without the tool (or strategy) at the expected performance level” (Parette, Peterson-Karlan, Wojcik, & Bardi, 2007, p. 22).

Step 2. Participate in Online Literacy Activity

For her literacy activity, Mrs. Jones accesses Starfall.com and shows students animated segments for each of the four beginning sounds (i.e., /p/, /c/, /d/, /b/; see Figure 1). She uses a guided discovery instructional strategy, which enables her to model, scaffold, and ask questions as she presents each

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<th>Strategy</th>
<th>Description</th>
<th>Classroom Examples</th>
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<tr>
<td>Flexible curriculum and technology use</td>
<td>Designing curricula that permit multiple means of representation, action and expression, and engagement to maximize activity participation.</td>
<td><strong>Representation:</strong> Use visuals (pictures) or three-dimensional items (the actual item the word represents, e.g., a real pot when teaching pot) and auditory (i.e., words spoken) when teaching vocabulary. <strong>Action and expression:</strong> Use assistive technology (e.g., a voice output device) to retell a story, either with or without teacher scaffolding. <strong>Engagement:</strong> Use visual and verbal cues (scaffolding) presented within the learning objective. Objectives should allow for multiple levels of relevant participation that are authentic to each child’s ability.</td>
</tr>
<tr>
<td>Flexible use of assistance (peer or adult support)</td>
<td>Used to provide a scaffold or in collaboration to maximize activity participation.</td>
<td><strong>Representation:</strong> Permit peers to restate instructions using a visual guide and verbal expression in collaboration with a partner. <strong>Action and expression:</strong> Allow peer assistance to child with disability to position wheelchair for Circle Time. <strong>Engagement/action and expression:</strong> Allow peers to collaborate together to choose a story to be read; one child expresses choice orally while another expresses it using a voice output device (assistive technology).</td>
</tr>
<tr>
<td>Flexible skill sequences</td>
<td>Permitting changes in order of skill sequence to maximize participation.</td>
<td><strong>Representation:</strong> During a unit overview, use a visual organizer on a SMART Board or iPad paired with the verbal presentation. Allow children to hold concrete objects that represent each skill sequence. <strong>Action and expression:</strong> Instead of retelling a story and identifying main characters, retell the story by simplifying the sequence. <strong>Engagement:</strong> Permit children to identify what is most important to learn and allow choices (individually and collaboratively when appropriate) about what to learn first.</td>
</tr>
<tr>
<td>Flexible rules</td>
<td>Allows for broader and more universal rules that maximize activity participation.</td>
<td><strong>Representation:</strong> Present rules visually and paired with an icon or picture. <strong>Action and expression:</strong> Define class rules as broad expectations (e.g., “clean up after activities”), allowing for peer assistance or flexible completion of the task for a child with a disability. <strong>Engagement:</strong> Permit choice regarding the classroom task a child will complete; allow task sharing to foster collaboration.</td>
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sound. Her students interact by answering questions and making sounds when shown letters. Each child has a set of four response cards, with pictures associated with each of the four beginning sounds; when prompted, they hold up the card that has the beginning sound made by Mrs. Jones. Because Cierra cannot speak or hold response cards, and has difficulty remembering rules for participation, Mrs. Jones’s flexible participation solutions for this step include peer support, an augmentative and alternative communication device, and a Boardmaker rules strip (see samples, Figure 2).

**Step 3. Draw and Talk About Pictures**

In the third step of the planned activity, students must go to the art bin to retrieve drawing materials, and then draw four pictures representing each of the beginning sounds. Using VoiceThread, a free web-based application, Mrs. Jones’s students make button selections with a mouse to record their comments about their drawings using audio or video, paired with “doodling” (drawing on a screen while talking). VoiceThread allows Mrs. Jones to capture a permanent product of children’s understanding of each of the four beginning sounds. Because Cierra cannot move independently to gather art materials, has fine-motor challenges, and is nonverbal, Mrs. Jones employs several flexible participation solutions: a peer helper selected by Cierra, an adapted pencil grip, and an augmentative communication device with recorded messages to assist Cierra in commenting. (Figure 3 provides a sample VoiceThread “doodle” activity.)

### Table 2. Do/Say/Remember Demands for Activity Steps

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<tr>
<th>Activity Demand</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do</td>
<td>Physical steps</td>
<td>Things children do with their hands, moving or walking between areas of the classroom, listening/hearing directions and content.</td>
</tr>
<tr>
<td>Say</td>
<td>Spoken requirements</td>
<td>Asking and answering questions, using social etiquette phrases.</td>
</tr>
<tr>
<td>Remember</td>
<td>Things that must be recalled</td>
<td>Facts, steps in task sequences, routine schedules.</td>
</tr>
</tbody>
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### Figure 1. Starfall Literacy Activity

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### Figure 2. Sample Boardmaker Rules Strips

Note. Picture Communication Symbols ©1981–2013 by DynaVox Mayer-Johnson LLC. All rights reserved worldwide. Used with permission.
Table 3. Flexible Participation Solutions for a Planned Technology-Supported Preschool Activity

<table>
<thead>
<tr>
<th>Activity Step</th>
<th>Activity Demands</th>
<th>Cierra’s Challenge</th>
<th>Flexible Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transition to SMART Board area</strong></td>
<td>• See SMART Board&lt;br&gt;• Hear teacher directions&lt;br&gt;• Move to SMART Board area and sit down</td>
<td>• Recall location of SMART Board&lt;br&gt;• Remember rules for quiet transition</td>
<td>Peer Helper Choice Board: Peer pushes her to the SMART Board area of the classroom and positions her.</td>
</tr>
<tr>
<td><strong>Participate in introductory Starfall activity</strong></td>
<td>• See Starfall screen and teacher&lt;br&gt;• Hear Starfall audio, teacher questions, and peer responses&lt;br&gt;• Hold and show response cards</td>
<td>• Recall sounds associated with letters&lt;br&gt;• Remember rules for participation</td>
<td>• Talking Brix Communicator or Talkbook Four&lt;br&gt;• Peer Helper Choice Board: Cierra points to response card; peer holds it up.</td>
</tr>
<tr>
<td><strong>Participate in VoiceThread activity</strong></td>
<td>• See VoiceThread screen and drawing materials&lt;br&gt;• Hear teacher instructions and peer comments&lt;br&gt;• Gather paper and pencil from bin&lt;br&gt;• Hold pencil and draw pictures&lt;br&gt;• Use mouse to make button selections and comments</td>
<td>• Pronounce beginning sounds (/p/, /c/, /d/, /b/)</td>
<td>Cierra cannot move to the art materials storage bin independently, cannot hold a pencil due to poor grip, and cannot speak.</td>
</tr>
<tr>
<td><strong>Transition to centers</strong></td>
<td>• See storage and centers areas&lt;br&gt;• Hear teacher signal&lt;br&gt;• Hold and return drawing materials&lt;br&gt;• Store drawings in cubby&lt;br&gt;• Move to centers area</td>
<td>• Pronounce beginning sounds&lt;br&gt;• Comment on drawings&lt;br&gt;• Recall sounds represented by drawings&lt;br&gt;• Remember steps for commenting in VoiceThread</td>
<td>Cierra has difficulty seeing from a distance, poor hand strength and difficulty holding objects, is nonverbal, and forgets participation rules.</td>
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Note. The Starfall “Learn to Read with phonics” website (http://starfall.com) offers a variety of free interactive beginning literacy activities. VoiceThread (VoiceThread LLC) is available both as a web-based application and a stand-alone app and is a tool for collecting and storing group conversations and activities. Talking Brix Communicator (Dynavox Mayer-Johnson), Talkbook Four (Enablemart), and 4-Message Compact Communicator are recording/augmentative communication devices; the teacher can record a different message for each button, and affix letters or images (or, in the case of 4-Message, objects linked) to each to enable nonverbal students to respond. Boardmaker (Mayer-Johnson) is a picture communication system, available in a variety of formats.
Step 4. Transition to Centers

Following this activity, Mrs. Jones expects her students to return their drawing materials to the art bin, store their drawings, and then quietly transition to learning centers. This activity presents some challenges for Cierra because of her difficulty seeing the storage and transition areas, problems in holding objects, and challenges with remembering transition rules. For this step, Cierra’s flexible participation is supported by use of a peer helper and a Boardmaker rules strip.

In each of the planned, technology-supported activity steps, flexible participation strategies enable Cierra to access the curriculum and participate with her typical peers. (For additional examples of flexible participation strategies, see box, “Case Studies in Flexible Participation.”)

Figure 3. Sample VoiceThread Doodle

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Case Studies in Flexible Participation

Omar

Mr. Giles has planned a multistep technology-supported whole class activity for his preschool classroom using a downloaded SMART Exchange (http://exchange.smarttech.com/) activity on story element sequencing, using a touchscreen computer with an LCD projector. One step in his activity is for students to listen to him read a story; in a subsequent step, students take turns using the computer to arrange pictures of story elements in sequence. Omar, a student with autism spectrum disorder, has difficulty identifying cues to take his turn. Mr. Giles uses a flexible participation strategy of allowing all the children in his class to participate with a peer if they wish. Mr. Giles asks Maddie, a classroom peer, to serve as a peer helper and provide verbal scaffolding—which is an effective strategy for Omar—to talk him through the steps when he is called upon. Because Mr. Giles’s planned activity incorporates flexible rules and scaffolded peer assistance, Omar is able to participate along with his peers.

Adelita

In Ms. Santiago’s planned technology-supported activity, one step requires having her preschool students draw and tell a story about their families using Educreations (http://www.educreations.com/), a free iPad app that permits children to draw, import media, and record their voices as they draw. The recorded stories and children’s drawing movements on the screen can be played back, and the stories can be e-mailed or shared with others on Facebook and Twitter. Ms. Santiago would like to send her students’ stories home to their families, and use these products as a component of the students’ portfolio assessments to demonstrate their skills. Adelita, who has Down syndrome, currently can only speak two-word sentences, which makes it difficult for her to create elaborate stories and participate in the activity. Ms. Santiago consciously plans for flexible participation in the activity: She allows children to select and import images (e.g., one or more pictures of the family on an outing) to help them remember what to draw or talk about. She also talks with Adelita’s family to get details about the images and family story. Based on this conversation, she records some key phrases on a GoTalk Pocket (Attainment Company), a small voice output device with space for six recordings and pictures representing those phrases. Adelita can use the GoTalk Pocket as needed for support. In applying flexible technology use, Ms. Santiago has enabled Adelita to participate in the activity: use of the GoTalk Pocket permits multiple means of representation (using pictures as a scaffold) and multiple means of action and expression (using both Adelita’s voice and a voice output device). The structure of the activity also permits Adelita to demonstrate her full abilities, as her story became part of her portfolio assessment. Most important for Adelita and her family, it permits her to be a member of the classroom and connect the family to her technology-supported activity. Her Educreations drawing was e-mailed home to the family, who in turn shared it with extended family members.
Conclusion

Many challenges that preschool children with disabilities encounter in the curriculum can be addressed by identifying AT support as part of a child’s individual family service plan (IFSPs) or individualized education program (IEP). These solutions, however, are specific to the child and connected to specific goals and objectives, rather than connected to steps in planned classroom activities designed for typical peers (and to associated benchmarks and standards). Flexible participation is a way for teachers to incorporate unique AT solutions to help young children participate in steps of a planned, technology-supported preschool activity along with their typical peers. Because many preschool teachers are just beginning to understand UDL and to implement its principles into planned, technology-supported activities, using flexible participation should be viewed as a work in progress.

Flexible participation is a way for teachers to incorporate unique AT solutions to help young children participate in steps of a planned, technology-supported preschool activity along with their typical peers.

Flexible participation, however, holds great promise for providing children with disabilities an opportunity to participate to the maximum extent possible, without any lowering of expectations. It is a method of removing barriers; incorporating UDL principles supports both maximizing access and offering all children in the classroom opportunities for success. This strategy warrants further examination by the field, and future research will substantively add to our knowledge base regarding inclusion of young children with disabilities in the general curriculum.

References


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