PROJECT BASED LEARNING AND UNIVERSAL DESIGN FOR LEARNING

Best Practices in Pedagogy

This paper presents research that supports the pedagogies of Project Based Learning and Universal Design in Learning and provides an analysis of elements, process, outcomes and methods.

PROJECT BASED LEARNING / UNIVERSAL DESIGN FOR LEARNING

Resource Notes

Project Based Learning

Universal Design for Learning

Project-Based Learning (PBL) is a teaching approach that engages students in sustained, collaborative real-world investigations. Projects are organized around a driving question, and students participate in a variety of tasks that seek to meaningfully address this question. **Project-Based Learning (PBL)** is a student centered pedagogy and considered an alternative to paper-based, rote memorization, teacher-led classrooms.

Proponents of Project-Based Learning cite numerous benefits to the implementation of these strategies in the classroom including a greater depth of understanding of concepts, broader knowledge base, improved communication and interpersonal/social skills, enhanced leadership skills, increased creativity, and improved writing skills.

According to the Buck Institute for Education (BIE), project-based learning has its roots in experiential education and the philosophy of John Dewey. John Dewey initially promoted the idea of "learning by doing." In My Pedagogical Creed (1897; 1929) Dewey enumerated his beliefs regarding education: "The teacher is not in the school to impose certain ideas or to form certain habits in the child, but is there as a member of the community to select the influences which shall affect the child and to assist him in properly responding to these.......I believe, therefore, in the so-called expressive or constructive activities as the centre of correlation."

The method of project-based learning emerged due to developments in learning theory in the past 25 years. The BIE suggests, "Research in neuroscience and psychology has extended cognitive and behavioral models of learning – which support traditional direct instruction – to show that knowledge, thinking, doing, and the contexts for learning are inextricably tied." Because learning is a social activity, teaching methods can scaffold on students' prior experiences and include a focus on community and culture. Furthermore, because we live in an increasingly more technological and global society, teachers realize that they must prepare students not only to think about new information, but they also must engage them in tasks that prepare them for this global citizenship. Based on the developments in cognitive research and the changing modern educational environment in the latter part of the 20th Century, project-based learning has gained popularity.

BIE defines project-based learning as "a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed products and tasks." This process can last for varying time periods and can extend over multiple content areas.

John Thomas (2000) explains that project-based learning requires "complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively

autonomously over extended periods of time; and culminate in realistic products or presentations."

According to Ronald Marx et. al. (1994), project-based instruction often has a "'driving question' encompassing worthwhile content that is anchored in a real-world problem; investigations and artifacts that allow students to learn concepts, apply information, and represent knowledge in a variety of ways; collaboration among students, teachers, and others in the community so that participants can learn from one another; and use of cognitive tools that help learners represent ideas by using technology".

Educational research has advanced this idea of teaching and learning into a methodology known as "project-based learning." Blumenfeld & Krajcik (2006) cite studies by Marx et al., 2004, Rivet & Krajcki, 2004 and William & Linn, 2003 state that "research has demonstrated that students in project-based learning classrooms get higher scores than students in traditional classroom."

Markham (2011) describes Project-Based Learning (PBL) as: " PBL integrates knowing and doing. Students learn knowledge and elements of the core curriculum, but also apply what they know to solve authentic problems and produce results that matter. PBL students take advantage of digital tools to produce high quality, collaborative products. PBL refocuses education on the student, not the curriculum--a shift mandated by the global world, which rewards intangible assets such as drive, passion, creativity, empathy, and resiliency. These cannot be taught out of a textbook, but must be activated through experience."

Project-Based Learning has been associated with the "situated learning" perspective of James G. Greeno (2006) and on the constructivist theories of Jean Piaget. A more precise description of the processes of PBL given by Blumenfeld et al. says that, "Project-based learning is a comprehensive perspective focused on teaching by engaging students in investigation. Within this framework, students pursue solutions to nontrivial problems by asking and refining questions, debating ideas, making predictions, designing plans and/or experiments, collecting and analyzing data, drawing conclusions, communicating their ideas and findings to others, asking new questions, and creating artifacts." (Blumenfeld, et al., 1991)

Elements

The core idea of project-based learning is that real-world problems capture students' interest and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context. The teacher plays the role of facilitator, working with students to frame worthwhile questions, structuring meaningful tasks, coaching both knowledge development and social skills, and carefully assessing what students have learned from the experience. Typical projects present a problem to solve (What is the best way to reduce the pollution in the schoolyard pond?) or a phenomenon to investigate (What causes rain?).

The basis of PBL lies in the authenticity or real-life application of the research. Students working as a team are given a "driving question" to respond to or answer, then directed to

create an artifact (or artifacts) to present their gained knowledge. Artifacts may include a variety of media such as writings, art, drawings, three-dimensional representations, videos, photography, or technology-based presentations.

Comprehensive Project-Based Learning:

- Is organized around an open-ended driving question or challenge.

- Creates a need to know essential content and skills.

- Requires inquiry to learn and/or create something new.

- Requires critical thinking, problem solving, collaboration, and various forms of communication, often known as "21st Century Skills."

- Allows some degree of student voice and choice.

- Incorporates feedback and revision.

- Results in a publicly presented product or performance.

Examples

Although projects are the primary vehicle for instruction in project-based learning, there are no commonly shared criteria for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content and structure of the activity, and guidance from the teacher. The role of projects in the overall curriculum is also open to interpretation. Projects can guide the entire curriculum (more common in charter or other alternative schools) or simply consist of a few hands-on activities. They might be multidisciplinary (more likely in elementary schools) or single-subject (commonly science and math). Some projects involve the whole class, while others are done in small groups or individually.

When PBL is used with 21st Century tools/skills, students are expected to use technology in meaningful ways to help them investigate, collaborate, analyze, synthesize and present their learning. The term IPBL has also been used to reflect pedagogy where an emphasis on technology and/or an interdisciplinary approach has been included.

An example of applied PBL is Muscatine High School, located in Muscatine, Iowa. The school started the G2 (Global Generation Exponential Learning) which consists of middle and high school "Schools within Schools" that deliver in four core subject areas (areas can include math, science, technology, language arts, social studies, culture, exploratory, etc.).

At the high school level, activities may include making water purification systems, investigating service learning, or creating new bus routes. At the middle school level, activities may include researching trash statistics, documenting local history through interviews, or writing essays about a community scavenger hunt. Classes are designed to help diverse students become college and career ready after high school.

Roles

PBL relies on learning groups. Student groups determine their projects, in so doing; they engage <u>student voice</u> by encouraging students to take full responsibility for their learning. This is what makes PBL <u>constructivist</u>. Students work together to accomplish specific goals.

When students use technology as a tool to communicate with others, they take on an active role versus a passive role of transmitting the information by a teacher, a book, or broadcast. The student is constantly making choices on how to obtain, display, or manipulate information. Technology makes it possible for students to think actively about the choices they make and execute. Every student has the opportunity to get involved either individually or as a group.

Instructor role in Project Based Learning is that of a facilitator. They do not relinquish control of the classroom or student learning but rather develop an atmosphere of shared responsibility. The Instructor must structure the proposed question/issue so as to direct the student's learning toward content-based materials. The instructor must regulate student success with intermittent, transitional goals to ensure student projects remain focused and students have a deep understanding of the concepts being investigated. The students are held accountable to these goals through ongoing feedback and assessments. The ongoing assessment and feedback are essential to ensure the student stays within the scope of the driving question and the core standards the project is trying to unpack.

According to Andrew Miller of the Buck Institute of Education, formative assessments are used "in order to be transparent to parents and students, you need to be able to track and monitor ongoing formative assessments, that show work toward that standard." The instructor uses these assessments to guide the inquiry process and ensure the students have learned the required content. Once the project is finished, the instructor evaluates the finished product and learning that it demonstrates

Student role is to ask questions, build knowledge, and determine a real-world solution to the issue/question presented. Students must collaborate expanding their active listening skills and requiring them to engage in intelligent focused communication. Therefore, allowing them to think rationally on how to solve problems. PBL forces students to take ownership of their success.

Outcomes

More important than learning science, students need to learn to work in a community, thereby taking on social responsibilities. The most significant contributions of PBL have been in schools languishing in poverty stricken areas; when students take responsibility, or ownership, for their learning, their self-esteem soars. It also helps to create better work habits and attitudes toward learning. In standardized tests, languishing schools have been able to raise their testing grades a full level by implementing PBL.

Although students do work in groups, they also become more independent because they are receiving little instruction from the teacher. With Project-Based Learning students also learn skills that are essential in higher education. The students learn more than just finding answers, PBL allows them to expand their minds and think beyond what they normally would. Students have to find answers to questions and combine them using critical thinking skills to come up with answers.

PBL is significant to the study of (mis-)conceptions; local concepts and childhood intuitions that are hard to replace with conventional classroom lessons. In PBL, project science *is* the community culture; the student groups themselves resolve their understandings of phenomena with their own knowledge building. Technology allows them to search in more useful ways, along with getting more rapid results.

Opponents of Project Based Learning warns against negative outcomes primarily in projects that become unfocused and tangential arguing that underdeveloped lessons can result in the wasting of precious class time. No one teaching method has been proven more effective than another. Opponents suggest that narratives and presentation of anecdotal evidence included in lecture-style instruction can convey the same knowledge in less class time. Given that disadvantaged students generally have fewer opportunities to learn academic content outside of school, wasted class time due to an unfocused lesson presents a particular problem.

Instructors can be deluded into thinking that as long as a student is engaged and doing, they are learning. Ultimately it is cognitive activity that determines the success of a lesson. If the project does not remain on task and content driven the student will not be successful in learning the material; the lesson will be ineffective. A source of difficulty for teachers includes, "Keeping these complex projects on track while attending to students' individual learning needs requires artful teaching, as well as industrial-strength project management." Like any approach, Project Based Learning is only beneficial when applied successfully.

Problem-Based Learning is a similar pedagogic approach; however, problem-based approaches structure students' activities more by asking them to solve specific (open-ended) problems rather than relying on students to come up with their own problems in the course of completing a project.

A meta-analysis conducted by Purdue University found that when implemented well, PBL can increase long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.

Project Based Learning Template

In order to provide consistency across Project Based Learning (PBL) professional development and the development of resources for Teach 21, the WVDE Office of Instruction adopted a project design template for use with PBL. It is important that all work classified as PBL

adhere to specific guidelines, the most important of which is an alignment with the grade appropriate West Virginia 21st century content, learning skills and technology tools standards and objectives. Quality Project Based Learning in the 21st century classroom engages students in thought-provoking, standards-focused, inquiry-based learning experiences that are open-ended and driven by an authentic and challenging problem, question or issue.

Standards-focused instruction often contains projects that are authentic and engaging for students but not all of these lessons or units of study meet the criteria of PBL. We view the implementation of PBL in the classroom as a continuum of practice for the classroom teacher, and it is important that all teachers and administrators view quality standards-focused instructional design in a positive light.

It is equally important that we provide the support necessary for teachers who embark upon this journey from more teacher-directed and highly-structured standards-focused instructional designs to authentic inquiry-based, open-ended, ongoing, and engaging learning designs that are driven by a challenging question, problem or issue.

	Projects	PBL

Teacher-directed
Inquiry-based
Highly-structured
Open-ended
Summative
On-going
Thematic
Driving question/challenge
Fun
Engaging
Answer giving
Problem solving
De-contextualized –
School world
Contextualized – Real world

Methods of Using Project-Based Learning

The project-based learning approach is often used in small school settings, like charter and magnet schools, because they are affected to a lesser degree by the high-stakes state-mandated testing movement. In the past few years, Project-Based Learning is gaining momentum in public, education systems including in many post-secondary STEM programs.

In order to create effective project-based learning units, professional development organizers suggest using the following guidelines:

- Begin with the end in mind and plan for this end result.
- Craft the driving question; select and refine a central question.
- Plan the assessment and define outcomes and assessment criteria.
- Map the project: Decide how to structure the project.
- Manage the process: Find tools and strategies for successful projects.

Project-Based Learning can involve, but is not limited to:

- Asking and refining questions
- Debating ideas
- Making predictions
- Designing plans and/or experiments
- Collecting and analyzing data
- Drawing conclusions
- Communicating ideas and findings to others
- Asking new questions
- Creating artifacts

10 Steps to Create a Lesson

Planning a PBL lesson can be challenging. According to Loring and Johnson (2011), characteristics of PBCL includes the structuring of a learning experience around current, authentic problems from business and industry and employs proven learning techniques that are natural to the way people learn. Students learn technical content within the context of a problem. Learning comes from actually solving the problem.

Below are some steps to guide the development of a lesson.

1. What <u>standards</u> and <u>objectives</u> will students achieve?

2. How will student learning be assessed at the end of the lesson?

3. What real life situations or <u>careers</u> can you think of where this would apply?

4. What <u>problem comes to mind</u> based on the answers to 1, 2, and 3?

5. What resources will students need? (texts, <u>technology</u>, supplies, <u>graphic organizers</u>, etc.)

6. How will you <u>support and scaffold</u> your <u>students' learning</u>?

7. How will students be grouped to facilitate their learning? Will specific roles be assigned?

8. What <u>formative assessment</u> will be used to gauge how students are learning and what changes need to be made to assist their learning during the lesson?

9. How will <u>students present</u> their solutions?

10. How will you provide feedback to the students? How will <u>they reflect on their learning</u>?

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Universal Design for Learning
Resource Notes

The UDL Guidelines began as a project of the National Center on Accessing the General Curriculum (NCAC), a cooperative agreement between the Center for Applied Special Technology (CAST) and the U.S. Department of Education, Office of Special Education Programs (OSEP), Cooperative Agreement No. h424H990004. The contents of this document do not necessarily reflect the views or policies of the U.S. Department of Education, nor does this acknowledgement imply endorsement by the U.S. Government.

The UDL Guidelines were compiled by David H. Rose, Ed.D., Co-Founder and Chief Education Officer at CAST, and Jenna Gravel, M.Ed., doctoral student at Harvard. They have received extensive review and comments from: colleagues at CAST; teachers at the elementary, secondary, and postsecondary levels; researchers; and other practitioners. As with Guidelines 1.0 we will be inviting peer review and comments from individuals throughout the field.

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 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.

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).

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 <u>expert learners</u>. 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 <u>barriers</u> 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 <u>hyperlinked</u> glossaries, background information, and on-screen <u>coaching</u>. 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.

Relationship of research to CAST's process of innovation and development focusing on UDL as a transdisciplinary and translational framework:

Basic and applied research > Development and Innovation > Systemic Implementation > Synthesis

(Q. *which standards are being used/cited in the development of SCTE curriculum?)

UDL 2.0 Research Evidence

The UDL Guidelines are based on research from several very different fields, and from many different researchers at many different universities and research organizations. That research has been reviewed, compiled and organized by educators and researchers at CAST. The process spanned a 10 year period and involved several different stages.

Stage One: The first stage constructed a general framework for UDL and its guidelines. The research basis for that framework came primarily from modern research in the learning sciences: cognitive science, cognitive neuroscience, neuropsychology, and neuroscience. The focus of that phase was on identifying the range and sources of variance in human learning – what are the individual differences that an adequate pedagogy must address? The three basic learning networks and principles of UDL were distilled from that review.

Stage Two: The second stage articulated those three basic principles further – identifying the most important categories within them that would need to be addressed in an adequate pedagogy of individual differences. The review of the research led us to the development of the nine UDL Guidelines.

Stage Three: Using that framework as a guide, the third stage involved over three years of extensive reviews of the educational research to identify those specific practices that are most effective in reducing barriers to instruction in each of the principles. This compilation began first by gathering existing reviews and meta-analyses of research and best practices to set the landscape. Following that, we began extensive secondary searches of the literature using keywords and concepts suggested by the meta-analysis and reviews. Nearly 1,000 articles were eventually reviewed and selected for inclusion in the evidence base that is now organized around each of the checkpoints in the UDL guidelines.

This evidence base is listed below. Within each checkpoint, the supporting research is organized into two categories:

1. Experimental and quantitative evidence
2. Scholarly reviews and expert opinions

Guideline 1: Provide options for perception

- Checkpoint 1.1: Offer ways of customizing the display of information
- Checkpoint 1.2: Offer alternatives for auditory information
- Checkpoint 1.3: Offer alternatives for visual information

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

- Checkpoint 2.1: Clarify vocabulary and symbols
- Checkpoint 2.2: Clarify syntax and structure
- Checkpoint 2.3: Support decoding of text, mathematical notation, and symbols

- Checkpoint 2.4: Promote understanding across languages
- Checkpoint 2.5: Illustrate through multiple media

Guideline 3: Provide options for comprehension

- Checkpoint 3.1: Activate or supply background knowledge
- Checkpoint 3.2: Highlight patterns, critical features, big ideas, and relationships
- Checkpoint 3.3: Guide information processing, visualization, and manipulation
- Checkpoint 3.4: Maximize transfer and generalization

Principle II. Provide Multiple Means of Action and Expression
Guideline 4: Provide options for physical action

- Checkpoint 4.1: Vary the methods for response and navigation
- Checkpoint 4.2: Optimize access to tools and assistive technologies

Guideline 5: Provide options for expression and communication

- Checkpoint 5.1: Use multiple media for communication
- Checkpoint 5.2: Use multiple tools for construction and composition
- Checkpoint 5.3: Build fluencies with graduated levels of support for practice and performance

Guideline 6: Provide options for executive functions

- Checkpoint 6.1: Guide appropriate goal-setting
- Checkpoint 6.2: Support planning and strategy development
- Checkpoint 6.3: Facilitate managing information and resources
- Checkpoint 6.4: Enhance capacity for monitoring progress

Principle III. Provide Multiple Means of Engagement
Guideline 7: Provide options for recruiting interest

- Checkpoint 7.1: Optimize individual choice and autonomy

- Checkpoint 7.2: Optimize relevance, value, and authenticity

- Checkpoint 7.3: Minimize threats and distractions

Guideline 8: Provide options for sustaining effort and persistence

- Checkpoint 8.1: Heighten salience of goals and objectives

- Checkpoint 8.2: Vary demands and resources to optimize challenge

- Checkpoint 8.3: Foster collaboration and community

- Checkpoint 8.4: Increase mastery-oriented feedback

Guideline 9: Provide options for self-regulation

- Checkpoint 9.1: Promote expectations and beliefs that optimize motivation

- Checkpoint 9.2: Facilitate personal coping skills and strategies

- Checkpoint 9.3: Develop self-assessment and reflection

Critical Elements of UDL Instruction

Universal Design for Learning (UDL) represents a paradigm shift in education that has the potential to improve outcomes for a broad range of learners. The UDL-IRN working with the Michigan Integrated Technology Supports (MITS) and in collaboration with CAST has identified four critical elements intended to serve as a foundation for UDL implementation and research. Educators aligning instruction to UDL must minimally include each of the four critical elements shown below.

1. Clear Goals

- Goals and desired outcomes of the lesson/unit are aligned to the established content standards.

- Goals are clearly defined and separate from means. They allow multiple paths/options for achievement.

- Teachers have a clear understanding of the goal(s) of the lesson and specific learner outcomes.

- Goals address the needs of every learner, are communicated in ways that are understandable to each learner, and can be expressed by them.

2. Intentional Planning for Learner Variability

- Intentional proactive planning that recognizes every learner is unique and that meeting the needs of learners in the margins-from challenged to most advanced-will likely benefit everyone.

- Addressing learner strengths and weaknesses, considering variables such as perceptual ability, language ability, background knowledge, cognitive strategies, and motivation.

- Anticipates the need for options, methods, materials, and other resources- including personnel- to provide adequate support and scaffolding.

- Maintains the rigor of the lesson- for all learners- by planning efforts (1) that embed necessary supports and (2) reduce unnecessary barriers.

3. Flexible Methods & Materials

- Teachers use a variety of media and methods to present information and content.

- A variety of methods are used to engage learners (e.g., provide choice, address student interest) and promote their ability to monitor their own learning (e.g., goal setting, self-assessment, and reflection).

- Learners use a variety of media and methods to demonstrate their knowledge.

4. Timely Progress Monitoring

- Formative assessments are frequent and timely enough to plan/redirect instruction and support intended outcomes.

- A variety of formative and summative assessments (e.g., projects, oral tests, written tests) are used by the learner to demonstrate knowledge and skill.

- Frequent opportunities exist for teacher reflection and new understandings.

Instructional Planning Process

As a framework, UDL requires educators to think proactively about the variability of all learners. In consideration of the UDL Critical Elements, educators implementing UDL should use a backwards design instructional process that incorporates the following five steps.

Step I: *Establish Clear Outcomes*

Establish a clear understanding of the goal(s) of the lesson and specific learner outcomes related to:

- The desired outcomes and essential student understandings and performance for every learner. (What will learning look like? What will students be able to do or demonstrate?)

- The desired big ideas and their alignment to the established standards within the program of study that learners should understand.

- The potential misunderstandings, misconceptions, and areas where learners may meet barriers to learning.

- How will goals be clearly communicated to the learners, in ways that are understandable to all learners?

Step 2: *Anticipate Learner Variability*

Curriculum barriers (e.g., physical, social, cultural, or ability-level) that could limit the accessibility to instruction and instructional materials.

- Learner strengths and weaknesses specific to lesson/unit goals.

- Learner background knowledge for scaffolding new learning.

- Learner preferences for representation, expression, and engagement.

- Learner language preferences.

- Cultural relevance and understanding.

Step 3: *Measurable Outcomes and Assessment Plan*

Prior to planning the instructional experience, establish how learning is going to be measured. Considerations should include:

- Previously established lesson goals and learner needs.

- Embedding checkpoints to ensure all learners are successfully meeting their desired outcomes.

- Providing learners multiple ways and options to authentically engage in the process, take action, and demonstrate understanding.

- Supporting higher-order skills and encouraging a deeper connection with the content.

Step 4: *Instructional Experience*

Establish the instructional sequence of events. At minimum plans should include:

- Intentional and proactive ways to address the established goals, learner variability, and the assessment plan.
- Establish a plan for how instructional materials and strategies will be used to overcome barriers and support learner understanding.
- A plan that ensures high-expectations for all learners and that the needs of the learners in the margins (i.e., struggling and advanced) are being met and anticipating that a broader range of learners will benefit.
- Integrate an assessment plan to provide necessary data.

Considerations should be made for how to support multiple means of:

- Engagement: A variety of methods are used to engage students (e.g., provide choice, address student interest) and promote their ability to monitor their own learning (e.g., goal setting, self-assessment, and reflection).
- Representation: Teacher purposefully uses a variety of strategies, instructional tools, and methods to present information and content to anticipate student needs and preferences.
- Expression & Action: Student uses a variety of strategies, instructional tools, and methods to demonstrate new understandings.

Step 5: *Reflection and New Understandings*

Establish checkpoints for teacher reflection and new understandings. Considerations should include:

- Whether the learners obtained the big ideas and obtained the desired outcomes. (What data support your inference?)
- What instructional strategies worked well? How can instructional strategies be improved?
- What tools worked well? How could the use of tools be improved?
- What strategies and tools provided for multiple means of representation, action/ expression, and engagement?
- What additional tools would have been beneficial to have access to and why?
- Overall, how might you improve this lesson?

Five stages of implementing UDL:
- Explore
- Prepare

- Integrate
- Scale
- Optimize

Bibliography and Website Resources for Universal Design for Learning

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