The Assessment of Young Children Through the Lens of Universal Design for Learning (UDL)

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Abstract

Early Childhood Education (EDE) describes the education of young children from birth through age 8. EDE reports have concluded that traditional approaches to curriculum, such as those emphasizing drill and practice of isolated, academic skills, are not in line with current knowledge of human learning and neuropsychology. These approaches fail to produce the higher-order thinking and problem-solving abilities that students need in the 21st century. Similar limitations in assessment process and scope also exist. Often, there is a poor match between the nature of young student learning and form of assessment. In reading and writing, for example, experts find informal observations and structured performance samples more appropriate than standardized tests for measuring early childhood literacy learning. These assessments are more consistent with developmental characteristics of young children. When considering childhood learning principles (i.e. children construct knowledge; children learn through play; children's interests motivate learning; child development and learning are characterized by individual variation; etc.), assessing the achievement of young children must be a multiply varied process that addresses all students' needs and capacities. UDL is a flexible structure of curriculum development that addresses learner variability. Learner variability dictates a need for assessment variability. By implementing UDL core principles, variation in assessment methods, formats, scope/range/level, product/outcome, and instructor feedback can support more authentic and, likely, more accurate assessment results for young children.

Background

Over the past 37 years, significant change has taken place in the laws and systems of education for learners with varying abilities and needs. As an example of such change, in the United States prior to 1975, there was very limited effort directed toward meeting needs of learners with disabilities within a general education environment. Most programs had evolved following the "separate but equal" model—with students of differing needs and abilities segregated from other students in specialized programs and schools. Following the implementation of U.S. Public Law 94-142 however, which is known as the Education for All Handicapped Children Act of 1975, differing learners' needs were required to be assessed and addressed through the implementation of individualized educational programs in order to achieve a free, appropriate public education (FAPE). PL 94-142 established the right for all students to be educated in the least restrictive environment that would meet their identified learning needs, and from that time on, gradually and increasingly, students with differing needs were included in the general education system

(the ultimate least restrictive environment) and were expected to achieve in similar ways to their non-disabled peers. While the system established by this law supported differing learners' involvement with non-disabled peers to the maximum extent possible through a "mainstreaming" approach, the system later came into question as being too separate from general education (Wang, Reynolds, & Walberg, 1988; Behrman, 1992). This resulted in movement by educational and political leaders in the U.S. to fully include learners with disabilities in the general education classroom (Fuchs & Fuchs, 1994). Now, inclusion of students with differing needs and abilities in general classroom instruction is a primary mode-of-operation for schools in the U.S., and the move toward inclusive education is expanding throughout the world.

Advances and developments in technology play a significant role in supporting increased access to the general curriculum for learners with widely-varying needs. Digital technology has opened the door to increased information accessibility. Digital information can be easily changed into different formats, such as enlarged print, auditory information, and even Braille. Supported by the varying capacities of technology, learning models now exist in which ***all*** learners' needs can be meaningfully addressed, including the needs of learners with disabilities, through innovative, diversified, and appropriate instructional design of the general education curriculum (Hitchcock, Meyer, Rose, & Jackson, 2002; Simmons & Kame'enui, 1996). One such learning model is Universal Design for Learning (UDL). The framework of UDL is a curriculum design model that supports these above-stated objectives, and it is highly relevant for learners with widely varying needs, including learners with and without specific disabilities (Rose & Meyer, 2002). Its three core principles - multiple means of representation, multiple means of action and expression, and multiple means of engagement—offer a relatively simple but effective roadmap for addressing learner variation through diverse curriculum design (CAST, 1999).

Recognizing the important connection between technology, UDL, and equity of access in education, the U.S. Department of Education included definitions and references to UDL in its recent National Educational Technology Plan, completed in 2010, and projecting technology use in education for the next 10 years (US DOE, 2010). Additionally, the U.S. Congress adopted the National instructional Materials Accessibility Standard (NIMAS) as part of the Individuals with Disabilities Education Improvement Act of 2004, a reauthorization of the Individuals with Disabilities Education Act. NIMAS ensures that all students, kindergarten through grade 12, will have access to educational texts and other printed resources in formats that are readily accessible for their individual learning needs. These policies have led the way in facilitating the development of contemporary learning environments where all students can learn effectively.

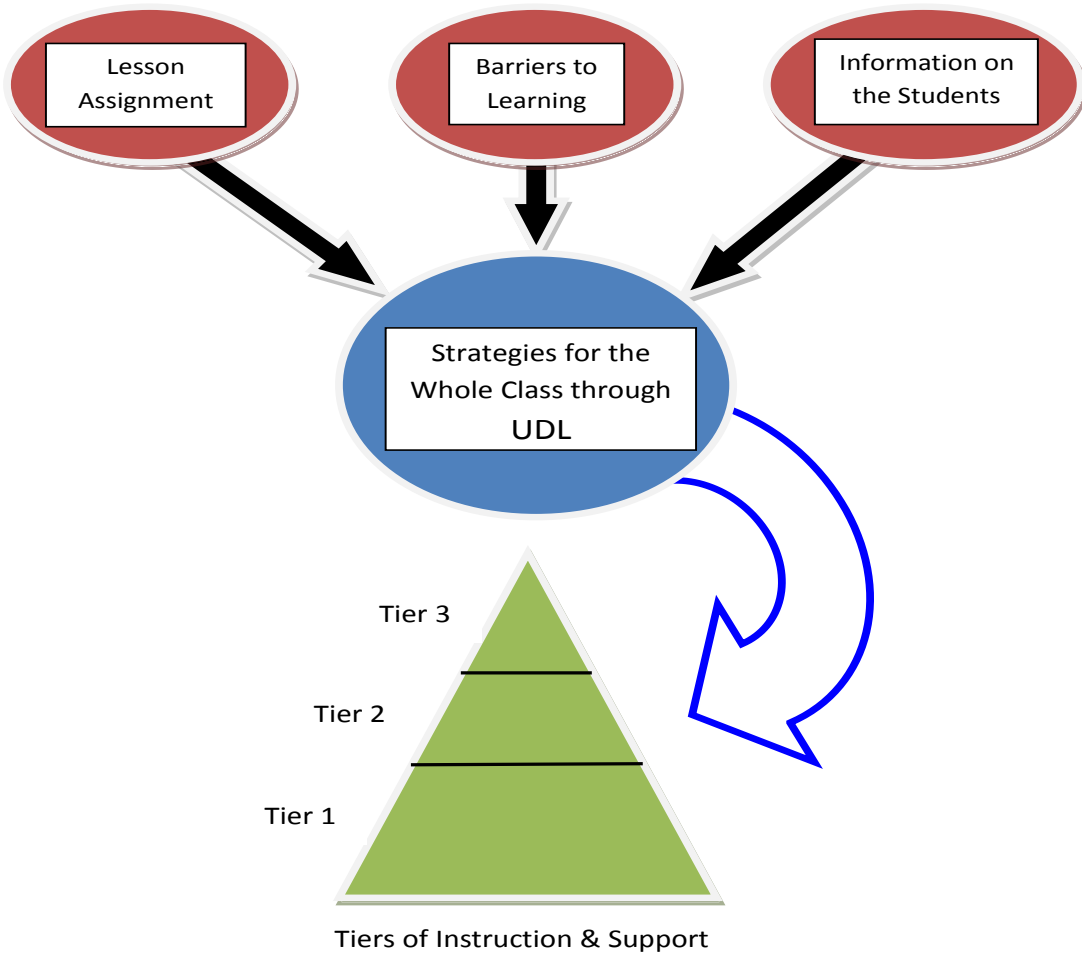
Around the world, teachers are increasingly responsible for providing instruction in a way that reduces barriers and meets the needs of a growing diversity of learners. This can be attributed in part to the continued growth of inclusion initiatives in the United States, Spain, Kuwait, South Africa, and in many other countries that support equal educational access and

opportunity for all learners (Brazil, Ford, & Voltz, 2001; Luftig & Pavri, 2000; Salend, 2000; Sapon-Shevin, Dobbelaere, & Corrigan, 1998; Zindler, 2009; Naicker, 2003; Peters, 2004). Different national and local education systems and leaders are seeking appropriate models to guide the effective teaching of learners whose styles and needs vary widely in general education classrooms or settings. All learners want and need to learn in ways that are engaging and accessible to them. Families recognize that learners with differing needs have a moral and legal right to be educated in environments that provide equal opportunities to learn, and equal access to the general curriculum. Therefore, teachers at all levels must become aware of those instructional models that can successfully integrate variation into teaching and learning, and can build diversification into the goals, methods, materials, and assessments of curriculum and instruction.

Here is a simple model (Fig. 1) that articulates the relationship between the learning task (lesson), the barriers to learning that may be encountered, the student(s)' unique needs, and the use of UDL as an instructional framework that helps teachers to address these areas (Dalton & Abruzzini, 2010). The model presents UDL's integration into a tiered level of instruction and support. Typically, activities and supports at Tier 1 would address the needs of approximately 85% of the student population. Some students will need more in-depth supports and more varied instruction to fully participate in a general education environment. These students' needs would be planned for at Tier 2, and would involve approximately 10-12% of the student population. The framework of UDL applies many variables to the design of instruction, and can be used to address the needs of tier 2 students. At Tier 3, students' needs are much more complex and involved. It is estimated that perhaps 3-5% of students experience this level of learning need. While the instructional strategies, supports, and assistive technologies that are needed for Tier 3 students are more specialized and individualized, UDL can still be used effectively to plan for this level of learner variation and learner need.

Figure 1

Building UDL into Instruction



Understanding and implementing UDL, therefore, can and should be part of the professional development available to educators, administrators, and education support professionals around the world, as it offers a curriculum planning framework that supports inclusivity for all students.

Universal Design for Learning and Access

There is a natural and systematic degree of variation across all groups of learners (Rose & Rose, 2011). As discussed earlier, "separate-but-equal" systems for educating student with differing needs and varied learning styles have not led to successful results for the majority of students with special needs in the U.S. (Wang, et al., 1988; Behrman, 1992) and a movement to include all students, including students with disabilities, in the general education classroom was established (Fuchs & Fuchs, 1994). As students were increasingly found in the general

education classrooms, they were increasingly involved in standardized assessments, culminating in the United States requirement that all students with disabilities, except those with the most complex support needs (the "bottom 2%"), be included in the standardized assessment process (Anderson & Anderson, 2006).

In response, and with the aid of technology, education is currently moving from merely accommodating basic educational needs to including all students in a meaningful way in the general education curriculum (Hitchcock, et al., 2002; Simmons & Kame'enui, 1996). This movement toward meaningful inclusion of all students in the general curriculum is not unique to the U.S. Countries around the world have embraced the concept of inclusion, and many have established legislation that requires inclusive practices be implemented in the schools. U.S. schools are now responsible for providing effective instruction for *all* children, together, in inclusive educational settings. The 2002 United States NCLB (No Child Left Behind) Act set forth standards directly affecting teaching and learning for all students, and requiring that all students be included in assessment, meet assessment standards and that educational and assistive technology should be used, as needed, to support standards achievement for all students. For the approximately 2% of students who have very complex learning needs, alternate assessments are allowed.

To design and implement the new, inclusively diverse classroom, a paradigm shift was necessary. Since U.S. implementation of the Individuals with Disabilities Education Act in 1997, special education and general education no longer follow parallel but separate paths. All students, including students with disabilities, need to be taught, supported, and assessed in the general education environment and curriculum. Answering the call for this paradigm shift, the Center for Applied Special Technology, known as CAST, Inc., developed and established the theory of Universal Design for Learning, or UDL (CAST, 1999). Based in brain research and neuroscience, UDL is framework for guiding educational change. It involves expanding, at the point of design, the teaching methods, materials, and assessments to make inclusive educational goals accessible for all students, including those with disabilities (Rose & Meyer, 2002).

A prior architectural concept, Universal Design (UD), focused on designing products and environments that would be usable by *all* people, to the greatest extent possible, without the need for adaptation or specialized design (Mace, et al., 1996). CAST began to consider how UD might relate to the learning environment. Based strongly upon Vygotsky's concepts of learning and on research in the neurosciences, the UD**L** core principles emerged from the understanding of how the brain learns through the recognition, strategic, and affective neural networks (Rose & Strangman, 2007). These 3 core principles are:

1. Multiple means of representation
2. Multiple means of action and expression
3. Multiple means of engagement

Moving past physical barriers into the learning environment, the UDL framework supports attainment of learning goals for individuals with wide differences in their functional educational abilities, such as seeing, hearing, moving, reading, writing, attending to content, organizing, engaging, and remembering and understanding English (Orkwis & McLean 1998). Specific guidelines for the implementation of UDL principles were developed by CAST, and are available online[1]. The UDL guidelines are intended to be applied as educators design curricula that include the curriculum design components of goals, methods, materials, and assessments. With the issue of accountability at the forefront of current educational dialogue, we focus now of the area of assessment, seeking to better understand it in the context of UDL, as well as in the context of working with young children.

Assessment in Education

The current emphasis on the assessment of students' knowledge and skills acquired in school environments is strong at all levels of education. Accountability has become a ruling factor in education, driving the emphasis on assessment. There are many ways to assess the academic performance of young children. From a recent comprehensive 2008 report on early childhood assessment, the purposes for assessment are identified:

> "Recommendations from the field and the professional literature indicate that early care and education programs should incorporate into their services, coherent *systems* of assessment organized to address the following purposes:
>
> **Screening:** To identify potential problems in development; ensure development is on target.
> **Instructional:** To inform, support, and monitor learning.
> **Diagnostic:** To diagnose strengths and areas of need to support development, instruction, and/or behavior. To diagnose the severity and nature of special needs, and establish program eligibility.
> **Program Evaluation/Accountability:** To evaluate programs and provide accountability data on program outcomes for the purpose of program improvement." (OSPI, 2008, p. 14)

Several methods currently used in evaluation of learning include summative assessment, (local, state, & national), formative assessment, authentic assessment (including project-based assessment), and functional/developmentally-based assessment. It is widely held that

> as a general rule, more formal methods and procedures (such as standardized, summative assessments) are used for higher stakes decisions however, "the use of formal tests with young children is generally considered inappropriate except for purposes of identifying disabilities, establishing eligibility, and documenting program accountability" (OSPI, 2008, p. 15).

[1] http://www.udlcenter.org/aboutudl/udlguidelines/downloads

The accountability of schools, teachers, and administrators depends upon accurate and effective assessment procedures and practices, however the process of accurately assessing *all* students, including the students who have diverse and varying strengths and needs, is complex at best, and likely very insufficient. The UDL framework builds assessments based upon stated goals, but with consideration of the learners' need for variability. The role of planning for variability in assessment is seen in the work of Mislevy, Steinberg, and Almond (2003) on improving accessibility for test takers with disabilities (Hanson & Mislevy, 2007, p. 12):

> "…four key attributes, namely focal knowledge, skills, and other abilities (Focal KSAs), additional KSAs, Characteristic Features, and Variable Features, are particularly important for building the assessment argument for students with or without disabilities.
>
> 1. **Focal KSAs** consist of the primary knowledge/skills/abilities of students that are addressed by assessment.
> 2. **Additional KSAs**. The other knowledge/skill/abilities that may be required in a task.
> 3. **Characteristic Features**. Characteristic Features of the assessment consist of the feature that must be present in a situation in order to evoke the desired evidence about the Focal KSAs.
> 4. **Variable Features.** Variable Features are described as features that can be varied to shift the difficulty or focus of tasks".

Mislevy, et al. (2003) identify variable features as having a particularly significant role with respect to students with disabilities and other sub-populations whose needs differ from those of the average student (e.g., speakers of minority language). When attention is paid to manipulating variable features, the need for additional KSAs to complete a task can be reduced or eliminated, thereby making sure (to the extent possible) that demands of the focal KSAs are less likely to be changed, and are more likely to be attained. The UDL principles and the specific design consideration categories contained in the UDL Guidelines invite the use of diverse variable features.

In a related paper by the authors, *Universal Design for Learning: Cognitive Theory into Practice for Facilitating Comprehension in Early Literacy*, we see how UDL principles & guidelines provide a framework for diversifying the instruction and assessment of early literacy comprehension focal KSAs using a developmentally appropriate approach. The paper clearly identifies the need for developmentally appropriate literacy instruction in ECE (Dunn, et al.,1994; Hart, et al., 1998), the importance of personally relevant text connections for early readers (Tompkins, 2008), and literacy experiences that relate to a child's prior knowledge using multisensory materials and individualized pacing (Fields, Groth, and Spangler, 2008). Using a Text-to-Text, Text-to-Self, and Text-to-World organizational structure (as focal KSAs) to design early comprehension curriculum and instruction, the authors of *Universal Design for Learning:*

Cognitive Theory into Practice for Facilitating Comprehension in Early Literacy address childrens' developmental learning needs by using the UDL framework to conceptualize and design the learning activities and assessments that support students' developing understanding of the Text-to-Text, Text-to-Self, and Text-to-World connections.

Developmentally appropriate instruction requires consideration of the many variables pertaining to instruction, as well as informed decision-making regarding the selection and integration of variables in instruction and assessment. Debarger, et al. (2009) demonstrate in Figure 2 how variable features can be related and applied within the various UDL categories:

Figure 2
Variable Features by UDL Category

Perceptual Features		
(1): *Representational Format* Flexible size of text and images Flexible amplitude of speech or sound Adjustable contrast Flexible colors Flexible layout	(2): *Auditory Information* Text equivalents (e.g. captions, automated speech to text) Visual graphics or outlines Virtual manipulatives, video animation Verbal descriptions Tactile graphics, objects	(3): *Visual Information* Spoken equivalents for text and images Automatic text to speech Tactile graphics Braille
Language and Symbols		
1): *Supports for Vocabulary and Symbols* Pre-taught vocabulary and symbols Embedded support for key terms (e.g. technical glossary, hyperlinks/ footnotes to definitions, illustrations, background knowledge) Embedded support for non-technical terms (e.g. non-technical glossary, hyperlinks/ footnotes to definitions, illustrations, background knowledge) Embedded alternatives for unfamiliar references (e.g. domain specific notation, jargon, figurative language, etc.)	(2): *Supports for Syntactic Skills and Underlying Structure* Alternate syntactic levels (simplified text) Grammar aids Highlighted syntactical elements (e.g. subjects, predicates, noun-verb agreement, adjectives, phrase structure, etc.) Highlight structural relations or make them more explicit (3): Supports for Decoding and Fluency Digital text with automatic text to speech Digital Braille with automatic Braille to speech	(4): *Supports for English Language* All key information in the dominant language (e.g. English) is also available in prevalent first languages (e.g. Spanish) for second language learners and in ASL for students who are deaf Key vocabulary words have links to both dominant and non-dominant definitions and pronunciations Domain-specific vocabulary (e.g. "matter" in science) is translated for both special and common meanings o Electronic translation tools, multi-lingual glossaries
Cognitive Features		
(1): *Supports for Background knowledge* Advanced organizers, pre-teaching, relevant analogies and examples Links to prior knowledge (e.g. hyperlinks to multimedia,	(3): *Options that Guide Information Processing* Explicit prompts for each step in a sequential process Interactive models that guide exploration and inspection Graduated scaffolds that support	(4): *Supports for Memory and Transfer* Checklists, organizers, sticky notes, electronic reminders Prompts for using mnemonic strategies and devices Templates, graphic organizers,

concrete objects in students' environments) Provision of an example (2): *Supports for Critical features, Big Ideas, and Relationships* Concept maps, graphic organizers, outlines Highlight features in text, diagrams, graphics, and illustrations Reducing the field of competing information or distractions, masking Using multiple examples and non-examples to emphasize critical concepts	information processing strategies Multiple entry points and optional pathways through content Chunking information into smaller elements, progressive release of information, sequential highlighting Discrete question (s) or scenario-based text presentation Complexity of the scientific investigation presented in the scenario Cognitive complexity Distractors based on misconceptions/typical errors vs. non-misconceptions	concept maps to support note-taking Scaffolding that connects new information to prior knowledge Embedding new ideas in familiar ideas and contexts, use of analogy, metaphor, example
Skill and Fluency		
(1): *Supports for Manipulations* Virtual manipulatives Snap-to constraints Nonstick mats Larger objects	(2): *Supports for Navigation* Alternatives for physically interacting with materials: by hand, by voice, by single switch, by keyboard, by joystick, by adapted keyboard (3): *Alternatives to Writing* Voice recognition Audio taping Dictation Video Illustration	(4): *Supports for Composition* Keyboarding and alternative keyboards, Onscreen keyboard, Wider lines, Larger paper, Pencil grips Drawing tools - with shapes, lines, etc. Blank tables, charts, graph paper Spellcheckers, calculators, sentence starters, word prediction, dictation (voice recognition or scribe), symbol-to-text, sentence strips
Executive Features		
(1): *Support for Goal and Expectation Setting* Prompts and scaffolds to estimate effort, resources, and difficulty Animated agents that model the process and product of goal-setting Guides and checklists for scaffolding goal-setting (2): Supports for Goal Maintenance and Adjustment Maintain salience of objectives and goals (e.g. reminders, progress charts) Adjust levels of challenge and support (e.g. adjustable leveling and embedded support, alternative levels of difficulty, alternative points of entry)	(3): *Supports for Planning and Sequencing* Embedded prompts to "stop and think" before acting Checklists and project planning templates for setting up prioritization, schedules, and steps Guides for breaking long-term objectives into reachable short-term objectives (4): Supports for Managing Information Graphic organizers and templates for organizing information Embedded prompts for categorizing and systematizing Checklists and guides for note-taking	(5): *Supports for Working Memory* Note-taking, mnemonic aids Locate items near relevant text (6): *Supports for Monitoring Progress* Guided questions for self-monitoring Representations of progress (e.g. before and after photos, graphs and charts) Templates that guide self-reflection on quality and completeness Differentiated models of self-assessment strategies

Affect Features		
(1): *Supports for Intrinsic Motivation (Challenge and/or Threat)* Offer individual choice Enhance relevance, value, authenticity (e.g. contextualize to students' lives, provision of an example) Options to vary level of novelty and risk (e.g. options in peer and adult support, alternatives to competition, alternatives to public display or performance, alternative consequences) Options to vary sensory stimulation (e.g. shortened work periods, frequent breaks, noise buffers, optional headphones, alternative settings, presentation of fewer items at a time)	(2): *Supports for Sustaining Effort and Persistence* Maintain salience of goals (e.g. explicit display of goals, periodic reminders, replacement of long-term goals with short-term objectives, prompts for visualization) Adjustable levels of challenge and support Encourage collaboration and support Communicate on-going, mastery-oriented feedback	(3): *Support for Self-regulation* Guide motivational goal-setting Scaffold self-regulatory skills and strategies Develop emotional self-assessment and reflection

The variable options readily available in the process of assessment are well represented in Figure 2. The integration of variation into the methods and approaches of assessment in order to support the attainment of focal knowledge (Mislevy, et al., 2003) can make assessment more relevant and appropriate for all learners, including early childhood learners with, or without disabilities.

As recently described by Dr. Michael Russell, Associate Professor, Department of Educational Research, Measurement, & Evaluation at Boston College:

> "Assessment programs, whether they be large-scale, district-based, or teacher developed, have traditionally attempted to assess students using a single instrument administered to students under the same conditions. Educators and test developers, however, are increasingly acknowledging that this practice does not result in valid information, inferences, and decisions for all students. This problem is particularly true for students in the margins, whose characteristics and needs differ from what the public thinks of as the general population of students. Increasingly, educators, educational leaders, and test developers are seeking strategies, techniques, policies, and guidelines for assessing students for whom standard assessment instruments do not function well." (Russell & Kavanaugh, 2011, p. x)

The limitations of standard (and standardized) assessments to determine learning and performance in young children, and the important role of alternate assessment

approaches are further clarified by Dr. William Teale in his writings on developmentally appropriate assessment of reading and writing:

> "informal observations and structured performance sample assessments are more appropriate than standardized tests for measuring early childhood literacy learning. Observations and performance samples are more consistent with the developmental characteristics of the young child. Furthermore, because observations can be conducted in conjunction with instruction and performance samples are more like actual teaching practices, these procedures yield information more useful to teachers" (Teale, 1988, p.172).

As evidenced by the information offered within this section, the assessment of student learning and student performance in early childhood education is certainly challenging, however the value of implementing accurate, effective, and valid assessments for *all* students, especially our young and diverse students, outweighs all challenges. To address the full scope and depth of these challenges, the key principles of early childhood education are reviewed below, and a new model for curriculum design and assessment through Universal Design for Learning is proposed for consideration in improving the teaching and assessment of young children.

Principles of Early Childhood Education

Early Childhood Education (ECE) describes the education of young children from birth through age 8. Many EDE reports have concluded that traditional approaches to curriculum, such as those emphasizing drill and practice of isolated, academic skills, are not in line with current knowledge of human learning and neuropsychology. These reports[2] reflect a growing consensus that the traditional scope and sequence approach to curriculum with its emphasis on drill and practice of isolated, academic skills does not reflect current knowledge of human learning and fails to produce students who possess the kind of higher-order thinking and problem-solving abilities that will be needed in the 21st century (Bredekamp, Knuth, Kunesh, & Shulman, 1992).

Several key principles of child development and learning, based on the work of Piaget, Vygotsky, Erikson (and others) are critical to the effective implementation of developmentally appropriate practice (DAP) in early childhood education (Bredekamp, Knuth, Kunesh, & Shulman, 1992). These principles include:

- Children learn best when their physical needs are met and they feel psychologically safe and secure
- Children construct knowledge

[2] These reports include the National Council of Teachers of Mathematics (1989), the American Association for the Advancement of Science (1989), the International Reading Association (1989), the National Council of Teachers of English (1989), the National Commission for the Social Studies (1989), the National Association of Elementary School Principals (1990), the National Association of State Boards of Education (1988), and the Association for Supervision and Curriculum Development (1989).

- Children learn through social interaction with other adults and other children
- Children learn through play
- Children's' interests and "need to know" motivate their learning
- Human development and learning and are characterized by individual variation

When considering the childhood learning principles described above, it becomes clear that learning objectives, methods, materials, and assessments for young children must be multiply varied in order to successfully support young children's learning. It is equally important that the instructional processes used must adequately address *all* students' needs and capacities, in order to support inclusive education models. Given these critical needs, strong models that imbed variation in instruction are necessary.

UDL and the Assessment of Young Children

UDL is a flexible structure of curriculum development that addresses learner variability. Learner variability dictates need for assessment variability. To effectively implement UDL core principles, variation in assessment is key. Varying the methods, formats, scope/range/level, product/outcome, and instructor feedback in the assessment design and process more universal, authentic and, perhaps, more accurate assessment results for young children.

With the establishment of UDL as an important and well-founded framework to support accessible and effective learning for a wide diversity of learners, it is critical that issues of diversity in assessment is addressed and clarified.

The Rhode Island UDL Workgroup, a group of educators from colleges and schools in Rhode Island (USA), received training in Universal Design for Learning from CAST in 2004-2006, and has worked together since that time to identify and establish ways to bring UDL principles and practices into the Rhode Island education system. The authors are active members of the RI UDL Workgroup. In our work, the Workgroup became keenly aware of teachers' needs for more specific checklist components relating to assessment. Rather than having assessment issues imbedded within the three Core UDL Principles as in CAST's UDL guidelines, teachers wanted clearer guidance on how to apply variation and variables in the steps and processes of assessment. Responding to these needs, the Workgroup modified and expanded the original CAST Educator Checklist to include more explicit examples, and to use more "user-friendly" terminology. A fourth section was developed in the RI Modified UDL Educator Checklist, one that focuses specifically on assessment and the different options for varying the assessment process to address the needs of a diverse population of students. Five key areas of variation are identified to assist in the design of the comprehensive and accessible assessment of student understanding. These areas address options for 1) methods, 2) formats, 3) scope/range/level, 4) product & outcome, and 5) feedback. The complete Rhode Island Modified

UDL Educator Checklist is available online[3]. The full assessment section of the RI modified UDL Educator Checklist is presented in Figure 3 below (RI UDL Workgroup, 2008).

Figure 3

IV. Use multiple means of assessment of student understanding *Does the teacher use multiple and ongoing assessments to adjust instruction and evaluate student learning. (All Networks)*
10. Assessment for outcome determination (student understanding)
10.1 Options for methods • *Discrete vs elaborative response (ie multiple choice vs essay),* • *varied time allowance* • *individualized vs group or peer-supported,* • *location varies w/in the curriculum, embedding assessment opportunities, etc.*
10.2 Options for formats • *Visual information: photographs, pictures, picture-symbols, written, computer text, computer text-to-speech, video, kinesthetic supports (w low-tech), etc.* • *Auditory information: Oral, technology-supported (taped, computer speech-to-text, voiced word processing, kinesthetic supports (w low-tech), etc.*
10.3 Options for scope/range/level • *Choice in number of items, type of items* • *Choice in focus. Deconstructs grade-level expectations. Connects across grade levels* • *Tiered assessments - from "big idea"(all learners) to complex details (some learners)* • *Multiple levels of understanding - concrete through synthesis, etc.*
10.4 Options for product & outcome • *Consider formative vs summative assessment.* • *Consider authentic assessments with "real-world" products.* • *Include differentiated products (e.g. plays, video productions, essays, point-of-view "rafts", "tic-tac-toes", debates, artistic productions, student-driven assessments, etc.)*
10.5 Options for feedback • *Teacher: acknowledgement, probing, challenging questions, positive feedback, detained response, real-time vs delayed, etc.* • *Student: journals, writing, prompts, reflection, peer feedback, self-evaluation, self-awareness, etc.*

[3] http://www.ric.edu/sherlockcenter/udl/udleducatorchecklist.pdf

UDL, its principles, and its guidelines are relevant for students of all ages and backgrounds. The authors, however, will specifically concentrate on the issue of assessment in the context of UDL and ECE. Using the lens of UDL, we consider again the principles of developmentally appropriate practice in early childhood education presented earlier in this paper (Bredekamp, et al.,1992); principles that include:

- Children learn best when their physical needs are met and they feel psychologically safe and secure
- Children construct knowledge
- Children learn through social interaction with other adults and other children
- Children learn through play
- Children's' interests and "need to know" motivate their learning
- Human development and learning and are characterized by individual variation

Considering these childhood learning principles one by one, and comparing them to the framework of UDL, we become aware of the logical connections between how children naturally learn and can demonstrate what they have learned, and the five areas of assessment variation articulated in Rhode Island's UDL planning tool.

First, *children learn best when their physical needs are met and they feel psychologically safe and secure*. By following 10.2 options for formats, assessment processes can address varied visual, auditory, and tactile needs and routes for diversifying students' responses and meeting their physical needs.

Next, *children construct knowledge.* To adequately address this learning principle in the assessment process, several areas of variation will apply. Students will show what knowledge they have constructed first through the use of 10.1 options for methods. Choice of method is key in the construction of knowledge. Also, 10.4 options for product and outcome will support the varied results that children will produce as they construct knowledge. Finally, 10.5 options for feedback offers children the opportunity to explore ways to share their knowledge with their teachers, and for teachers to share their perspectives on this learning back with the children, following a constructivist approach.

Thirdly, *children learn through social interaction with other adults and other children.* What children learn through interactions can be better determined when the assessments that are used include both 10.2 options for formats (including interactive formats) and also 10.5 options for feedback.

The next principle is *children learn through play.* Play is interactive; play is multisensory. Determination of learning through play is supported by 10.1 options for methods, 10.2 options for formats, 10.3 options for scope/range/level, and also 10.4 options for product & outcome. By including variations in each of these option areas, the learning achieved through play can be much more comprehensively identified and understood.

Also, *children's' interests and "need to know" motivate their learning.* This learning principle again emphasizes the important of choice for children. To assess learning based upon interests and "need to know, relevant areas of variation include 10.2 options for formats, 10.3 options for scope/range/level, and 10.4 options for products & outcomes. Each of these variation areas support varied interest levels and motivations.

Finally, *human development and learning are characterized by individual variation.* As this learning principle for young children is based on the need for variation throughout learning, all of the assessment variation areas identified in the Checklist, 10.1–10.5, would apply. Following this principle, variation is key in human development and learning, and variation is at the heart of UDL and of any UDL-based assessment process.

UDL-based Instruction and Assessment in ECE Exemplified

In a related paper entitled *Universal Design for Learning: Cognitive Theory into Practice for Facilitating Comprehension in Early Literacy*, the authors describe how Universal Design for Learning is applied as the framework of a literacy curriculum designed to enhance all children's vocabulary and text comprehension. The instructional strategies of Text-to-Text, Text-to-Self, and Text-to-World literacy connections are exemplified and discussed in that article from the perspective of UDL as a foundational curriculum model. Some examples of the application of the principles of UDL to the curriculum addressing early childhood literacy knowledge and skills include the following:

- **Multiple means of representation**: word walls, differing color and font size, auditory books, concrete objects, magnetic letters/words, pantomime, text-to-speech technologies, etc.
- **Multiple means of engagement**: novel activities, developmentally appropriate risk-taking activities, self-reflection tasks, setting own goals, peer collaboration and evaluation, self-checklists, etc.
- **Multiple means of action and expression**: sensory-rich materials, taping responses, group guided reading, story starters, concept maps, pocket charts, SmartBoards, "turn and talk" & "stop and think" prompts, etc.

By using the RI modified grid for identifying and planning multiple means of assessment, we see in Figure 4 how the variables pertaining to determination of student understanding and outcomes can be applied to achieve diversification of assessment according to UDL principles while remaining true to the focal KSAs of the early literacy & comprehension areas of Text-to-Text, Text-to-Self, and Text-to-World.

Figure 4

IV. Use multiple means of assessment of student understanding *Does the teacher use multiple and ongoing assessments to adjust instruction and evaluate student learning. (All Networks)*
10. Assessment for outcome determination (student understanding)
10.1 Options for methods ***Text to Text:*** *Hold a debate on the texts; conduct a literature circle* ***Text to Self:*** *Develop a timeline of students and of main characters* ***Text to World:*** *Students as researchers on who, what, where, when & why;*
10.2 Options for formats ***Text to Text:*** *Use book reports that compare texts; use graphic organizers for comparisons* ***Text to Self:*** *Use Venn diagramming to connect text and self; Use expressive arts to connect to self-concepts* ***Text to World:*** *Incorporate student checklist development into Past/Present research activities**;** Incorporate field trips into literacy curriculum*
10.3 Options for scope/range/level ***Text to Text:*** *Literature circles with tiered supports and/or texts at different complexity levels* ***Text to Self:*** *Vary the supports within the art activities to enhance independent response* ***Text to World:*** *Students use varied levels of "exploration" checklists on field trips to document critical findings*
10.4 Options for product & outcome ***Text to Text:*** *Use debating as culminating activity; use walking, talking book covers* ***Text to Self:*** *Write thank-you letters to class visitors; Class timeline (individual timelines combined as culminating project)* ***Text to World:*** *Use student-designed checklist to assess student performance, raising self-awareness and purposeful focus; report findings using K-W-L charts, concept maps, videotaping, or tape recorders*
10.5 Options for feedback ***Text to Text:*** *Vary feedback on book reports (peer, teacher verbal, teacher written)* ***Text to Self:*** *Peers read & give feedback on thank-you letters; Group discussion* ***Text to World:*** *Connect with persons from other cultures and countries via the Internet*

Conclusion

Early childhood education has identified the need to assess children's learning in ways that go far beyond traditional methods. Limitations of standard assessment processes and in current

accessibility of assessments for the diverse student population clearly exist. The framework of UDL, and its application to the process of assessment, offers guidance for the design of assessment processes for young children. Examples of varied approaches to assessment in relation to several literacy development techniques indicate that it is possible to apply the principles of UDL in a meaningful way to assess the learning and performance of young children. By applying UDL in assessment, there can be a better match between early childhood learning principles, diverse ways that children learn, and appropriately measured educational outcomes for young children. Policies concerning Early Childhood Education need to consider UDL as a necessary component in planning the goals, methods, materials, and assessments recommended for use with young children. Training programs, as well, need to include UDL in the professional development curriculum.

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Published by the Forum on Public Policy