

# **Universal Design for Learning (UDL) Guidelines: Full-Text Representation**

**Version 2.0**

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## Table of Contents

<b><u>PREFACE: THE DEVELOPMENT OF UDL AND THE GUIDELINES</u></b>	<b>3</b>
<b><u>INTRODUCTION</u></b>	<b>4</b>
<b><u>WHAT IS UNIVERSAL DESIGN FOR LEARNING?</u></b>	<b>4</b>
THE CONCEPT OF UDL	4
THE THREE PRINCIPLES	4
<b><u>VITAL QUESTIONS TO UNIVERSAL DESIGN FOR LEARNING</u></b>	<b>5</b>
HOW HAS UDL BEEN DEFINED?	6
WHAT ARE EXPERT LEARNERS?	6
WHAT IS MEANT BY THE TERM CURRICULUM?	7
WHAT DOES IT MEAN TO SAY CURRICULA ARE “DISABLED”?	8
HOW DOES UDL ADDRESS CURRICULAR DISABILITIES?	9
IS TECHNOLOGY NECESSARY TO IMPLEMENT UDL?	9
WHAT EVIDENCE SUPPORTS UDL?	10
<b><u>ABOUT THIS REPRESENTATION</u></b>	<b>12</b>
HOW ARE THE GUIDELINES ORGANIZED?	12
HOW CAN THE GUIDELINES BE USED?	12
<b><u>THE UNIVERSAL DESIGN FOR LEARNING GUIDELINES</u></b>	<b>14</b>
<b>PRINCIPLE I. PROVIDE MULTIPLE MEANS OF REPRESENTATION</b>	<b>14</b>
GUIDELINE 1: PROVIDE OPTIONS FOR PERCEPTION	14
GUIDELINE 2: PROVIDE OPTIONS FOR LANGUAGE, MATHEMATICAL EXPRESSIONS, AND SYMBOLS	16
GUIDELINE 3: PROVIDE OPTIONS FOR COMPREHENSION	18
<b>PRINCIPLE II. PROVIDE MULTIPLE MEANS OF ACTION AND EXPRESSION</b>	<b>22</b>
GUIDELINE 4: PROVIDE OPTIONS FOR PHYSICAL ACTION	22
GUIDELINE 5: PROVIDE OPTIONS FOR EXPRESSION AND COMMUNICATION	23
GUIDELINE 6: PROVIDE OPTIONS FOR EXECUTIVE FUNCTIONS	25
<b>III. PROVIDE MULTIPLE MEANS OF ENGAGEMENT</b>	<b>28</b>
GUIDELINE 7: PROVIDE OPTIONS FOR RECRUITING INTEREST	28
GUIDELINE 8: PROVIDE OPTIONS FOR SUSTAINING EFFORT AND PERSISTENCE	30
GUIDELINE 9: PROVIDE OPTIONS FOR SELF-REGULATION	32

## **Preface: The Development of UDL and the Guidelines**

At CAST, we began working nearly 26 years ago to develop ways to help learners with disabilities gain access to the general education curriculum. In the early years, we focused on helping individuals adapt or “fix” themselves – overcoming their disabilities in order to learn within the general education curriculum. This work commonly focused on Assistive Technology, compensatory tools (such as spellcheck) and skill building software, all of which remain an important facet of any comprehensive educational plan.

However, we also realized that our focus was too narrow. It obscured the critical role of the environment in determining who is or who is not considered “disabled.” In the late 1980s, we shifted our focus towards the curriculum and its limitations. Asking the important question: how do those limitations “disable” learners?

This shift led to a simple, yet profound realization: the burden of adaptation should be first placed on curricula, not the learner. Because most curricula are unable to adapt to individual variability, we have come to recognize that curricula, rather than learners, are disabled, and thus we need to “fix” curricula not learners.

CAST began in the early 1990s to research, develop, and articulate the principles and practices of Universal Design for Learning. The term was inspired by the universal design concept from architecture and product development pioneered by Ron Mace of North Carolina State University in the 1980s. This movement aims to create physical environments and tools that are usable by as many people as possible. A classic example of universal design is curb cuts. Though originally designed for people in wheelchairs, they are now used by everyone from people with shopping carts to a parent pushing a stroller. Since our focus was on learning and not buildings or products, we approached the problem via the learning sciences and not through direct application of the original architectural principles.

Over time, we came to understand that learning involves specific challenge in the area to be learned, and so for it to occur, we have to eliminate unnecessary barriers without eliminating the necessary challenges. Thus, the UDL principles go deeper than merely focusing on physical access to the classroom; they focus on access to all aspects of learning. This is an important distinction between UDL and a pure access orientation.

This work has been carried out in collaboration with many talented and dedicated education researchers, neuroscientists, practitioners, and technologists. As the UDL field has grown, so has the demand from stakeholders for Guidelines to help make applications of these principles and practices more concrete and applicable to curricular design. It was because of this call from the field that the UDL Guidelines were created.

## Introduction

The goal of education in the 21<sup>st</sup> century is not simply the mastery of content knowledge or use of new technologies. It is the mastery of the learning process. Education should help turn novice learners into *expert* learners—individuals who want to learn, who know how to learn strategically, and who, in their own highly individual and flexible ways, are well prepared for a lifetime of learning. Universal Design for Learning (UDL) helps educators meet this goal by providing a framework for understanding how to create curricula that meets the needs of all learners from the start.

The UDL Guidelines, an articulation of the UDL framework, can assist anyone who plans lessons/units of study or develops curricula (goals, methods, materials, and assessments) to reduce barriers, as well as optimize levels of challenge and support, to meet the needs of *all* learners from the start. They can also help educators identify the barriers found in existing curricula. However, to fully understand these Guidelines one must first understand what UDL is.

## What is Universal Design for Learning?

### The Concept of UDL

Universal Design for Learning (UDL) is a framework that addresses the primary barrier to fostering expert learners within instructional environments: **inflexible, “one-size-fits-all” curricula**. It is inflexible curricula that raise unintentional barriers to learning. Learners who are “in the margins”, such as learners who are gifted and talented or have disabilities, are particularly vulnerable. However, even learners who are identified as “average” may not have their learning needs met due to poor curricular design.

In learning environments, such as schools and universities, individual variability is the norm, not the exception. When curricula are designed to meet the needs of an imaginary “average”, they do not address the reality learner variability. They fail to provide all individuals with fair and equal opportunities to learn by excluding learners with different abilities, backgrounds, and motivations who do not meet the illusive criteria for “average”.

UDL helps address learner variability by suggesting flexible goals, methods, materials, and assessments that empower educators to meet these varied needs. Curricula that is created using UDL is designed from the outset to meet the needs of all learners, making costly, time-consuming, and after-the-fact changes unnecessary. The UDL framework encourages creating flexible designs from the start that have customizable options, which allow all learners to progress from where they are and not where we would have imagined them to be. The options for accomplishing this are varied and robust enough to provide effective instruction to all learners.

### The Three Principles

Three primary principles, which are based on neuroscience research, guide UDL and provide the underlying framework for the Guidelines:

- **Principle I: Provide Multiple Means of Representation** (the “what” of learning). Learners differ in the ways that they perceive and comprehend information that is presented to them. For example, those with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth may all require different ways of approaching content. Others may simply grasp information quicker or more efficiently through visual or auditory means rather than printed text. Also learning, and transfer of learning, occurs when multiple representations are used, because it allows students to make connections within, as well as between, concepts. In short, there is not one means of representation that will be optimal for all learners; *providing options for representation is essential.*
- **Principle II: Provide Multiple Means of Action and Expression** (the “how” of learning). Learners differ in the ways that they can navigate a learning environment and express what they know. For example, individuals with significant movement impairments (e.g., cerebral palsy), those who struggle with strategic and organizational abilities (executive function disorders), those who have language barriers, and so forth approach learning tasks very differently. Some may be able to express themselves well in written text but not speech, and vice versa. It should also be recognized that action and expression require a great deal of strategy, practice, and organization, and this is another area in which learners can differ. In reality, there is not one means of action and expression that will be optimal for all learners; *providing options for action and expression is essential.*
- **Principle III: Provide Multiple Means of Engagement** (the “why” of learning). Affect represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn. There are a variety of sources that can influence individual variation in affect including neurology, culture, personal relevance, subjectivity, and background knowledge, along with a variety of other factors presented in these guidelines. Some learners are highly engaged by spontaneity and novelty while others are disengaged, even frightened, by those aspects, preferring strict routine. Some learners might like to work alone, while others prefer to work with their peers. In reality, there is not one means of engagement that will be optimal for all learners in all contexts; *providing multiple options for engagement is essential.*

The pedagogical, neuroscientific, and practical underpinnings of UDL are also discussed at greater length in books such as *Teaching Every Student in the Digital Age* by Rose & Meyer (ASCD, 2002), *The Universally Designed Classroom* (Rose, Meyer, & Hitchcock, Eds.; Harvard Education Press, 2005), and *A Practical Reader in Universal Design for Learning* (Rose & Meyer, Eds.; Harvard Education Press, 2006).

### **Vital Questions to Universal Design for Learning**

Prior to providing a complete articulation of the UDL Guidelines, it is important to answer some questions that clarify the terms and underlying concepts of UDL. This will

help create the background knowledge and vocabulary necessary for understanding these guidelines. The questions include:

- **How has UDL been defined?**
- **What are expert learners?**
- **What is meant by the term “curriculum”?**
- **What does it mean to say that curricula are “disabled”?**
- **How does UDL address curricular disabilities?**
- **Is technology necessary to implement UDL?**
- **What evidence supports the practices of UDL?**

### **How has UDL been defined?**

A concise definition of Universal Design for Learning was provided by the Higher Education Opportunity Act of 2008, which stated:

The term UNIVERSAL DESIGN FOR LEARNING means a scientifically valid framework for guiding educational practice that:

(A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and

(B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient.

In addition to this definition, the framework of UDL has been elaborated by CAST in *Teaching Every Student in the Digital Age* by Rose & Meyer (ASCD, 2002), *The Universally Designed Classroom* (Rose, Meyer, & Hitchcock, Eds.; Harvard Education Press, 2005), and *A Practical Reader in Universal Design for Learning* (Rose & Meyer, Eds.; Harvard Education Press, 2006).

### **What are expert learners?**

The goal of education is the development of expert learners, something that all students can become. From the UDL perspective expert learners are:

1. *Resourceful, knowledgeable learners.* Expert learners bring considerable prior knowledge to new learning, and activate that prior knowledge to identify, organize, prioritize, and assimilate new information; they recognize the tools and resources that would help them find, structure, and remember new information; they know how to transform new information into meaningful and useable knowledge.

2. *Strategic, goal-directed learners.* Expert learners formulate plans for learning; they devise effective strategies and tactics to optimize learning; they organize resources and tools to facilitate learning; they monitor their progress; they recognize their own strengths and weaknesses as learners; they abandon plans and strategies that are ineffective.
3. *Purposeful, motivated learners.* Expert learners are eager for new learning and are motivated by the mastery of learning itself; they are goal-directed in their learning; they know how to set challenging learning goals for themselves, and know how to sustain the effort and resilience that reaching those goals will require; they can monitor and regulate emotional reactions that would be impediments or distractions to their successful learning.

## **What is meant by the term curriculum?**

### **Purpose of UDL Curriculum**

The purpose of UDL curricula is not simply to help students master a specific body of knowledge or a specific set of skills, but to help them master learning itself—in short, to become expert learners. Expert learners have developed three broad characteristics. They are: a) strategic, skillful and goal directed; b) knowledgeable, and c) purposeful and motivated to learn more. Designing curricula using UDL allows teachers to remove potential barriers that could prevent learners from meeting this important goal.

### **Components of UDL Curriculum**

Four highly interrelated components comprise a UDL curriculum: goals, methods, materials, and assessments. Here we explain differences between traditional and UDL definitions of each component.

**Goals** are often described as learning expectations. They represent the knowledge, concepts, and skills all students should master, and are generally aligned to standards. Within the UDL framework, goals themselves are articulated in a way that acknowledges learner variability and differentiates goals from means. These qualities enable teachers of UDL curricula to offer more options and alternatives—varied pathways, tools, strategies, and scaffolds for reaching mastery. Whereas traditional curricula focus on content or performance goals, a UDL curriculum focuses on developing “expert learners.” This sets higher expectations, reachable by every learner.

**Methods** are generally defined as the instructional decisions, approaches, procedures, or routines that expert teachers use to accelerate or enhance learning. Expert teachers apply evidence-based methods and differentiate those methods according to the goal of instruction. UDL curricula facilitate further differentiation of methods, based on learner variability in the context of the task, learner’s social/emotional resources, and the classroom climate. Flexible and varied, UDL methods are adjusted based on continual monitoring of learner progress.

**Materials** are usually seen as the media used to present learning content and what the learner uses to demonstrate knowledge. Within the UDL framework, the hallmark of materials is their variability and flexibility. For conveying conceptual knowledge, UDL materials offer multiple media and embedded, just-in-time supports such as hyperlinked glossaries, background information, and on-screen coaching. For strategic learning and expression of knowledge, UDL materials offer tools and supports needed to access, analyze, organize, synthesize, and demonstrate understanding in varied ways. For engaging with learning, UDL materials offer alternative pathways to success including choice of content where appropriate, varied levels of support and challenge, and options for recruiting and sustaining interest and motivation.

**Assessment** is described as the process of gathering information about a learner’s performance using a variety of methods and materials in order to determine learners’ knowledge, skills, and motivation for the purpose of making informed educational decisions. Within the UDL framework, the goal is to improve the accuracy and timeliness of assessments, and to ensure that they are comprehensive and articulate enough to guide instruction – for all learners. This is achieved in part by keen focus on the goal, as distinct from the means, enabling the provision of supports and scaffolds for construct irrelevant items. By broadening means to accommodate learner variability, UDL assessments reduce or remove barriers to accurate measurement of learner knowledge, skills, and engagement.

### **What does it mean to say curricula are “disabled”?**

Curricula can be “disabled” in the following ways:

1. *Curricula are disabled in **WHO** they can teach.*  
Curricula are often not conceived, designed, or validated for use with the diverse populations of learners who actually populate our classrooms. Learners “in the margins”—those who are gifted and talented, those with special needs or disabilities, those who are English language learners, etc.—often bear the brunt of curricula devised for the fictional “average”, because such curricula do not account for learner variability.
2. *Curricula are disabled in **WHAT** they can teach.*  
Curricula are often designed to deliver or assess information, or content, without consideration of the development of learning strategies - skills learners need to comprehend, evaluate, synthesize, and transform information into usable knowledge. Mainstream curricula remain largely constructed around print-based media, which are good at delivering narrative and expository content. However, they are not ideal for information that requires an understanding of dynamic processes and relationships, computations, or procedures.
3. *Curricula are disabled in **HOW** they can teach.*



Curricula often provide for very limited instructional options. Not only are they typically ill-equipped to differentiate instruction for differing learners, or even for the same learner at different levels of understanding, but they are disabled by their inability to provide many of the key elements of evidence-based pedagogy, such as the ability to highlight critical features or big ideas, the ability to provide relevant background knowledge as needed, the ability to relate current skills to previous skills, the ability to actively model successful skills and strategies, the ability to monitor progress dynamically, the ability to offer graduated scaffolding, among others. Most current curricula are typically much better at presenting information than teaching.

### **How does UDL address curricular disabilities?**

The usual process for making existing curricula more accessible is adaptation of curricula so that they are more accessible to all learners. Often, teachers themselves are forced to make difficult attempts at adapting inflexible “one-size-fits-all” curricular elements that were not designed to meet the variability of individual learners. The term Universal Design for Learning is often mistakenly applied to such after-the-fact adaptations.

However, Universal Design for Learning refers to a process by which a curriculum (i.e., goals, methods, materials, and assessments) is intentionally and systematically designed from the beginning to address individual differences. With curricula that are designed with the principles of UDL, the difficulties and expenses of subsequent “retrofitting” and adaptation of “disabled” curricula can be reduced or eliminated—and a better learning environment can be implemented.

The challenge is not to modify or adapt curricula for a special few, but to do so *effectively and from the start*. Considerable research already exists that identifies the effective evidence-based practices for learners presently “in the margins”. Unfortunately, these best practices have not been available to all learners, and typically are offered only after learners have already failed in mainstream curricula. They are often then provided in separate remedial or special placements where ties to the general curriculum and its high standards have been severed entirely. A UDL curriculum provides the means to repair those severed ties, and promote the inclusion of all learners.

### **Is technology necessary to implement UDL?**

Dedicated educators always find ways to design curricula that meets the needs of all learners, whether they are using technology or not. However, powerful digital technologies applied using UDL principles enable easier and more effective customization of curricula for learners. Advances in technology and the learning sciences have made “on-the-fly” individualization of curricula possible in practical, cost-effective ways, and many of these technologies have built in supports, scaffolds, and challenges to help learners understand, navigate, and engage with the learning environment.

Learning and demonstrating effective uses of technology is itself an important instructional outcome. Technology has permeated all aspects of our economy and culture. Every learner now in school needs a range of literacies that are much broader and more inclusive of our changing culture. Further an understanding of these technologies leads to a greater understanding of the possible non-tech options that can be utilized.

However, it is important to note that these technologies should not be considered to be the only way to implement UDL. Effective teachers should be creative and resourceful in designing flexible learning environments that address the variability of learners using a range of high-tech and low-tech solutions. The goal of UDL is to create environments in which everyone will have the opportunity to become expert learners, and the means to get there, be it tech or non-tech, should be flexible.

It is also important to point out that simply using technology in the classroom should not be considered implementation of UDL. Using technology does not necessarily enhance learning, and many technologies have the same accessibility problems that non-tech options might have. Technology needs to be carefully planned into the curriculum as a way to achieve the goals.

However, there is an important exception. For some students, the use of personal assistive technologies – e.g., an electric wheelchair, eyeglasses, or a cochlear implant – is essential for basic physical and sensory access to learning environments. Those students will need their assistive technologies, even during activities where other students may not use any technologies at all. Even in classrooms that are well equipped with UDL materials and methods, their assistive technology neither precludes nor replaces the need for UDL overall. (For a more elaborate discussion of the complementary roles of UDL and Assistive Technology see Rose, D., Hasselbring, T. S., Stahl, S., & Zabala, J. (2005))

In short, technology is not synonymous with UDL, but it does play a valuable role in its implementation and conceptualization.

## **What evidence supports UDL?**

UDL is based upon the most widely replicated finding in educational research: learners are highly variable in their response to instruction. In virtually every report of research on instruction or intervention, individual differences are not only evident in the results; they are prominent. However, these individual differences are usually treated as sources of annoying error variance as distractions from the more important “main effects.” UDL, on the other hand, treats these individual differences as an equally important focus of attention. In fact, when viewed through the UDL framework these findings are fundamental to understanding and designing effective instruction. The research that supports UDL falls into four categories: foundational research of UDL, research on the UDL principles, research on promising practices, and research on implementation of UDL.

### **Foundational Research on UDL**

UDL draws from a variety of research including the fields of neuroscience, the learning sciences, and cognitive psychology. It is deeply rooted in concepts such as the Zone of Proximal Development, scaffolding, mentors, and modeling, as well as the foundational works of Piaget; Vygotsky; Bruner, Ross, and Wood; and Bloom, who espoused similar principles for understanding individual differences and the pedagogies required for addressing them. For example, Vygotsky emphasized one of the key points of UDL curricula—the importance of graduated “scaffolds”. These are important to the novice, but that can be gradually removed as the individual acquires expertise. Scaffolding with graduated release is a practice that is as old as human culture and is relevant to learning in almost any domain, from learning to walk or ride a bike “unaided” to the long apprenticeships of neurosurgery or aircraft flying.

### **Principle Level Research**

The research basis for the general principles of UDL is also grounded in modern neuroscience. The three basic principles are built upon the knowledge that our learning brains are composed of three different networks, recognition, strategic, and affective. The Guidelines align these three networks with the three principles (recognition to representation, strategic to action and expression, and affective to engagement). This empirical base in neuroscience provides a solid foundation for understanding how the learning brain intersects with effective instruction. This alignment is further extended and clarified by the guidelines and checkpoints.

### **Promising Practices Research**

Promising lines of research include work identifying the specific practices that are critical to meeting the challenge of individual differences—research that has been amassed over decades and by many different researchers. These studies are labeled as “promising” because they appear to fit within the UDL framework, but they have not been tested in a UDL environment or using the framework. It is important that these practices are studied within a UDL environment for them to be considered effective UDL practices. This is an area in which we greatly encourage contributions from the field.

### **Implementation Research**

Fourth, there is research on specific applications of UDL within learning environments, including conditions necessary for implementation, common barriers, and lessons from the field. This new area of research is in its early stages but will take a more prominent place as full-scale curricular applications and system-wide implementations are developed. It should be noted that this is another area in which we greatly encourage contributions from the research field.

### **Additional Research Questions**

As with any field, there are many research questions that still need to be answered. These include questions like: how do teachers or districts *start* implementing UDL; how do teachers progress in their implementation of UDL; what are the most vital components of UDL; how can UDL be implemented most efficiently; how do we know when schools are ready to implement UDL, along with many others. These and other questions of implementation and effectiveness need to begin to be studied systematically on a large

scale. Of course, there are also many questions that are not articulated yet, which will develop as the field does.

### **About this Representation**

This is the text representation of the Guidelines. It features full descriptions of each principle and guideline, as well as descriptions and examples of each checkpoint. Of course, this type of representation is not always best for everyone, so we have also created a graphic organizer and a teacher checklist, and have plans to develop other representations. These are all available online through the National Center on Universal Design for Learning (<http://www.udlcenter.org/>).

This text-version of the Guidelines is the second revision in what we consider a dynamic and developmental process. As such they are not to be thought of as final. They will constantly evolve with our understanding of the research from the fields of UDL, education, psychology, neuroscience, along with others. Since this document lacks finality, we greatly encourage participation and collaboration from implementers, advocates, and researchers, as well as people working in other fields, with the goal of making the Guidelines more accurate and inclusive.

As with the first version of these Guidelines, our intention remains to collect and synthesize comments from the field, weigh them against the latest research evidence, and, in consultation with an editorial advisory board, make appropriate modifications, additions, and updates to the UDL Guidelines on a regular basis. This is just a beginning and, we hope, a promising one for improving opportunities for *all* individuals to become expert learners.

### **How are the Guidelines organized?**

The UDL Guidelines are organized according to the three main principles of UDL (representation, action and expression, and engagement). These are arranged differently depending on the purpose of the representation, but the content is consistent. To provide more detail, the principles are broken down into Guidelines, which each have supporting checkpoints. In short, they are arranged from *principle (least detail) → guideline → checkpoint (most detail)*.

### **How can the Guidelines be used?**

These Guidelines should be carefully selected and applied to the curriculum as appropriate. The UDL Guidelines are not meant to be a “prescription”, but rather as a set of strategies that can be employed to overcome the barriers inherent in most existing curricula. They may serve as the basis for building in the options and the flexibility that are necessary to maximize learning opportunities. In many cases, educators may find that they are already incorporating many of these guidelines into their practice.

The Guidelines should not just be applied to one aspect of the curriculum nor should they be used with only a few students. Ideally the guidelines would be used to evaluate and plan goals, methods, materials, and assessments for the purpose of creating a fully accessible learning environment for all.

## The Universal Design for Learning Guidelines

### Principle I. Provide Multiple Means of Representation

Learners differ in the ways that they perceive and comprehend information that is presented to them. For example, those with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth may all require different ways of approaching content. Others may simply grasp information quicker or more efficiently through visual or auditory means rather than printed text. Also learning, and transfer of learning, occurs when multiple representations are used, because it allows students to make connections within, as well as between, concepts. In short, there is not one means of representation that will be optimal for all learners; providing options for representation is essential.

#### Guideline 1: Provide options for perception

Learning is impossible if information is imperceptible to the learner, and difficult when information is presented in formats that require extraordinary effort or assistance. To reduce barriers to learning, it is important to ensure that key information is equally perceptible to all learners by: 1) providing the same information through different modalities (e.g., through vision, hearing, or touch); 2) providing information in a format that will allow for adjustability by the user (e.g., text that can be enlarged, sounds that can be amplified). Such multiple representations not only ensure that information is accessible to learners with particular sensory and perceptual disabilities, but also easier to access and comprehend for many others.

#### *Checkpoint 1.1 – Offer ways of customizing the display of information*

In print materials, the display of information is fixed and permanent. In properly prepared digital materials, the display of the same information is very malleable and customizable. For example, a call-out box of background information may be displayed in a different location, or enlarged, or emphasized by the use of color, or deleted entirely. Such malleability provides options for increasing the perceptual clarity and salience of information for a wide range of learners and adjustments for preferences of others. While these customizations are difficult with print materials. They are commonly available automatically in digital materials, though it cannot be assumed that because it is digital it is accessible as many digital materials are equally inaccessible. Educators and learners should work together to attain the best match of features to learning needs.

#### Implementation Examples:

- Display information in a flexible format so that the following perceptual features can be varied:
  - The size of text, images, graphs, tables, or other visual content
  - The contrast between background and text or image

- The color used for information or emphasis
- The volume or rate of speech or sound
- The speed or timing of video, animation, sound, simulations, etc.
- The layout of visual or other elements
- The font used for print materials

***Checkpoint 1.2 - Offer alternatives for auditory information***

Sound is a particularly effective way to convey the impact of information, which is why sound design is so important in movies and why the human voice is particularly effective for conveying emotion and significance. However, information conveyed solely through sound is not equally accessible to all learners and is especially inaccessible for learners with hearing disabilities, for learners who need more time to process information, or for learners who have memory difficulties. In addition, listening itself is a complex strategic skill that must be learned. To ensure that all learners have access to learning, options should be available for any information, including emphasis, presented aurally.

***Implementation Examples:***

- Use text equivalents in the form of captions or automated speech-to-text (voice recognition) for spoken language
- Provide visual diagrams, charts, notations of music or sound
- Provide written transcripts for videos or auditory clips
- Provide American Sign Language (ASL) for spoken English
- Use visual analogues to represent emphasis and prosody (e.g., emoticons, symbols, or images)
- Provide visual or tactile (e.g., vibrations) equivalents for sound effects or alerts
- Provide visual and/or emotional description for musical interpretation

***Checkpoint 1.3 - Offer alternatives for visual information***

**Images, Graphics, Animations, Video,** or Text (see below) are often the optimal way to present information, especially when the information is about the relationships between objects, actions, numbers, or events. But such visual representations are not equally accessible to all learners, especially learners with visual disabilities or those who are not familiar with the type of graphic being used. Visual information can be quite dense, particularly with visual art, which can have multiple complex meanings and interpretations depending on contextual factors and the viewer's knowledge base. To ensure that all learners have equal access to information, it is essential to provide non-visual alternatives.

***Implementation Examples:***

- Provide descriptions (text or spoken) for all images, graphics, video, or animations
- Use touch equivalents (tactile graphics or objects of reference) for key visuals that represent concepts
- Provide physical objects and spatial models to convey perspective or interaction

- Provide auditory cues for key concepts and transitions in visual information

**Text** is a special case of visual information. The transformation from text into audio is among the most easily accomplished methods for increasing accessibility. The advantage of text over audio is its permanence, but providing text that is easily transformable into audio accomplishes that permanence without sacrificing the advantages of audio. Digital synthetic Text-To-Speech is increasingly effective but still disappoints in its ability to carry the valuable information in prosody.

Implementation Examples:

- Follow accessibility standards (NIMAS, DAISY, etc.) when creating digital text
- Allow for a competent aide, partner, or “intervener” to read text aloud
- Provide access to text-to-Speech software

**Guideline 2: Provide options for language, mathematical expressions, and symbols**

Learners vary in their facility with different forms of representation – both linguistic and non-linguistic. Vocabulary that may sharpen and clarify concepts for one learner may be opaque and foreign to another. An equals sign (=) might help some learners understand that the two sides of the equation need to be balanced, but might cause confusion to a student who does not understand what it means. A graph that illustrates the relationship between two variables may be informative to one learner and inaccessible or puzzling to another. A picture or image that carries meaning for some learners may carry very different meanings for learners from differing cultural or familial backgrounds. As a result, inequalities arise when information is presented to all learners through a single form of representation. An important instructional strategy is to ensure that alternative representations are provided not only for accessibility, but for clarity and comprehensibility across all learners.

***Checkpoint 2.1 - Clarify vocabulary and symbols***

The semantic elements through which information is presented – the words, symbols, numbers, and icons – are differentially accessible to learners with varying backgrounds, languages, and lexical knowledge. To ensure accessibility for all, key vocabulary, labels, icons, and symbols should be linked to, or associated with, alternate representations of their meaning (e.g., an embedded glossary or definition, a graphic equivalent, a chart or map). Idioms, archaic expressions, culturally exclusive phrases, and slang, should be translated.

Implementation Examples:

- Pre-teach vocabulary and symbols, especially in ways that promote connection to the learners’ experience and prior knowledge
- Provide graphic symbols with alternative text descriptions
- Highlight how complex terms, expressions, or equations are composed of simpler words or symbols



- Embed support for vocabulary and symbols within the text (e.g., hyperlinks or footnotes to definitions, explanations, illustrations, previous coverage, translations)
- Embed support for unfamiliar references within the text (e.g., domain specific notation, lesser known properties and theorems, idioms, academic language, figurative language, mathematical language, jargon, archaic language, colloquialism, and dialect)

### ***Checkpoint 2.2 - Clarify syntax and structure***

Single elements of meaning (like words or numbers) can be combined to make new meanings. Those new meanings, however, depend upon understanding the rules or structures (like syntax in a sentence or the properties of equations) of how those elements are combined. When the syntax of a sentence or the structure of a graphical representation is not obvious or familiar to learners, comprehension suffers. To ensure that all learners have equal access to information, provide alternative representations that clarify, or make more explicit, the syntactic or structural relationships between elements of meaning.

#### ***Implementation Examples:***

- Clarify unfamiliar syntax (in language or in math formulas) or underlying structure (in diagrams, graphs, illustrations, extended expositions or narratives) through alternatives that:
  - Highlight structural relations or make them more explicit
  - Make connections to previously learned structures
  - Make relationships between elements explicit (e.g., highlighting the transition words in an essay, links between ideas in a concept map, etc.)

### ***Checkpoint 2.3 - Support decoding of text, mathematical notation, and symbols***

The ability to fluently decode words, numbers or symbols that have been presented in an encoded format (e.g., visual symbols for text, haptic symbols for Braille, algebraic expressions for relationships) takes practice for any learner, but some learners will reach automaticity more quickly than others. Learners need consistent and meaningful exposure to symbols so that they can comprehend and use them effectively. Lack of fluency or automaticity greatly increases the cognitive load of decoding, thereby reducing the capacity for information processing and comprehension. To ensure that all learners have equal access to knowledge, at least when the ability to decode is not the focus of instruction, it is important to provide options that reduce the barriers that decoding raises for learners who are unfamiliar or dysfluent with the symbols.

#### ***Implementation Examples:***

- Allow the use of Text-to-Speech
- Use automatic voicing with digital mathematical notation (Math ML)
- Use digital text with an accompanying human voice recording (e.g., Daisy Talking Books)
- Allow for flexibility and easy access to multiple representations of notation where appropriate (e.g., formulas, word problems, graphs)

- Offer clarification of notation through lists of key terms

***Checkpoint 2.4 - Promote understanding across languages***

The language of curricular materials is usually monolingual, but often the learners in the classroom are not, so the promotion of cross-linguistic understanding is especially important. For new learners of the dominant language (e.g., English in American schools) or for learners of academic language (the dominant discourse in school), the accessibility of information is greatly reduced when no linguistic alternatives are available. Providing alternatives, especially for key information or vocabulary is an important aspect of accessibility.

***Implementation Examples:***

- Make all key information in the dominant language (e.g., English) also available in first languages (e.g., Spanish) for learners with limited-English proficiency and in ASL for learners who are deaf
- Link key vocabulary words to definitions and pronunciations in both dominant and heritage languages
- Define domain-specific vocabulary (e.g., “map key” in social studies) using both domain-specific and common terms
- Provide electronic translation tools or links to multilingual glossaries on the web
- Embed visual, non-linguistic supports for vocabulary clarification (pictures, videos, etc)

***Checkpoint 2.5 - Illustrate through multiple media***

Classroom materials are often dominated by information in text. But text is a weak format for presenting many concepts and for explicating most processes. Furthermore, text is a particularly weak form of presentation for learners who have text- or language-related disabilities. Providing alternatives - especially illustrations, simulations, images or interactive graphics – can make the information in text more comprehensible for any learner and accessible for some who would find it completely inaccessible in text.

***Implementation Examples:***

- Present key concepts in one form of symbolic representation (e.g., an expository text or a math equation) with an alternative form (e.g., an illustration, dance/movement, diagram, table, model, video, comic strip, storyboard, photograph, animation, physical or virtual manipulative)
- Make explicit links between information provided in texts and any accompanying representation of that information in illustrations, equations, charts, or diagrams

**Guideline 3: Provide options for comprehension**

The purpose of education is not to make information accessible, but rather to teach learners how to transform accessible information into useable knowledge. Decades of cognitive science research have demonstrated that the capability to transform accessible information into useable knowledge is not a passive process but an active one.

Constructing useable knowledge, knowledge that is accessible for future decision-making, depends not upon merely perceiving information, but upon active “information processing skills” like selective attending, integrating new information with prior knowledge, strategic categorization, and active memorization. Individuals differ greatly in their skills in information processing and in their access to prior knowledge through which they can assimilate new information. Proper design and presentation of information – the responsibility of any curriculum or instructional methodology - can provide the scaffolds necessary to ensure that all learners have access to knowledge.

***Checkpoint 3.1 - Activate or supply background knowledge***

Information is more accessible and likely to be assimilated by learners when it is presented in a way that primes, activates, or provides any pre-requisite knowledge. Barriers and inequities exist when some learners lack the background knowledge that is critical to assimilating or using new information. However, there are also barriers for learners who have the necessary background knowledge, but might not know it is relevant. Those barriers can be reduced when options are available that supply or activate relevant prior knowledge, or link to the pre-requisite information elsewhere.

***Implementation Examples:***

- Anchor instruction by linking to and activating relevant prior knowledge (e.g., using visual imagery, concept anchoring, or concept mastery routines)
- Use advanced organizers (e.g., KWL methods, concept maps)
- Pre-teach critical prerequisite concepts through demonstration or models
- Bridge concepts with relevant analogies and metaphors
- Make explicit cross-curricular connections (e.g., teaching literacy strategies in the social studies classroom)

***Checkpoint 3.2 - Highlight patterns, critical features, big ideas, and relationships***

One of the big differences between experts and novices in any domain is the facility with which they distinguish what is critical from what is unimportant or irrelevant. Since experts quickly recognize the most important features in information, they allocate their time efficiently, quickly identifying what is valuable and finding the right “hooks” with which to assimilate the most valuable information into existing knowledge. As a consequence, one of the most effective ways to make information more accessible is to provide explicit cues or prompts that assist individuals in attending to those features that matter most while avoiding those that matter least.

***Implementation Examples:***

- Highlight or emphasize key elements in text, graphics, diagrams, formulas
- Use outlines, graphic organizers, unit organizer routines, concept organizer routines, and concept mastery routines to emphasize key ideas and relationships
- Use multiple examples and non-examples to emphasize critical features

- Use cues and prompts to draw attention to critical features
- Highlight previously learned skills that can be used to solve unfamiliar problems

### ***Checkpoint 3.3 - Guide information processing, visualization, and manipulation***

Successful transformation of information into useable knowledge often requires the application of mental strategies and skills for “processing” information. These cognitive, or meta-cognitive, strategies involve the selection and manipulation of information so that it can be better summarized, categorized, prioritized, contextualized and remembered. While some learners in any classroom may have a full repertoire of these strategies, along with the knowledge of when to apply them, most learners do not. Well-designed materials can provide customized and embedded models, scaffolds, and feedback to assist learners who have very diverse abilities in using those strategies effectively.

#### ***Implementation Examples:***

- Give explicit prompts for each step in a sequential process
- Provide options for organizational methods and approaches (tables and algorithms for processing mathematical operations)
- Provide interactive models that guide exploration and new understandings
- Introduce graduated scaffolds that support information processing strategies
- Provide multiple entry points to a lesson and optional pathways through content (e.g., exploring big ideas through dramatic works, arts and literature, film and media)
- “Chunk” information into smaller elements
- Progressively release information (e.g., sequential highlighting)
- Remove unnecessary distractions unless they are essential to the instructional goal

### ***Checkpoint 3.4 - Maximize transfer and generalization***

All learners need to be able to generalize and transfer their learning to new contexts. Students vary in the amount of scaffolding they need for memory and transfer in order to improve their ability to access their prior learning. Of course, all learners can benefit from assistance in how to transfer the information they have to other situations, as learning is not about individual facts in isolation, and students need multiple representations for this to occur. Without this support and the use of multiple representations, information might be learned, but is inaccessible in new situations. Supports for memory, generalization, and transfer include techniques that are designed to heighten the memorability of the information, as well as those that prompt and guide learners to employ explicit strategies.

#### ***Implementation Examples:***

- Provide checklists, organizers, sticky notes, electronic reminders
- Prompt the use of mnemonic strategies and devices (e.g., visual imagery, paraphrasing strategies, method of loci, etc.)

- Incorporate explicit opportunities for review and practice
- Provide templates, graphic organizers, concept maps to support note-taking
- Provide scaffolds that connect new information to prior knowledge (e.g., word webs, half-full concept maps)
- Embed new ideas in familiar ideas and contexts (e.g., use of analogy, metaphor, drama, music, film, etc.)
- Provide explicit, supported opportunities to generalize learning to new situations (e.g., different types of problems that can be solved with linear equations, using physics principles to build a playground)
- Offer opportunities over time to revisit key ideas and linkages between ideas

## **Principle II. Provide Multiple Means of Action and Expression**

Learners differ in the ways that they can navigate a learning environment and express what they know. For example, individuals with significant movement impairments (e.g., cerebral palsy), those who struggle with strategic and organizational abilities (executive function disorders), those who have language barriers, and so forth approach learning tasks very differently. Some may be able to express themselves well in written text but not speech, and vice versa. It should also be recognized that action and expression require a great deal of strategy, practice, and organization, and this is another area in which learners can differ. In reality, there is not one means of action and expression that will be optimal for all learners; providing options for action and expression is essential.

### **Guideline 4: Provide options for physical action**

A textbook or workbook in a print format provides limited means of navigation or physical interaction (e.g., turning pages, handwriting in spaces provided). Many interactive pieces of educational software similarly provide only limited means of navigation or interaction (e.g., using a joystick or keyboard). Navigation and interaction in those limited ways will raise barriers for some learners – those with physical disabilities, blindness, dysgraphia, or who need various kinds of executive functioning supports. It is important to provide materials with which all learners can interact. Properly designed curricular materials provide a seamless interface with common assistive technologies through which individuals with movement impairments can navigate and express what they know – to allow navigation or interaction with a single switch, through voice activated switches, expanded keyboards and others.

#### ***Checkpoint 4.1 - Vary the methods for response and navigation***

Learners differ widely in their capacity to navigate their physical environment. To reduce barriers to learning that would be introduced by the motor demands of a task, provide alternative means for response, selection, and composition. In addition, learners differ widely in their optimal means for navigating through information and activities. To provide equal opportunity for interaction with learning experiences, an instructor must ensure that there are multiple means for navigation and control is accessible.

#### ***Implementation Examples:***

- Provide alternatives in the requirements for rate, timing, speed, and range of motor action required to interact with instructional materials, physical manipulatives, and technologies
- Provide alternatives for physically responding or indicating selections (e.g., alternatives to marking with pen and pencil, alternatives to mouse control)
- Provide alternatives for physically interacting with materials by hand, voice, single switch, joystick, keyboard, or adapted keyboard

#### ***Checkpoint 4.2 - Optimize access to tools and assistive technologies***

Providing a child with a tool is often not enough. We need to provide the support to use the tool effectively. Many learners need help navigating through their environment (both in terms of physical space and the curriculum), and all learners should be given the opportunity to use tools that might help them meet the goal of full participation in the classroom. However, significant numbers of learners with disabilities have to use Assistive Technologies for navigation, interaction, and composition on a regular basis. It is critical that instructional technologies and curricula do not impose inadvertent barriers to the use of these assistive technologies. An important design consideration, for example, is to ensure that there are keyboard commands for any mouse action so that learners can use common assistive technologies that depend upon those commands. It is also important, however, to ensure that making a lesson physically accessible does not inadvertently remove its challenge to learning.

Implementation Examples:

- Provide alternate keyboard commands for mouse action
- Build switch and scanning options for increased independent access and keyboard alternatives
- Provide access to alternative keyboards
- Customize overlays for touch screens and keyboards
- Select software that works seamlessly with keyboard alternatives and alt keys

**Guideline 5: Provide options for expression and communication**

There is no medium of expression that is equally suited for all learners or for all kinds of communication. On the contrary, there are media, which seem poorly suited for some kinds of expression, and for some kinds of learning. While a learner with dyslexia may excel at story-telling in conversation, he may falter when telling that same story in writing. It is important to provide alternative modalities for expression, both to the level the playing field among learners and to allow the learner to appropriately (or easily) express knowledge, ideas and concepts in the learning environment.

***Checkpoint 5.1 - Use multiple media for communication***

Unless specific media and materials are critical to the goal (e.g., learning to paint specifically with oils, learning to handwrite with calligraphy) it is important to provide alternative media for expression. Such alternatives reduce media-specific barriers to expression among learners with a variety of special needs, but also increases the opportunities for all learners to develop a wider range of expression in a media-rich world. For example, it is important for all learners to learn *composition*, not just writing, and to learn the optimal medium for any particular content of expression and audience.

Implementation Examples:

- Compose in multiple media such as text, speech, drawing, illustration, design, film, music, dance/movement, visual art, sculpture or video
- Use physical manipulatives (e.g., blocks, 3D models, base-ten blocks)

- Use social media and interactive web tools (e.g., discussion forums, chats, web design, annotation tools, storyboards, comic strips, animation presentations)
- Compose in multiple media such as text, speech, drawing, illustration, comics, storyboards, design, film, music, visual art, sculpture, or video
- Solve problems using a variety of strategies

***Checkpoint 5.2 - Use multiple tools for construction and composition***

There is a tendency in schooling to focus on traditional tools rather than contemporary ones. This tendency has several liabilities: 1) it does not prepare learners for their future; 2) it limits the range of content and teaching methods that can be implemented; 3) it restricts learners ability to express knowledge about content (assessment); and, most importantly, 4) it constricts the kinds of learners who can be successful. Current media tools provide a more flexible and accessible toolkit with which learners can more successfully take part in their learning and articulate what they know. Unless a lesson is focused on learning to use a specific tool (e.g., learning to draw with a compass), curricula should allow many alternatives. Like any craftsman, learners should learn to use tools that are an optimal match between their abilities and the demands of the task.

***Implementation Examples:***

- Provide spellcheckers, grammar checkers, word prediction software
- Provide Text-To-Speech software (voice recognition), human dictation, recording
- Provide calculators, graphing calculators, geometric sketchpads, or pre-formatted graph paper
- Provide sentence starters or sentence strips
- Use story webs, outlining tools, or concept mapping tools
- Provide Computer-Aided-Design (CAD), music notation (writing) software, or mathematical notation software
- Provide virtual or concrete mathematics manipulatives (e.g., base-10 blocks, algebra blocks)
- Use web applications (e.g., wikis, animation, presentation)

***Checkpoint 5.3 - Build fluencies with graduated levels of support for practice and performance***

Learners must develop a variety of fluencies (e.g., visual, audio, mathematical, reading, etc.). This means that they often need multiple scaffolds to assist them as they practice and develop independence. Curricula should offer alternatives in the degrees of freedom available, with highly scaffolded and supported opportunities provided for some and wide degrees of freedom for others who are ready for independence. Fluency is also built through many opportunities for performance, be it in the form of an essay or a dramatic production. Performance helps learners because it allows them to synthesize their learning in personally relevant ways. Overall, it is important to provide options that build learners' fluencies.

***Implementation Examples:***



- Provide differentiated models to emulate (i.e. models that demonstrate the same outcomes but use differing approaches, strategies, skills, etc.)
- Provide differentiated mentors (i.e., teachers/tutors who use different approaches to motivate, guide, feedback or inform)
- Provide scaffolds that can be gradually released with increasing independence and skills (e.g., embedded into digital reading and writing software)
- Provide differentiated feedback (e.g., feedback that is accessible because it can be customized to individual learners)
- Provide multiple examples of novel solutions to authentic problems

### **Guideline 6: Provide options for executive functions**

At the highest level of the human capacity to act skillfully are the so-called “executive functions.” Associated with networks that include the prefrontal cortex, these capabilities allow humans to overcome impulsive, short-term reactions to their environment and instead to set long-term goals, plan effective strategies for reaching those goals, monitor their progress, and modify strategies as needed. In short, they allow learners to take advantage of their environment. Of critical importance to educators is the fact that executive functions have very limited capacity due to working memory. This is true because executive capacity is sharply reduced when: 1) executive functioning capacity must be devoted to managing “lower level” skills and responses which are not automatic or fluent thus the capacity for “higher level” functions is taken; and 2) executive capacity itself is reduced due to some sort of higher level disability or to lack of fluency with executive strategies. The UDL framework typically involves efforts to expand executive capacity in two ways: 1) by scaffolding lower level skills so that they require less executive processing; and 2) by scaffolding higher level executive skills and strategies so that they are more effective and developed. Previous guidelines have addressed lower level scaffolding, this guideline addresses ways to provide scaffolding for executive functions themselves.

#### ***Checkpoint 6.1 - Guide appropriate goal-setting***

It cannot be assumed that learners will set appropriate goals to guide their work, but the answer should not be to provide goals for students. Such a short-term remedy does little to develop new skills or strategies in any learner. It is therefore important that learners develop the skill of effective goal setting. The UDL framework embeds graduated scaffolds for learning to set personal goals that are both challenging and realistic.

#### ***Implementation Examples:***

- Provide prompts and scaffolds to estimate effort, resources, and difficulty
- Provide models or examples of the process and product of goal-setting
- Provide guides and checklists for scaffolding goal-setting
- Post goals, objectives, and schedules in an obvious place

#### ***Checkpoint 6.2 - Support planning and strategy development***

Once a goal is set, effective learners and problem-solvers plan a strategy, including the tools they will use, for reaching that goal. For young children in any domain, older learners in a new domain, or any learner with one of the disabilities that compromise executive functions (e.g., intellectual disabilities), the strategic planning step is often omitted, and trial and error attempts take its place. To help learners become more plan-full and strategic a variety of options are needed, such as cognitive “speed bumps” that prompt them to “stop and think;” graduated scaffolds that help them actually implement strategies; or engagement in decision-making with competent mentors.

Implementation Examples:

- Embed prompts to “stop and think” before acting as well as adequate space
- Embed prompts to “show and explain your work” (e.g., portfolio review, art critiques)
- Provide checklists and project planning templates for understanding the problem, setting up prioritization, sequences, and schedules of steps
- Embed coaches or mentors that model think-alouds of the process
- Provide guides for breaking long-term goals into reachable short-term objectives

***Checkpoint 6.3 - Facilitate managing information and resources***

One of the limits of executive function is that imposed by the limitations of so-called working memory. This “scratch pad” for maintaining chunks of information where they can be accessed as part of comprehension and problem-solving is very limited for any learner and even more severely limited for many learners with learning and cognitive disabilities. As a result, many such learners seem disorganized, forgetful, and unprepared. Wherever working memory capacity is not construct-relevant in a lesson, it is important to provide a variety of internal scaffolds and external organizational aids – exactly those kinds that executives use - to keep information organized and “in mind.”

Implementation Examples:

- Provide graphic organizers and templates for data collection and organizing information
- Embed prompts for categorizing and systematizing
- Provide checklists and guides for note-taking

***Checkpoint 6.4 - Enhance capacity for monitoring progress***

Learning cannot happen without feedback, and that means learners need a clear picture of the progress that are (or are not) making. When assessments and feedback do not inform instruction or when they are not given to the students in a timely manner, learning cannot change because students do not know what to do differently. This lack of knowledge about what to improve can make some learners seem “perseverative,” careless, or unmotivated. For these learners all of the time, and for most learners some of the time, it is important to ensure that options can be customized to provide feedback that is more explicit, timely, informative, and accessible. Especially important is providing “formative”

feedback that allows learners to monitor their own progress effectively and to use that information to guide their own effort and practice.

Implementation Examples:

- Ask questions to guide self-monitoring and reflection
- Show representations of progress (e.g., before and after photos, graphs and charts showing progress over time, process portfolios)
- Prompt learners to identify the type of feedback or advice that they are seeking
- Use templates that guide self-reflection on quality and completeness
- Provide differentiated models of self-assessment strategies (e.g., role-playing, video reviews, peer feedback)
- Use of assessment checklists, scoring rubrics, and multiple examples of annotated student work/performance examples

### III. Provide Multiple Means of Engagement

Affect represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn. There are a variety of sources that can influence individual variation in affect including neurology, culture, personal relevance, subjectivity, and background knowledge, along with a variety of other factors. Some learners are highly engaged by spontaneity and novelty while other are disengaged, even frightened, by those aspects, preferring strict routine. Some learners might like to work alone, while others prefer to work with their peers. In reality, there is not one means of engagement that will be optimal for all learners in all contexts; providing multiple options for engagement is essential.

#### **Guideline 7: Provide options for recruiting interest**

Information that is not attended to, that does not engage learners' cognition, is in fact inaccessible. It is inaccessible both in the moment and in the future, because relevant information goes unnoticed and unprocessed. As a result, teachers devote considerable effort to recruiting learner attention and engagement. But learners differ significantly in what attracts their attention and engages their interest. Even the same learner will differ over time and circumstance; their "interests" change as they develop and gain new knowledge and skills, as their biological environments change, and as they develop into self-determined adolescents and adults. It is, therefore, important to have alternative ways to recruit learner interest, ways that reflect the important inter- and intra-individual differences amongst learners.

#### ***Checkpoint 7.1 - Optimize individual choice and autonomy***

In an instructional setting, it is often inappropriate to provide choice of the learning objective itself, but it *is* often appropriate to offer choices in how that objective can be reached, in the context for achieving the objective, in the tools or supports available, and so forth. Offering learners choices can develop self-determination, pride in accomplishment, and increase the degree to which they feel connected to their learning. However, it is important to note that individuals differ in how much and what kind of choices they prefer to have. It is therefore not enough to simply provide choice. The right kind of choice and level of independence must be optimized to ensure engagement.

#### ***Implementation Examples:***

- Provide learners with as much discretion and autonomy as possible by providing choices in such things as:
  - The level of perceived challenge
  - The type of rewards or recognition available
  - The context or content used for practicing and assessing skills
  - The tools used for information gathering or production
  - The color, design, or graphics of layouts, etc.
  - The sequence or timing for completion of subcomponents of tasks
- Allow learners to participate in the design of classroom activities and academic tasks

- Involve learners, where and whenever possible, in setting their own personal academic and behavioral goals

***Checkpoint 7.2 - Optimize relevance, value, and authenticity***

Individuals are engaged by information and activities that are relevant and valuable to their interests and goals. This does not necessarily mean that the situation has to be equivalent to real life, as fiction can be just as engaging to learners as non-fiction, but it does have to be relevant and authentic to learners' individual goals and the instructional goals. Individuals are rarely interested in information and activities that have no relevance or value. In an educational setting, one of the most important ways that teachers recruit interest is to highlight the utility and relevance, of learning and to demonstrate that relevance through authentic, meaningful activities. It is a mistake, of course, to assume that all learners will find the same activities or information equally relevant or valuable to their goals. To recruit all learners equally, it is critical to provide options that optimize what is relevant, valuable, and meaningful to the learner.

***Implementation Examples:***

- Vary activities and sources of information so that they can be:
  - Personalized and contextualized to learners' lives
  - Culturally relevant and responsive
  - Socially relevant
  - Age and ability appropriate
  - Appropriate for different racial, cultural, ethnic, and gender groups
- Design activities so that learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants
- Provide tasks that allow for active participation, exploration and experimentation
- Invite personal response, evaluation and self-reflection to content and activities
- Include activities that foster the use of imagination to solve novel and relevant problems, or make sense of complex ideas in creative ways

***Checkpoint 7.3 - Minimize threats and distractions***

One of the most important things a teacher can do is to create a safe space for learners. To do this, teachers need to reduce potential threats and distractions in the learning environment. When learners have to focus their attention on having basic needs met or avoiding a negative experience they cannot concentrate on the learning process. While the physical safety of a learning environment is of course necessary, subtler types of threats and distractions must be attended to as well; what is threatening or potentially distracting depends on learners' individual needs and background. An English Language Learner might find language experimentation threatening, while some learners might find too much sensory stimulation distracting. The optimal instructional environment offers options that reduce threats and negative distractions for everyone to create a safe space in which learning can occur.

***Implementation Examples:***

- Create an accepting and supportive classroom climate
- Vary the level of novelty or risk
  - Charts, calendars, schedules, visible timers, cues, etc. that can increase the predictability of daily activities and transitions
  - Creation of class routines
  - Alerts and previews that can help learners anticipate and prepare for changes in activities, schedules, and novel events
  - Options that can, in contrast to the above, maximize the unexpected, surprising, or novel in highly routinized activities
- Vary the level of sensory stimulation
  - Variation in the presence of background noise or visual stimulation, noise buffers, number of features or items presented at a time
  - Variation in pace of work, length of work sessions, availability of breaks or time-outs, or timing or sequence of activities
- Vary the social demands required for learning or performance, the perceived level of support and protection and the requirements for public display and evaluation
- Involve all participants in whole class discussions

**Guideline 8: Provide options for sustaining effort and persistence**

Many kinds of learning, particularly the learning of skills and strategies, require sustained attention and effort. When motivated to do so, many learners can regulate their attention and affect in order to sustain the effort and concentration that such learning will require. However, learners differ considerably in their ability to self-regulate in this way. Their differences reflect disparities in their initial motivation, their capacity and skills for self-regulation, their susceptibility to contextual interference, and so forth. A key instructional goal is to build the individual skills in self-regulation and self-determination that will equalize such learning opportunities (see Guideline 9). In the meantime, the external environment must provide options that can equalize accessibility by supporting learners who differ in initial motivation, self-regulation skills, etc.

***Checkpoint 8.1 - Heighten salience of goals and objectives***

Over the course of any sustained project or systematic practice, there are many sources of interest and engagement that compete for attention and effort. For some learners, they need support to remember the initial goal or to maintain a consistent vision of the rewards of reaching that goal. For those learners, it is important to build in periodic or persistent “reminders” of both the goal and its value in order for them to sustain effort and concentration in the face of distracters.

***Implementation Examples:***

- Prompt or require learners to explicitly formulate or restate goal
- Display the goal in multiple ways
- Encourage division of long-term goals into short-term objectives
- Demonstrate the use of hand-held or computer-based scheduling tools

- Use prompts or scaffolds for visualizing desired outcome
- Engage learners in assessment discussions of what constitutes excellence and generate relevant examples that connect to their cultural background and interests

***Checkpoint 8.2 - Vary demands and resources to optimize challenge***

Learners vary not only in their skills and abilities, but also in the kinds of challenges that motivate them to do their best work. All learners need to be challenged, but not always in the same way. In addition to providing appropriately varied levels and types of demands, learners also need to be provided with the right kinds of resources necessary for successful completion of the task. Learners cannot meet a demand without appropriate, and flexible, resources. Providing a range of demands, and a range of possible resources, allows all learners to find challenges that are optimally motivating. Balancing the resources available to meet the challenge is vital.

***Implementation Examples:***

- Differentiate the degree of difficulty or complexity within which core activities can be completed
- Provide alternatives in the permissible tools and scaffolds
- Vary the degrees of freedom for acceptable performance
- Emphasize process, effort, improvement in meeting standards as alternatives to external evaluation and competition

***Checkpoint 8.3 - Foster collaboration and community***

In the 21<sup>st</sup> century, all learners must be able to communicate and collaborate effectively within a community of learners. This is easier for some than others, but remains a goal for all learners. The distribution of mentoring through peers can greatly increase the opportunities for one-on-one support. When carefully structured, such peer cooperation can significantly increase the available support for sustained engagement. Flexible rather than fixed grouping allows better differentiation and multiple roles, as well as providing opportunities to learn how to work most effectively with others. Options should be provided in how learners build and utilize these important skills.

***Implementation Examples:***

- Create cooperative learning groups with clear goals, roles, and responsibilities
- Create school-wide programs of positive behavior support with differentiated objectives and supports
- Provide prompts that guide learners in when and how to ask peers and/or teachers for help
- Encourage and support opportunities for peer interactions and supports (e.g., peer-tutors)
- Construct communities of learners engaged in common interests or activities
- Create expectations for group work (e.g., rubrics, norms, etc.)

***Checkpoint 8.4 - Increase mastery-oriented feedback***

Assessment is most productive for sustaining engagement when the feedback is relevant, constructive, accessible, consequential, and timely. But the *type* of feedback is also critical in helping learners to sustain the motivation and effort essential to learning. Mastery-oriented feedback is the type of feedback that guides learners toward mastery rather than a fixed notion of performance or compliance. It also emphasizes the role of effort and practice rather than “intelligence” or inherent “ability” as an important factor in guiding learners toward successful long-term habits and learning practices. These distinctions may be particularly important for learners whose disabilities have been interpreted, by either themselves or their caregivers, as permanently constraining and fixed.

***Implementation Examples:***

- Provide feedback that encourages perseverance, focuses on development of efficacy and self-awareness, and encourages the use of specific supports and strategies in the face of challenge
- Provide feedback that emphasizes effort, improvement, and achieving a standard rather than on relative performance
- Provide feedback that is frequent, timely, and specific
- Provide feedback that is substantive and informative rather than comparative or competitive
- Provide feedback that models how to incorporate evaluation, including identifying patterns of errors and wrong answers, into positive strategies for future success

**Guideline 9: Provide options for self-regulation**

While it is important to design the *extrinsic environment* so that it can support motivation and engagement (see guidelines 7 and 8), it is also important to develop learners’ *intrinsic* abilities to regulate their own emotions and motivations. The ability to self-regulate – to strategically modulate one’s emotional reactions or states in order to be more effective at coping and engaging with the environment – is a critical aspect of human development. While many individuals develop self-regulatory skills on their own, either by trial and error or by observing successful adults, many others have significant difficulties in developing these skills. Unfortunately some classrooms do not address these skills explicitly, leaving them as part of the “implicit” curriculum that is often inaccessible or invisible to many. Those teachers and settings that address self-regulation explicitly will be most successful in applying the UDL principles through modeling and prompting in a variety of methods. As in other kinds of learning, individual differences are more likely than uniformity. A successful approach requires providing sufficient alternatives to support learners with very different aptitudes and prior experience to effectively manage their own engagement and affect.

***Checkpoint 9.1 - Promote expectations and beliefs that optimize motivation***

One important aspect of self-regulation is the personal knowledge each learner has about what he or she finds motivating, be it intrinsic or extrinsic. To



accomplish this, learners need to be able to set personal goals that can be realistically reached, as well as fostering positive beliefs that their goals can be met. However, learners also need to be able to deal with frustration and avoid anxiety when they are in the process of meeting their goals. Multiple options need to be given to learners to help them stay motivated.

Implementation Examples:

- Provide prompts, reminders, guides, rubrics, checklists that focus on:
  - Self-regulatory goals like reducing the frequency of aggressive outbursts in response to frustration
  - Increasing the length of on-task orientation in the face of distractions
  - Elevating the frequency of self-reflection and self-reinforcements
- Provide coaches, mentors, or agents that model the process of setting personally appropriate goals that take into account both strengths and weaknesses
- Support activities that encourage self-reflection and identification of personal goals

***Checkpoint 9.2 - Facilitate personal coping skills and strategies***

Providing a model of self-regulatory skills is not sufficient for most learners. They will need sustained apprenticeships that include scaffolding. Reminders, models, checklists, and so forth can assist learners in choosing and trying an adaptive strategy for managing and directing their emotional responses to external events (e.g., strategies for coping with anxiety-producing social settings or for reducing task-irrelevant distracters) or internal events (e.g., strategies for decreasing rumination on depressive or anxiety-producing ideation). Such scaffolds should provide sufficient alternatives to meet the challenge of individual differences in the kinds of strategies that might be successful and the independence with which they can be applied.

Implementation Examples:

- Provide differentiated models, scaffolds and feedback for:
  - Managing frustration
  - Seeking external emotional support
  - Developing internal controls and coping skills
  - Appropriately handling subject specific phobias and judgments of “natural” aptitude (e.g., “how can I improve on the areas I am struggling in?” rather than “I am not good at math”)
  - Use real life situations or simulations to demonstrate coping skills

***Checkpoint 9.3 - Develop self-assessment and reflection***

In order to develop better capacity for self-regulation, learners need to learn to monitor their emotions and reactivity carefully and accurately. Individuals differ considerably in their capability and propensity for metacognition, and some learners will need a great deal of explicit instruction and modeling in order to learn how to do this successfully. For many learners, merely recognizing that they are making progress toward greater independence is highly motivating.

Alternatively, one of the key factors in learners losing motivation is their inability to recognize their own progress. It is important, moreover that learners have multiple models and scaffolds of different self-assessment techniques so that they can identify, and choose, ones that are optimal.

Implementation Examples:

- Offer devices, aids, or charts to assist individuals in learning to collect, chart and display data from their own behavior for the purpose of monitoring changes in those behaviors
- Use activities that include a means by which learners get feedback and have access to alternative scaffolds (e.g., charts, templates, feedback displays) that support understanding progress in a manner that is understandable and timely

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