Universal Design for Learning Innovation Configuration: Recommendations for Teacher Preparation and Professional Development

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Introduction

Universal design for learning (UDL) is an instructional planning and delivery framework intended to increase meaningful access and reduce barriers to learning for students with diverse learning needs including (but not limited to) students with disabilities, English language learners, and those from diverse cultural and socioeconomic backgrounds. Educational researchers, policy makers, and practitioners have embraced this instructional framework for meeting the needs of an increasingly diverse student population. The purpose of this innovation configuration (IC) is to provide recommendations for embedding UDL in special and general education preservice teacher preparation programs, and for including this content in professional development for inservice teachers. It is important to note that when we describe UDL, we are not doing so for a specific population of learners; rather, the point of UDL is to meet the needs of the widest range of learners while still acknowledging that there will always be a need for individualization for some students related to areas such as explicit strategy instruction, assistive technologies, and modifications to curriculum. With this said, however, when teachers use the UDL framework to proactively plan for student diversity, the need for individualization decreases.

This Innovation Configuration focuses broadly on UDL implementation and practical recommendations rather than on the evidence-based practices. This is done because UDL should be considered a framework within which evidence-based practices are embedded. When teachers implement instruction using the UDL framework, they make choices regarding how to deliver evidence-based practices within their instruction in a manner consistent with UDL. Consequently,
UDL looks different in different settings and results in different implementation models. With that said, however, the UDL principles, guidelines and checkpoints have a wealth of research that can be accessed through the National Center on Universal Design for Learning (http://www.udlcenter.org/aboutudl/udlguidelines). This website provides citations directly tied to each of the principles, guidelines, and checkpoints related to UDL that are addressed in this IC.

**Basic principles of UDL**

The basis of UDL lies in the conviction that at the very essence of instructional planning, teachers and curriculum developers should identify the specific barriers that students may have to learning and ameliorate those barriers through effective instructional planning that focuses on engagement, flexible use of materials, and meaningfully accessible instruction. UDL is based on foundational research within the neurosciences, developmental psychology, and learning differences (Rose & Gravel, 2010). This research suggests that to accomplish effective instructional planning, teachers should consider how to integrate three principles into their instruction and assessment practices that are based on three interrelated types of brain networks (recognition, strategic, and affective networks). Considering teaching and learning through these three brain networks provides a framework for planning instruction for diverse learners (Hall, Meyer, & Rose, 2012). The UDL framework is based on the following three principles:

- **Multiple means of representation** to support ways in which we assign meaning to what we see and recognize (i.e., *what* we learn): Providing content through multiple channels such as discussion, readings, digital texts, multimedia presentations.

- **Multiple means of action and expression** to support strategic ways of learning (i.e., *how* we learn): Providing opportunities for students to demonstrate their understanding in
multiple ways such as through traditional tests or papers as well as through other venues such as art, multimedia presentations, digital recordings.

- Multiple means of engagement to support affective learning (i.e., why we learn):

Considering how to engage students in learning through activities such as collaborative learning, instructional games and simulations, real and virtual tours.

These three principles are expanded into more detailed guidelines and checkpoints that should be explicitly introduced, explained and practiced within teacher preparation programs and professional development so that new and continuing general and special education teachers can effectively integrate them into their teaching practices (see Figure 1; CAST, 2011). It is important to note that although UDL was conceptualized in special education, the focus is on use in general education classrooms (Edyburn, 2013), so it is critical for both general and special education teachers to have a strong foundation in UDL. Thus, in this IC, we provide a roadmap for integrating the three principles, guidelines, and accompanying checkpoints into teacher preparation programs and professional development (PD) to equip all teachers to work with diverse learners.

Importance of planning from a UDL framework for instruction and assessment for students with diverse needs

Historical, Legal and policy foundations of UDL

To begin, it is important to consider the foundational elements of UDL including policy and legislative components. The term “universal design” was originally coined by Ron Mace, an architect and disability rights advocate in 1988 (Courey, Tappe, Siker, & LePage, 2012). The term subsequently emerged in federal disability policy with the Assistive Technology Act in 1998 (U.S.C.§ 3002). The Center for Universal Design at North Carolina State University and
the Center for Applied Special Technology (CAST) later adapted the principles for education to promote accessibility for all learners (Courey et al., 2012). The term “Universal Design for Learning” appears in the 2004 reauthorization of the Individuals with Disabilities Education Act [IDEA], the Common Core State Standards section entitled “Application to Students with Disabilities,” and The Higher Education Opportunity Act [HEOA] of 2008. The HEOA characterized UDL as “a scientifically valid framework for guiding educational practices that: (a) provides flexibility in the ways information is presented, in the ways learners respond or demonstrate knowledge and skills, and in the ways learners are engaged; and (b) reduces barriers in instruction, provides appropriate accommodations, supports and challenges, and maintains high achievement expectations for all learners including students with disabilities and students who are limited English proficient” (20 U.S.C. § 1022d(b)(1)(K)).

Additionally, the No Child Left Behind Act [NCLB] (2001) and the reauthorization of IDEA in 2004 emphasize increased accountability and access to the general education curriculum for all students. As a result, students with disabilities are increasingly educated in inclusive settings. Based on this changing educational landscape, it is imperative for both general and special education teacher preparation programs to provide instruction related to UDL. The HEOA, in fact, requires states to describe how teacher preparation programs integrate technology into their instruction in a manner consistent with the UDL framework. Lastly, the National Education Technology Plan reaffirms this importance by stating that implementation of the three UDL principles can lead to improved outcomes for diverse learners (U.S. Department of Education, 2010), pointing to additional evidence that teacher preparation programs as well as professional developers ought to take a proactive role in preparing future teachers to implement UDL in an effective manner.
Components of the Innovation Configuration

The following section describes each of the components of the Innovation Configuration (IC) matrix as well as recommendations for integrating them within teacher preparation programs as well as continuing PD within schools. We acknowledge that teacher preparation programs and K-12 instructional settings differ and that any single recommendation may not be appropriate for all settings. Therefore, we provide general descriptions of effective UDL implementation and suggestions that should be adapted to programs and needs.

1.0 General understanding of how to use the UDL framework for planning instruction for diverse learners

1.1 Understand how the UDL framework can reduce barriers to learning and support high expectations for learning

Experts in the field indicate that a general understanding of the UDL framework is a necessary prerequisite for successful UDL implementation (Spooner et al., 2008; Edyburn, 2010, Hehir, 2009). This understanding is especially important as students with disabilities and other struggling learners spend more time within inclusive classrooms due to various policy and best practice recommendations (Courey et al., 2012).

The UDL framework can be used to facilitate inclusion by enabling educators to reduce barriers to learning while maintaining high expectations for all learners. It enables educators to consider learner differences, preferences, and needs at the onset of planning and instruction rather than after lessons have been developed for “typical learners” and then modified to address individual students’ needs (Edyburn, 2010). Traditional planning and curriculum development assumes that learners can access and engage in learning through a single pathway (e.g., by reading the textbook or listening to a teacher explain a concept); flexibility is not built into this type of instruction and lessons must be altered whenever a learner struggles. Subsequently,
teachers use the UDL framework to structure their lessons to make them accessible and engaging for all learners. If teachers consider the UDL framework in how they address instructional goals, planning, materials, and progress monitoring, they will meet the needs of a wider range of learners.

There are several ways that preservice teacher preparation programs and professional developers can integrate UDL into their programs. One way of introducing learners to the UDL framework is to make use of the tools and resources available online. Some examples include:

- The CAST website (http://cast.org)
- The National Center on Universal Design for Learning (http://udlcenter.org)
- The IRIS Center UDL module—Universal Design for Learning: Creating a Learning Environment that Challenges and Engages All Students (http://iris.peabody.vanderbilt.edu/module/udl/)

These web resources can be assigned for homework, used in discussions, and facilitate conversations about whether preservice and inservice teachers have seen and/or participated in instruction that is aligned with the UDL framework. While these tools will provide a general introduction to the UDL framework including the principles, guidelines, and checkpoints, teacher educators and professional developers need to develop purposeful experiences where the framework is used to manipulate content, revise instruction, and address environmental barriers existing in the general and special education setting.

1.2 Understand how the four curricular pillars of UDL implementation (goals, instruction, materials, and assessment) are applied in different instructional contexts

The principles of UDL should be considered alongside thoughtful planning related to the four curricular pillars of UDL: (1) instructional goals, (2) instructional delivery methods, (3)
instructional materials, and (4) student assessments. To consider these four pillars essentially means that instruction is flexible enough to address the needs of diverse learners (Meyer & Rose, 2005; Rose & Meyer, 2002). Classroom instruction is often based on:

- Unclear goals for learning beyond those established by national and state standards (which are not typically shared with students explicitly),
- Materials that may or may not be accessible (e.g., written materials presented through textbooks alone), and
- Assessment practices (e.g., paper and pencil tests) that assess learners in one way.

The UDL framework, on the other hand, addresses goals, methods, materials, and assessments in a more flexible manner that makes instructional content both physically and intellectually more accessible (Meo, 2008). Rose and Meyer (2002) provide the following guidelines:

- Instructional goals address learning outcomes for all learners. For example, teachers have clearly defined goals that maintain high expectations for all learners, but are differentiated to be appropriate for a wide range of learners.
- A variety of methods and materials are used in instruction that provide for flexibility to address the needs of all learners. For example, teachers make use of multimedia materials, e-text, and other resources that support learning within their instruction.
- The assessments used to evaluate student learning are flexible enough to allow students to demonstrate their learning in an accurate manner not hindered by the student’s disability. For example, if a student has difficulties with written expression, a paper and pencil assessment requiring written expression will not assess their subject understanding.

Although these curricular processes may be taught within teacher preparation programs, they are not often taught in a manner that focuses on flexibility and student diversity. Consequently, it is
important for teacher educators and professional developers to embed these curricular pillars in their instruction of UDL, and provide examples across grade levels and content areas because UDL-based instruction will look different across instructional contexts. This occurs largely because each content area has its own disciplinary ways of thinking, text structures, and discourse. For example, Curry, Cohen, and Lightbody (2006) explained how the UDL framework was applied to scientific inquiry and describe how teachers used tools such as visual content mapping and accessible laboratory and field equipment to ensure that standards-based inquiry learning was planned and implemented in a flexible and accessible manner. In another example, Bouck et al. (2009) described how UDL was integrated into social studies through a web-based curriculum called the Virtual History Museum (VHM) with multiple means of accessing and interacting with historical, geographical, and cultural materials.

Just as Curry et al. (2006) and Bouck et al. (2009) described how UDL uniquely applies within the context of science inquiry-based and social studies learning, the four curricular pillars of UDL will be applied differently in different content areas. Therefore, it is important for teacher educators and professional developers to provide a range of examples of UDL implementation so that the teachers can begin to understand both general ways of understanding instructional goals, methods, materials, and assessments within a UDL framework and how these are applied in different educational contexts.

1.3 Understand the three principles of UDL framework and how they apply to instructional planning, instruction, and environments that support learning.

Teacher education programs and professional developers need to be thoughtful and purposeful in their instruction of the three principles of the UDL framework. As previously mentioned, the three principles focus on multiple means of representation, action and expression,
and engagement. While teachers need to be able to identify and define the three principles, teacher educators and professional developers need to ensure that this understanding can be applied and generalized to content, planning for instruction, instruction, and the educational environment where growth and development is expected. Considering the general nature of the three principles, one would expect that these conceptual ideas would often be taught in teacher preparation programs (Smith, Robb, West, & Tyler, 2010). However, knowing the definition is one thing, being able to recognize how it applies to instruction, steps for implementation, and overall appreciate why and when to apply the framework requires a deeper understanding. Therefore, it is important for teacher educators and professional developers to embed these principles into their instruction, required experiences, activities, and assignments across teacher education coursework and/or PD experiences. By expecting preservice and inservice teachers to consider what these principles mean to content construction and classroom instruction, understanding and implementation of UDL will be enhanced.

For example, the three principles can be embedded within content development dependent on the preservice and inservice teacher’s area of expertise (e.g., reading instruction, mathematics, behavior, science). Preparation for the elementary, middle or secondary instructional environment could then be used to identify potential barriers for struggling learners and those with disabilities via the UDL principles. Suggested solutions would also be delivered using these same principles.

To contextualize this information, consider a science classroom beginning as early as 4th grade. Although the content will differ, it is likely that foundational knowledge will begin with required reading. Expression of student understanding often includes written science reports.
Finally, teacher directed presentations and experiments within a traditional desk and chair environment will be featured.

Nelson (2013) explains how the UDL principles are applied to the planning, content identification, and instructional process so that teachers can identify barriers and then use tools to ensure instruction is flexible and accessible. Consider potential challenges in science instruction through the following three principles:

• Representation – foundational reading requires skills in reading for vocabulary, reading fluency, and reading comprehension. By using print, students often struggle in identifying critical information, the main idea, and structuring the foundational knowledge for subsequent learning. An initial barrier then is the printed text and the expectation of a specific reading ability. Subsequent instruction will be negatively impacted as a result (Edyburn, 2010).

• Demonstration – science reports present challenges in accessibility and flexibility to the student’s ability to express understanding. Writing (e.g., mechanics, grammar, organization) can quickly become the barrier in this example.

• Engagement – lectures and structured group experiments often present barriers in promoting student engagement, self-discovering, and empowering the student in the learning process.

It is important that preservice and inservice teachers identify the barriers associated with content, planning for and the delivery of instruction, and the environmental constraints of the classroom. The UDL principles foster the identification of these barriers, as well as purposeful planning for accessible and flexible content and instruction. Likewise, embedding the three
principles into content planning and instruction affords teachers an understanding of application of the UDL framework. Consider the application of these principals in a science classroom:

- **Representation** – variety of materials and modes of information to develop foundational knowledge. Visual scaffolds, audio, embedded supports, video, illustrations, animations, interactive webs, or similar components that contextualize the content for the learner.

- **Action and Expression** – opportunities to demonstrate understanding in an appropriate manner. Illustrations, storyboards, presentations, multimedia and similar elements.

- **Engagement** – methods to promote engagement and interaction with the learning experience and the instruction process. Interactive games and active learning allow for learner self-determination, and activities that enable students to develop social capital.

A mature understanding of the UDL principles enables teachers to appreciate the complexity of the UDL framework while comprehending the complexity and significant barriers associated with typical content, instruction, and the environmental constraints of the K-12 classroom. Standard-based content often assumes that there is a typical student who is the primary audience for the content and subsequent instruction. Furthermore, a primary pathway for learning and assessment is often the foundation for most instructional planning. By embedding the UDL principles into teacher education coursework and ongoing PD, the fallacy of the single pathway, the barriers that content and instruction often present to struggling learners and those with disabilities, and the critical elements of the solutions derived can be thoroughly understood by teachers.

**1.4 Understand how the nine UDL guidelines and accompanying checkpoints can be used to create instructional environments that support learning.**
The next step in using the UDL framework to create instructional environments is knowledge of the UDL Guidelines. These guidelines further articulate the UDL framework offering a path or strategy to reduce barriers and optimize levels of challenges and supports from the beginning (Rose & Meyer, 2013). Similar to the UDL principles, teacher educators need to infuse the UDL guidelines, the organization of the guidelines, and the connected checkpoints into teacher preparation experiences. As Figure 1 illustrates, the guidelines offer depth to the three principles and a road map to reduce barriers and strategically plan lessons/units of study or curricula for all learners.

<Insert CAST figure of UDL Principles and Checkpoints>

Each of these guidelines further defines the three principles of UDL, while the corresponding checkpoints clarify and illustrate the guideline and the respective principle. Using
these guidelines, the teacher can quickly identify barriers common to curricula (goals, methods, materials, and assessments). Aligning the UDL principles and guidelines to the instructional content (e.g., reading, science, mathematics) provides the teachers with a framework to determine what content specific to a standard is required by all students, what parts are applicable to most students, and what areas are relevant for enrichment are applicable to some students. If teachers understand and appreciate what all students need to know specific to a curriculum standard (e.g., Common Core State Standards), they are then in the position to consider the UDL framework and its application to this content.

It is important to note that if teachers are not able to determine what is primary or critical for all learners within the content, they will likely struggle with various goals and levels of complexity, limiting the flexibility of instruction. Therefore, it is important for teacher educators and professional developers to emphasize that special education teachers must collaborate with general education content experts to identify critical content, and if they are not comfortable with the content, they should, in time, gain some of the content expertise.

When introducing the checkpoints, teacher educators and professional developers should consider two primary tools (see http://www.udlcenter.org/aboutudl/udlguidelines/) provided by the National Center on UDL. These tools structure the guidelines and corresponding checkpoints under the three respective principles so that teachers can use the guidelines and basic elements of UDL to improve planning and the subsequent instructional experiences of students. The checkpoints are designed to walk educators through an understanding of the principles and guidelines that extends beyond a definition to support implementation of UDL. For example, the National Center on UDL defines the checkpoints, explains the potential barriers and how the
principles and guidelines address content and instructional limitations, and offers examples and links to resources allowing teachers solutions/tools for subsequent implementation.

2.0. Planning instruction using the UDL framework

2.1 Proactively plan instruction using the three principles, nine guidelines, and accompanying checkpoints of UDL.

For teachers to begin to learn about UDL implementation, they must first understand how to implement the three UDL principles by using the guidelines and checkpoints as flexible implementation options. There are instructional planning frameworks that can be introduced to new implementers of UDL to help them plan instruction consistent with the UDL framework. One such framework described by Meo (2008) is called the Planning for All Learners (PAL) which can be accessed on the National Center for Universal Design for Learning website in the resources section (http://www.udlcenter.org/resource_library/articles/hs_reading). The PAL process offers a practical 4-step process for a collaboratively implementing UDL that includes: (1) setting goals, (2) analyzing the current status of the curriculum and classroom, (3) applying the UDL framework to lesson and unit development, and (4) teaching these UDL-aligned lessons and units. As this process is intended to be collaborative, members of the instructional team can rely on each other to gain the information and expertise necessary to implement UDL effectively.

Another framework is offered by the Universal Design for Learning-Implementation and Research Network (UDL-IRN), and provides teachers with a five-step instructional planning framework based on critical elements of UDL instruction and a backwards design instructional process that includes five steps: (1) establish clear goals, (2) anticipate learner variability, (3) establish measurable outcomes and an assessment plan, (4) establish an instructional sequence of
events, and (5) reflect on the instructional process. These five steps are described in detail on the UDL-IRN website within their tools and resources area (http://udl-irn.org/tools-resources/).

When introducing a UDL planning framework to preservice and inservice teachers, they are often overwhelmed because unlike rigid curricula and benchmarks, the UDL framework is broad and offers many instructional choices. It is thus important to offer strategies for implementation that are concrete. Some examples that teacher educators and professional developers can use include:

- Evaluate instruction that the preservice or inservice teachers see in their field experiences/instructional settings or in specific curricula that they may encounter (such as a social studies, language arts, or science unit) from a UDL perspective. The teachers can reflect on:
  - Aspects of that instruction are consistent with the UDL framework
  - Aspects of that instruction that are inconsistent with the UDL framework
  - Recommendations for how they might implement that instruction from a UDL perspective

- Design instruction in groups so that different teachers focus on different principles, guidelines, and checkpoints. The teachers can then:
  - Share their lesson ideas and evaluate the different instructional choices within these lesson ideas. This will reinforce the idea that there are multiple ways to deliver instruction using the UDL framework.
  - Discuss whether the lesson implementation, when examined as a whole, would meet the needs of specific student case examples so that the students can reflect on how the lessons designed would meet the needs of diverse learners.
2.2 Create and evaluate learning environments that align with the UDL framework.

Because instruction occurs across many learning environments, it is important that teacher preparation and professional development related to UDL address the role of the learning environments (e.g., the classrooms and other instructional areas in which learning takes place). These learning environments contain the technologies, resources, and supports that students and teachers interact within during learning.

Teachers should be given opportunities to evaluate the physical instructional spaces as well as the resources within them from a UDL perspective. That is, can students physically access all the resources within the environment? Is the space conducive to the types of instructional delivery planned through the UDL framework (e.g., is the physical layout conducive to collaboration, use of specific technologies)? For example, in a mathematics lesson that makes use of multiple means of representing the concept of a number line, does the physical space have room for various manipulatives, online materials that can be accessed through computers or mobile devices, and a space for students to collaboratively solve problems?

Strategies for helping teachers create and assess learning environments from a UDL perspective include:

- When teachers learn about environmental or ecological inventories, they can simultaneously evaluate environments from a UDL perspective.
- When creating or evaluating lesson plans, teachers can include a section devoted to the learning environment so they learn to consider the environment within their lesson planning process.

2.3 Identify and strategically use materials, curricula, and technologies that align instruction with the UDL framework.
It is widely accepted that many students with disabilities have difficulty accessing instructional curriculum for a wide variety of reasons such as text difficulty (e.g., Mastropieri, Scruggs, & Graetz, 2003; Swanson, Edmonds, Hairrell, Vaughn, & Simmons, 2011) and lack of metacognitive strategies (e.g., Faggella-Luby, Graner, Deshler, & Drew, 2012). It is important that teachers have opportunities to identify and use materials, curricula, and technologies that are accessible and meet the needs of diverse learners.

UDL implementation research related to accessible materials and curricula focuses on how instructional materials can be used in a flexible manner and be altered to meet the needs of individual learners (Abell, 2006). Discussions of UDL and technology often occur concurrently as technology can enhance teaching and learning through the UDL framework due to the power of technology to act as an equalizer, to empower students, and to encourage independence (Edyburn, 2005). Initial research has been conducted on the use of technology to support teaching and learning through the UDL framework (e.g., Basham, Meyer, & Perry, 2010, Dalton et al., 2009; Marino et al., 2013). These studies point toward the adaptability and individualization afforded to learning by the flexibility inherent within technologies such as gaming, digital text, text-to-speech software, media-rich experiences, and flexible technology-based assessment systems.

For a thorough discussion of integrating technology into teaching and learning, including its use within the UDL framework, see the Integrating Technology into Teaching and Learning Innovation Configuration from CEEDAR (Israel & Marino, 2014). Several strategies to provide teachers with experiences that enhance their understanding and use of materials, curricula, and technologies that align with the UDL framework are described below.
1. Compare and contrast technology within the UDL framework to assistive technologies (AT) and the role of both AT and general instructional technologies within the UDL framework. It is important to stress that although UDL proactively addresses the needs of diverse learners, there will always be a need for individualization for some students from a technology (i.e., AT) and instructional planning perspective. The distinction between AT and technologies used generally within the UDL framework is that AT meets the individual needs of learners with disabilities while general instructional technologies are those designed to be used by any learner that may benefit from their use (Basham, Israel, & Maynard, 2010). Thus, AT use by individual students occurs concurrently alongside UDL-based materials and technologies for all learners.

2. Emphasize that materials and technologies used within the UDL framework should be considered tools (UDL-IRN, 2011) to enhance curricula and make it more engaging and assessable. Teacher educators should be aware that too often, teachers think that by using technology, they are “doing UDL.” For example, just because a teacher is using Clicker software (a reading and writing based technology tool) does not mean that the teacher has fully considered the UDL framework. Teacher educators should, therefore, emphasize instruction and pedagogy and the way that technologies support and enhance teaching and learning rather than simply assuming that the use of technology results in increased access, learning, and engagement.

3. Assess the degree to which materials and technologies enhance learning, meaningful access, and engagement. When considering these materials and technologies through the lens of UDL, teachers can evaluate whether they are appropriate for the specific desired learning tasks and outcomes. This should occur throughout instruction related to lesson planning, lesson evaluation, and general discussions of technology integration as well as in specific instruction related to UDL.
4. Extend technology consideration beyond access. Too often, access to content or instruction is deemed effective and aligned with the UDL framework. For example, text-to-speech through services like Bookshare (see bookshare.org) or speech-to-text through applications like Dragon Naturally Speaking (see http://www.nuance.com/) are highlighted as effective UDL-aligned tools and furthermore, showcased as UDL in action. Teacher educators should emphasize that while these tools provide access to content, they do not offer the scaffolds and embedded supports needed for subsequent learning. Thus, access afforded by such technologies is a part of UDL, but do not represent the entire framework. An analogy to present to teachers could be to keep in mind the traditional classroom accessibility efforts via automatic doors, automatic classroom lights, and wider entryways to accommodate wheelchairs; these solutions offer entry into the classroom but do not alter the content or instruction once there.

2.4 Use progress monitoring and data-based decision making to inform instruction and student learning in order to provide timely mastery-oriented feedback.

The UDL literature base showcases that there is a complex interaction between progress monitoring, understanding the interplay between student performance and UDL-based instruction and environmental factors, and the ways in which teachers provide feedback to their students. Consequently, it is important for teacher educators to consider how to embed experiences to related to progress monitoring, data-based decision making, and mastery-oriented feedback within the UDL framework.

The UDL framework relies heavily on general literature related to progress monitoring, and there is a great deal of support for the effectiveness of timely progress monitoring that is unrelated to UDL (e.g., Ardoin, Witt, Connell, & Keonig, 2005; Fuchs & Fuchs, 2005; Fuchs, Fuchs, Hamlett & Allinder, 1991; Stecker, Stecker, Lembke & Foegen, 2008). All of these
studies point to the need to include timely progress monitoring as part of instruction for struggling learners and students with disabilities.

Edyburn (2010) and Basham, Israel, Graden, Poth, and Winston (2010) provide examples of how the UDL literature relies on this research in discussions of the relationship between data-based decision making based on timely progress monitoring and the UDL framework. Edyburn (2010) explained that the need for data-based decision making is a critical aspect of teaching through the UDL framework. Basham and colleagues described how multi-tiered systems of support should embed UDL throughout the tiers of instruction with all students receiving effective core instruction that is planned and implemented through the UDL framework in Tier 1 and then progressively more individualized and intensive instruction based on timely progress monitoring as students require increased levels of support.

Because teacher preparation programs already address progress monitoring and data-based decision making, doing so within the context of UDL would be a natural fit. This should be done both with student-level data and the environmental-level data (as part of evaluating the instructional environment). Although student-level progress monitoring data are typically gathered, students’ learning environments are not assessed to the same degree.

To support the implementation of UDL, teacher educators and professional developers should provide experiences that allow teachers to consider what elements of the learning environment support or impede learning. When teachers have opportunities to collect student level data, they should also consider ways of providing feedback to students in a manner that guides students toward success. In this way, they will begin to see the relationship between assessment practices and students’ goals, motivation, and performance. This is important because research has revealed that providing students feedback on their learning and performance helps
them persevere, makes them aware of how their effort translates into success, and improves their attitudes about themselves as learners. When teachers focus on providing mastery learning feedback, students are more likely to want to invest in the learning process for the sake of learning and they see increases in self-efficacy, persistence and self-regulation (Kaplan & Maehr, 2007; Schunk, 1986; Zimmerman, 1990).

2.5 Strategically integrate evidence-based practices into UDL planning, teaching, and assessment.

As mentioned previously, UDL is not considered an evidence-based practice, but provides an instructional framework in which evidence-based practices should be embedded. Therefore, as teachers start to understand how the UDL framework meets the needs of diverse learners, it is critical to help them understand how to embed effective instruction within the UDL framework. As they learn about different evidence-based practices, therefore, teachers should have opportunities to see how these practices fit within the UDL framework.

Suggestions include:

1. When teaching about different evidence-based practices, provide examples of how they would be taught within the UDL framework. For example, when teaching about mathematics practices that provide opportunities for students to have concrete examples of mathematical concepts, illustrate how to provide multiple means of representation using manipulatives, virtual manipulatives, and opportunities to access information through online resources. When teaching about instructional strategies in writing or reading that make use of modeling, guided practice, independent practice, and generalization, illustrate how students can integrate different means of expressing their understanding (beyond paper and pencil assessments), have access to technologies to support understanding, and monitor their progress.
2. When teaching about implementing evidence-based practices, discuss those practices by filtering them through the UDL framework including the guidelines and checkpoints to identify additional tools that can maximize the impact of the intervention and potentially extend its usefulness to a larger set of learners.

**Conclusions**

This UDL innovation configuration (see Appendix) was created to offer practical recommendations that are intended to assist and guide special and general education teacher preparation programs as both special and general education teachers instruct students with diverse needs, including students with disabilities. By doing so, teachers will be better prepared to effectively instruct the range of learners in their classrooms.
References


Common Core State Standards (2012). *Application to students with disabilities*. Retrieved July 7,


Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446.


Appendix: The UDL IC

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<td>2.3 Identify and strategically use materials, curricula, and technologies to align instruction with the UDL framework.</td>
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<td>2.4 Use progress monitoring and data-based decision making to inform instruction and student learning in order to provide timely mastery-oriented feedback.</td>
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<td>2.5 Strategically integrate evidence-based practices into UDL planning and teaching.</td>
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