

EFFICIENT STRATEGIES FOR INTEGRATING UNIVERSAL DESIGN FOR LEARNING IN THE ONLINE CLASSROOM

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ABSTRACT

Many learners who have not chosen to identify as having physical, sensory, and learning disabilities still may struggle to learn in the online learning environment due to diverse abilities and backgrounds, differing cultural and linguistic backgrounds, and other factors that affect perception, learning ability, and engagement. Given the apparent difficulty of a subset of learners who choose to learn in technology-enhanced instructional environments, most online learners identify as average or exceptional learners but they may not have their learning needs met due to inadequate course design, development, and delivery. This article will explore how the Universal Design for Learning (UDL) framework can be integrated efficiently into all phases of the online course development process. It will explore how the strategies can help faculty meet the challenge of learner diversity. Alternative approaches are included to encourage the creation of flexible instructional materials, techniques, and options that empower educators to meet the varied needs of online learners.

Keywords: Universal Design for Learning, UDL, design, development, delivery, course and curriculum planning, instructional design services, learner readiness, online course readiness, course materials, content creation, accessible content development and instructional media, engagement, retention, success, evaluation, and redesign

INTRODUCTION

The goal of education should not be just the mastery of knowledge but the mastery of learning. Education should help turn novice learners into expert learners—individuals who know how to learn, who want to learn, and who, in their own highly individual ways, are well prepared for a lifetime of learning (CAST, 2018). In the online learning environment, there are invariably learners who will not be as successful in courses designed using traditional online course development best practices. According to a ten-year study conducted by the Online Learning Consortium, 6.7 million learners have taken at least one online course, and roughly 32% of all higher-education learners now enroll in at least one online course during their educational career (Allen & Seaman, 2013). *U.S. News and World Report* reported that only 17% of learners who entered any of the 69 online bachelor's

programs that reported degree completion data to *U.S. News and World Report* graduated in three years, while just 35% graduated within six years (Haynie, 2015).

With an influx of learners choosing to learn primarily online, faculty can expect a range of learners in courses who vary in their background preparation, learning situated in the context of the course, and learning based on age and development (Rose & Fischer, 2009). Learners with disabilities may be less likely to self-disclose their disability to their instructor due to the impersonal nature of the online environment. As a result, these learners may be less likely to receive necessary accommodations in an online course (Barnard-Brak & Sulak, 2010; Bricout, 2001). Strategies within the Universal Design for Learning (UDL) framework can be leveraged into the design, development, and delivery of the traditional online

course to help address the needs of learners in this category or any who find it difficult to complete their degree in technology-enhanced learning modalities. The integration of UDL principles in learning helps to facilitate motivation, persistence, self-regulation, personalization of learning, and community participation (Gordon, Meyer, & Rose, 2016). Its strategies reduce barriers by addressing the learning needs of all through the development of goals, materials, and assessments that put learners in control. If integrated efficiently, the UDL framework has the potential to change the effectiveness of online learning and increase the success for all learners.

UNDERSTANDING UNIVERSAL DESIGN FOR LEARNING AND ONLINE LEARNING MATERIALS

Universal Design for Learning is a framework currently being adopted by educators to guide the planning process used for inclusive instruction. According to the National Center on Universal Design for Learning, the UDL framework consists of three neuroscience-based principles: Multiple Means of Action and Expression, Multiple Means of Representation, and Multiple Means of Engagement. The guidelines within the framework focus on the what, how, and why of learning (CAST, 2015).

The UDL framework and its principles help address learner variability by shaping the design of flexible course goals, instructional methods, materials, and assessments that empower educators to meet the varied needs of their learners. In 2008, Congress emphasized the importance of Universal Design for Learning when they defined it in the Higher Education Opportunity Act as a scientifically valid framework 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 to 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. (Higher Education Opportunity Act, 2008)

UDL's approach to learning design addresses the primary barrier to making expert learners:

inflexible, one-size-fits-all curricula that raise unintentional barriers to learning. Providing accessible learning materials to postsecondary learners with disabilities is essential—and required by law. Assistive technology and accessible materials can lower barriers to access. However, access to course materials is not the same as access to learning.

Multiple Means of Action and Expression

The primary focus of this principle is on the “how of learning,” and its elements help faculty make adjustments for how individual learners navigate a learning environment and express what they have learned. Using this principle to focus on the design of the online environment will ensure that the online learning environment includes course goals and materials designed for all learners. The strategies can be individually chosen to encourage learners to practice, organize, and prioritize their online learning experience to address their different learning needs.

Multiple Means of Representation

The primary focus of this principle is on the “what of learning,” and its strategies help faculty develop content for the online learning environment that multiple learners can both perceive and comprehend. Using this principle to focus on the development of online learning materials will ensure that learners with or without differing abilities (sensory or learning disabilities or language and cultural differences) will be able to access the content in a course with the same ease as those without differing abilities.

Multiple Means of Engagement

The primary focus of this principle is on the “why of learning,” and its strategies help faculty deliver online learning that ensures learners are engaged or motivated to learn. Using this principle to provide an engaging online experience can help learners connect to online materials based on their cultural, background knowledge and their professional needs.

Holistically, the UDL framework can assist faculty with designing, developing, and delivering online instruction that addresses the needs of all learners. When online curriculum is prepared following the guidelines in the UDL framework, it includes strategies that meet the needs of all learners, making costly, time-consuming, and

after-the-fact changes unnecessary. Each of the principles discussed can help faculty address learner variability and include guidelines for improving a learner's ability to become more motivated, resourceful, and goal-directed. By incorporating the UDL principles and guidelines into an online course, the faculty is exposed to strategies that help them to create an inclusive learning environment and address learner variability.

Phases of Instructional Design for Online Course Development

Successful online courses take into consideration the three phases of online course development: design, development, and delivery. In the online learning environment, a successful learning experience relies heavily on technology mediation making the focus on each phase of instructional design especially critical to the success of the learners in the course.

Faculty can refer to the UDL principles during the course development process to intentionally consider and proactively build in strategies that support the academic and affective needs of learners (Israel, Ribuffo, & Smith, 2014). Successful integration of the UDL strategies begins with designing clear learning objectives and assessments, continues with developing accessible instructional materials, and ends with engaging delivery and reflection. When faculty consider each phase carefully, the courses delivered online synchronously, or asynchronously, will be well designed with a keen focus on using teaching and learning best practices for learners of all abilities.

Design

UDL is based on the premise that instruction can be accessible to a broader range of learners

when courses are intentionally designed to include multiple means for accessing, processing, and internalizing information (King-Sears, 2009). The design phase of online course development encompasses the course planning activities usually centered around aligning course goals, competencies, and objectives to the activities and assessments for the course. Courses improperly designed can negatively affect learning, confuse course goals, and increase attrition and withdrawals. Online course goals are learning expectations that represent the knowledge, concepts, and skills all learners should show mastery of during the delivery of the course. These goals should be aligned to standards determined by the discipline's accrediting body and/or program committee. When considering the UDL framework in this phase of course development, it is imperative that course goals acknowledge learner variability and differentiate the course goals from the means exhibited by each learner. This task challenges faculty to consider more options and alternatives in their course plan to vary navigation, tool selection, and strategies provided for learners to achieve content mastery. The focus in this phase is to design course experiences that require all parties to set higher expectations that are attainable by every learner.

To ensure that the design of the course integrates UDL efficiently, faculty are encouraged to use this phase of the process to help learners attain predetermined course goals. Courses should be designed to implement goals that are adequately aligned with learning outcomes by using course planning tools such as the following course planning worksheet (Figure 1).

Unit/Week/Topic	Objectives	Content-Readings/ Media/ Resources	Student Interaction with Content	Assessment Strategy

Figure 1. Course Planning Worksheet

In addition to planning course goals, it is imperative that faculty design a comprehensive course syllabus that specifies the tools and the methods for use in the course. The tools are the technology-enhanced instruments used to organize the course and ensure a smooth learning experience for both faculty and learners. The technology tools selected in the design phase should be compatible with the type of content included in the course goals. The methods determined in the design phase are the instructional approaches or procedures that will be used to accelerate or enhance learning. Designing a syllabus that efficiently incorporates UDL principles and strategies into an online course means focusing on including comprehensive and specific course requirements, expectations, and due dates. It should also include learner support services options and multiple forms of contact for potential questions and concerns.

PHASE ONE: INTEGRATING THE UDL GUIDELINE OF PROVIDING MULTIPLE MEANS FOR ACTION AND EXPRESSION INTO ONLINE COURSE DESIGN AND PLANNING

To efficiently integrate opportunities for all learners to complete course activities and assignments and to express learning in the online learning environment, faculty should include options for learners to respond to stimuli (communications, activities, and assessments) in a varied and flexible way (Wakefield, 2014). In the course design and planning process, focusing on the UDL principle of

providing Multiple Means of Action and Expression will help the faculty incorporate course elements centered around the “how of learning.” In this phase, it is important to integrate design strategies that accentuate how learners differ in both how they can navigate the online learning environment and how they can express what they learn in this environment. “UDL principles guide the design of learning environments with a deep understanding and appreciation of individual variability” (CAST, 2015). There is undoubtedly more than one method or means of efficiently executing the UDL principle of Multiple Means of Action and Expression that will be beneficial to all learners. It is a more realistic goal to focus on providing options for learners to express learning in as many course experiences as possible in an attempt to accommodate as many learners as possible.

To provide an equal opportunity for course content and or interaction with learning experiences, the design of the course should include options that ensure that there are multiple methods for navigation and control is accessible for all learners. Consider:

- a. including an online course orientation that explains the learning management tools, the support learners can expect to receive, and how to efficiently navigate the online learning environment. (Figure 2)
- b. ensuring that all course content pages are visually and functionally consistent throughout

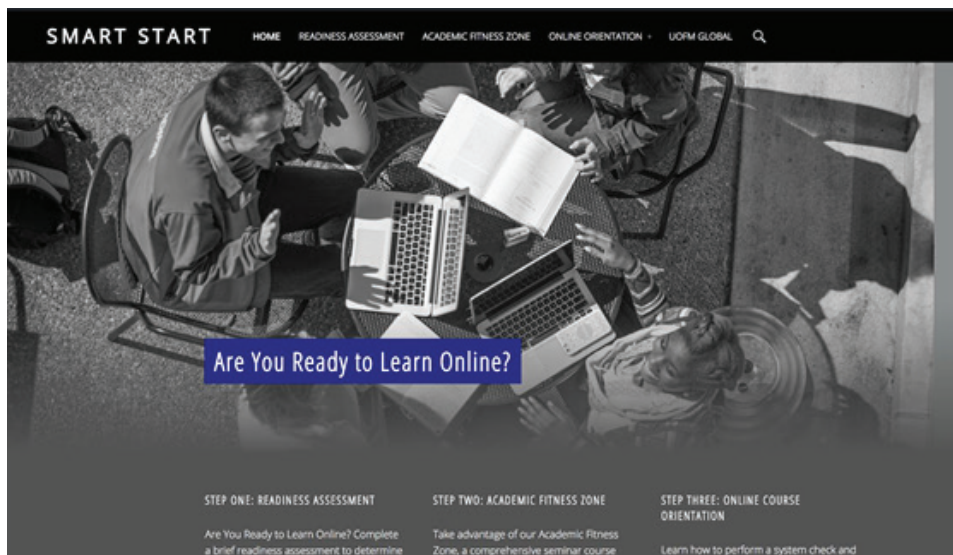


Figure 2. Sample Online Course Orientation Module

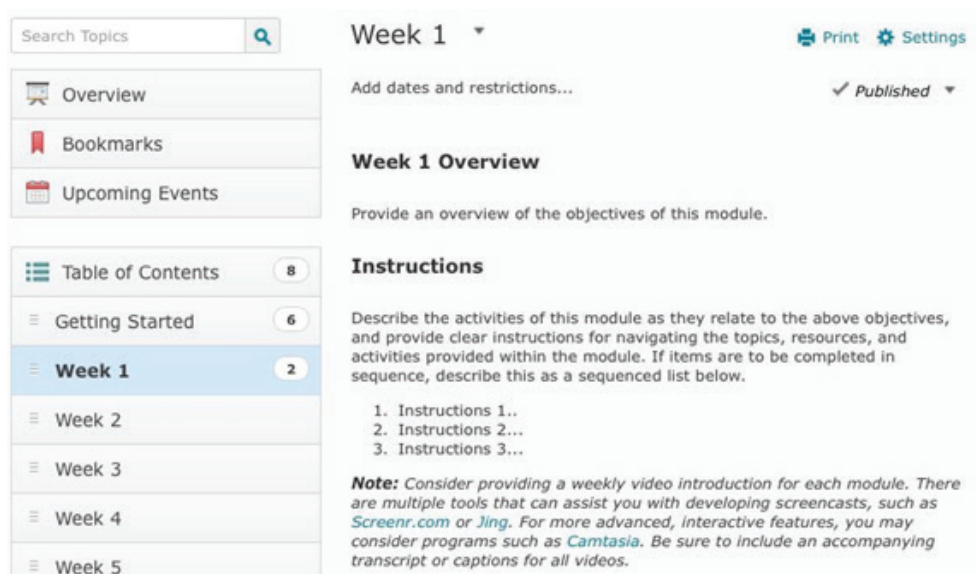


Figure 3. Consistent Course Content Pages

the course. The consistencies should be apparent in weekly modules or chronological units of materials. (Figure 3)

c. creating checkpoints to ensure that learners receive regular feedback about their progress and performance in the course.

Online Course Orientation

First, learners begin a course with preconceived ideas about how knowledge works, and their initial understanding needs to be engaged. Learning transfer is heightened or hampered by the orientation of this prior knowledge (Smith, 2012). An online course orientation can be designed to give learners the information and tools they will need to be successful in the online course.

Online learning requires an additional set of skills to be a successful learner, and learners need to be self-motivated and acquire these skills to help them manage their time and learn to utilize new technologies. The content in the orientation module should be designed to help learners become knowledgeable of the course goals and take advantage of the resources and support available to them in the course.

The administration of an online orientation increases course delivery efficiency and learner performance. Aside from saving learners from

embarrassment, the online orientation can give learners a sense of what online learning in the course entails—and maybe even help improve overall performance (Haynie, 2014). Ali and Leeds (2009) found online learners with access to an orientation performed significantly better than learners who did not have access to an orientation; therefore, an orientation program for online learners is a significant help for them to develop positive learning experiences in online learning environments (Cho, 2012).

Consistent Course Content Pages

The design of the course should help learners manage their time and maintain attention for the duration of the course. Creating consistent online course design modules or units increases the chances and opportunities for learners with differing abilities to navigate and interact with the online learning environment more seamlessly. To ensure that this guideline is integrated into the course design, include opportunities that allow learners to set goals, communicate efficiently, and complete assignments in more than one way. Brain research supports the idea that clear goals are essential for learning, but faculty often lack clear goals for learners, in part because their reliance on traditional, fixed media leads most faculty to

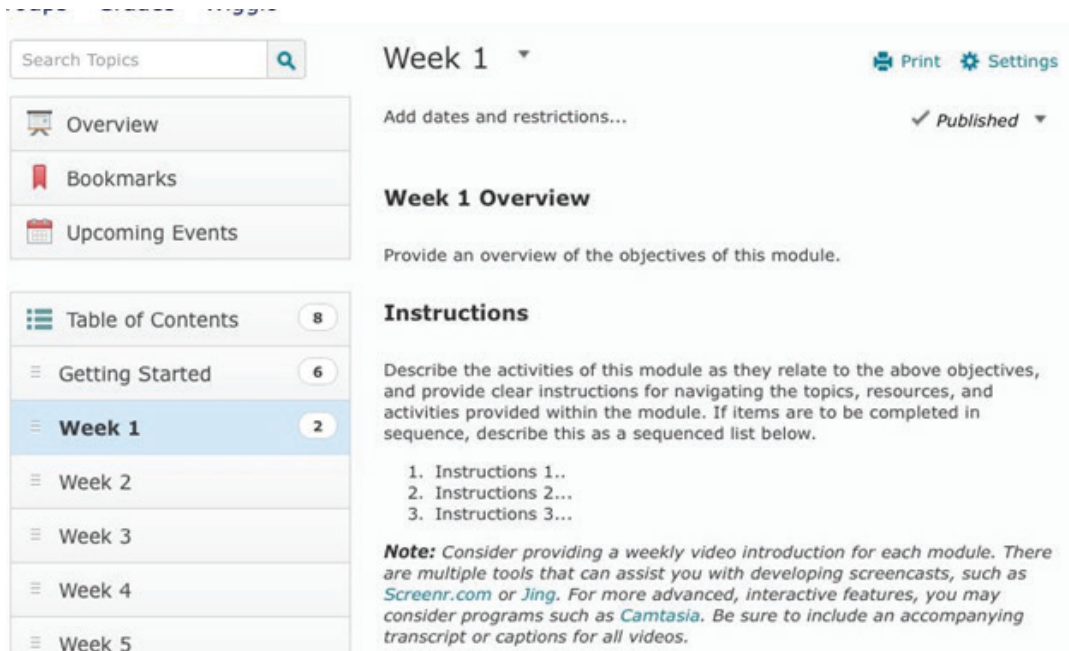


Figure 4. Clear And Consistent Module Learning Objectives

believe that there is only one path to learning (Rose & Meyer, 2002).

The implementation of consistent course content pages increases efficiency in the online course because it simplifies navigation and overall access to content for the learner. Learners presented with consistent navigation are less likely to misunderstand module or course goals. The gained efficiency can be reflected in the length of time and the amount of effort needed to achieve learning outcomes (Rao & Tanners, 2011).

Course Feedback and Checkpoints

A fully online course should include checkpoints to ensure learners are making steady progress toward completing the course requirements within a predetermined period. The checkpoints should be based on the number of weeks in the course and the number of graded assignments required for learners to complete. They should be designed as milestones in the online course where faculty contact the learner synchronously or asynchronously to review course progress. These checkpoints should be designed to help learners achieve success in the course and are prime opportunities for formal or informal course feedback. When deciding on formal or informal feedback in a specific checkpoint, it is essential to determine what information should be obtained from learners. Formal feedback can be useful when

activities or assessments include clear guidelines and rubrics. This feedback provides learners with opportunities to determine their academic standing in the course, and this method is most effective when the feedback is frequent and consistent. Informal feedback allows learners to retain more ownership of their learning experiences. Learners should receive an opportunity to provide faculty with feedback on what is working well in the course and what might help them have a better learning experience.

The implementation of consistent course feedback positively affects knowledge retention for learners. This is important because research has revealed that providing learners with feedback on their learning and performance helps them persevere, makes them aware of how their effort translates into success, and improves their attitudes about themselves as learners (Israel, Ribuffo, & Smith, 2014). When faculty focus on providing mastery-oriented feedback, learners are more likely to invest in the learning process for the sake of learning and see increases in self-efficacy, persistence, and self-regulation (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013).

To provide learners with alternatives for demonstrating what they have learned, and to include clear guidelines for all course assignments,

consider:

a. identifying course goals and learning objectives in each learning unit and making sure the goals and objectives are precisely aligned with learning activities and assessments. (Figure 4)

b. designing learning experiences that encourage learners to demonstrate their knowledge of content in a variety of ways.

Module Learning Goals and Objectives

When designing a fully online course, begin by creating an established set of course goals. The course goals should be reflected in the course milestones, learning units, and schedule. This calendar should be adjusted based on how many weeks are in the course schedule, how many modules will be included, and what content topics will need to be covered. Once those items are determined, start to determine the objectives for each module.

Module objectives are important because they help learners delineate what they need to learn in each module. They can serve as a checklist that spells out what learners should know and be able to accomplish after completing the specific module or learning unit.

Knowledge Expressed in a Variety of Ways

There isn't a single method of demonstrating knowledge that will be equally effective for all learners in the online learning environment. The most important strategy for addressing all learners is to use alternative modalities for learners to express how they have retained knowledge of a specific competency or learning objective. Unless specific instructions or materials are critical to the overall learning goal, it is vital to ensure learners have alternatives. For example, learners can receive instructions to show mastery of content via a three- to five-page paper or a 10- to 15-minute video assignment. Course content, activities, and assessments should be designed to encourage learners to submit assignments using various media such as text, speech, drawing, illustration, design, film, music, dance/movement, visual art, sculpture, or video.

Implementing this strategy has a positive effect on a learner's performance in the course by allowing for an appropriate measure of achievement without depending on a specific technology or tool. These alternative assessments offer options for gauging

student progress (Rapp, 2014). By being open to and aware of learners' backgrounds, experiences, and needs, instructors can build supports into their courses, proactively creating online environments that make it possible for learners to complete courses and reach their educational goals (Rao, Edelen-Smith, & Wailehua, 2015).

DEVELOPMENT

Traditional planning and curriculum development assume that learners can access and engage in learning through a single pathway (e.g., reading the textbook or listening to a teacher lecture); however, flexibility is not built into this instruction, and lessons must be altered whenever learners struggle (Israel et al., 2014). Course content created in the development phase of the online course development process should be structured and well organized with the overall goal of making the online learning environment accessible to all learners. When developing course materials using the UDL framework, the static or dynamic content used to present learning objectives and the groundwork needed for the learner to demonstrate knowledge must be variable and flexible. Graphics or visual media may not be accessible to learners who are visually impaired, whereas text-heavy environments are challenging for learners with reading disabilities and other types of LD or ADHD (Burgstahler, 2015). To address all learners, this could mean offering additional supports such as practice assignments, self-assessments, and glossaries for conceptual content. It could also mean providing simulations and multiple options for expressing knowledge opportunities for assessments and activities.

During this phase of course development, faculty should conduct a needs assessment to determine the content that should undergo accessibility review and redesign. Once it has been determined, the materials should meet accessibility guidelines established locally or by national standards such as Web Content Accessibility Guidelines (WCAG 2.0). UDL researchers suggest that designing accessible content and delivering it in an accessible learning environment can improve learning experience regardless of individual learning abilities (Al-Azawei, Serenelli, & Lundqvist, 2016). Employing UDL strategies to address accessibility is usually preferred because most instructors realize that

Are Your Course Materials Accessible?

Apply the following checklist as you review your own course materials.

Documents and Non-HTML Files

Guideline	Met		
Apply heading and paragraph styles.	Yes	No	N/A
Use sans-serif fonts (i.e. Arial, Verdana, Trebuchet) for all text.	Yes	No	N/A
Avoid instructions that rely on shape, size, or visual location .	Yes	No	N/A
Avoid using color to convey meaning .	Yes	No	N/A

HTML Files

Guideline	Met		
Provide descriptive module and topic headings .	Yes	No	N/A
Use the toolbar to format paragraph text and headings .	Yes	No	N/A
Use sans-serif fonts (i.e. Arial, Verdana, Trebuchet) for all text.	Yes	No	N/A
Avoid using color to convey meaning .	Yes	No	N/A
Avoid instructions that rely on shape, size, or visual location .	Yes	No	N/A

Links

Guideline	Met		
Provide links that are descriptive and distinguishable from other links.	Yes	No	N/A

Figure 5. Sample Course Materials Accessibility Guidelines

access to accessible course materials is not the same as access to learning. Creating accessible materials can be a daunting task for most faculty, and it requires them to focus on technology versus learning. To ensure course materials developed during this phase are accessible, it is important to follow guidelines and standards similar to those found in Figure 5. Although UDL-based courses broaden access for varied learners and build in supports that can address a range of learner needs, it is worth noting that for some learners, additional accommodations and modifications may also need to be made to address specific needs and objectives in their individualized learning pathways (Rao et al., 2015).

PHASE TWO: INTEGRATING THE UDL GUIDELINE OF DEVELOPING MULTIPLE MEANS OF REPRESENTATION INTO ONLINE COURSE DEVELOPMENT

In the course development process of integrating UDL into the online learning environment, it is essential to focus on the UDL principle Multiple Means of Representation. Because learners differ in the ways that they perceive and comprehend course content and the material presented to them, multiple representations of those materials should be used to allow learners to make connections with the course materials (Wakefield, 2014). To reduce

barriers to knowledge and learning in the online learning environment, it is essential to develop content that is accessible to all learners. Consider the following strategies for developing online course materials that are accessible to all learners.

Construct a comprehensive course introduction to cultivate instructor presence.

A comprehensive course introduction should orient the learner to the course content and their responsibilities as detailed in the course syllabus and, inform them on how to get started in the course and how to navigate the course. The online learning environment separates faculty from learners, and faculty have to make an extra effort to create a strong presence in their online courses; otherwise, learners are likely to feel isolated, which can lower learning achievement and increase attrition. Innovative course design supports increased engagement, participation, satisfaction, and learning (Moore, 2007). To expand faculty presence, faculty should spend some time creating a comprehensive introduction to themselves and model how learners could begin building a community of learners.

Utilize Multiple Methods of Expressing General Course Content Utilizing Different Modes, So Learners Have Varied Ways to Access the Course

Accessible Course Materials

Material Types



Figure 6. Basic Course Accessibility Requirements

Content and Materials.

In online learning environments, it is essential to avoid creating content that can only display information fixedly and permanently. Ensure that course sites and resources can be utilized with assistive technologies. Many learners with disabilities use assistive technology such as alternative keyboards, text-to-speech software, and screen magnifiers to complete online activities and assessments (Burgstahler, 2015). Course materials developed for an online course should be very malleable and customizable, which provides learners options for perceptual clarity by giving them the ability to adjust the size of text, images, graphs, tables, or other visual content. When including multimedia content in a course, it is important to give learners the ability to adjust the speed and volume of the audio content. Most streaming services have those features built in to their viewer interface.

Create multiple ways of clearly identifying and explaining essential course concepts.

Course materials are predominantly delivered in a textual format. However, research has found that textual materials are less efficient for presenting many complex or straightforward concepts (Dunlosky et al., 2013). Providing alternatives (lecture videos, illustrations, interactive simulations, etc.) to textual content can make the course content delivered via text more interesting and comprehensible for any learner. It could also help to make the learning materials more accessible

for learners who have difficulty learning concepts from static text. To integrate this strategy, consider presenting course materials using various formats, such as including traditional textual information and having supporting content delivered in video format, which could consist of an interactive simulation. This ensures that regardless of which instructional strategy the learner chooses to access, they can access the same learning objectives intended in the original instructional method.

Ensure Accessibility of Course Content and Materials.

The technical requirements of making course materials accessible could be relative to making learning available to all online learners. The Multiple Means of Representation principle refers to the process of making learning efficient and usable for all and can extend beyond the technical requirements of accessibility to addressing learner preferences and styles, and methods of instruction that reaches all learners (Rao et al., 2015). Focusing on the technical requirements of making materials accessible requires faculty to focus on developing materials in the most accessible and inclusive formats. Faculty with little to no online course development experience can be intimidated by the seemingly high requirements of making materials accessible. It is essential to understand minor accessibility requirements to make learning more accessible to all. Some of the necessary elements (Figure 6) to focus on when creating accessible materials are:

Use **content headers** to delineate content importance in course materials and make it easier for learners to review the content. Headings are a significant way for learners to navigate course materials with a screen reader. To facilitate accessibility using standard text, it is best to use the proper heading tags for information hierarchy and formatting purposes

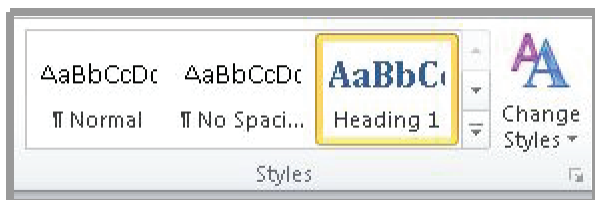


Figure 7. Microsoft Word Header Tool

Use **sans-serif fonts** for all text in course materials. These font types will help make content more legible to all learners, including those with visual impairments. Common sans serif fonts include Arial, Trebuchet, and Helvetica. Serif fonts have semi-structural details or small decorative flourishes on the ends of some of the strokes that make up letters and symbols. It is this characteristic that makes the font in this font family challenging to read. Common serif fonts include Times New Roman, Courier, New Century Schoolbook, and Palatino.

Use **hyperlinks** as a way to connect information and concepts. By providing a hyperlink that has a clear description and destination, the learner will know the target of the intended link.



Figure 8. Accessible Hyperlinks To Provide Course Links That Are Descriptive and Distinguishable

When creating course links, it is common just to provide a vague description of the hyperlink (i.e., Click Here). However, this method will make it difficult for learners using a screen reader to identify where the URL is intended to lead learners.

Use **alternative text descriptions** for all images, charts, graphs, and tables. This is vital to ensure access to non-text elements of a Word document for all learners and is critical for learners both unfamiliar with the learning materials and learners utilizing screen readers to view instructional content. There are no standard rules for determining what alternative text should say (it depends on the image, its context, the intent of the author, etc.).

Provide captions and summaries to describe all tables and charts included in instructional materials. This further helps learners understand the content that is available. Information provided in a table without a title or introductory information is inaccessible and could become confusing to learners.

Provide examples and illustrations of all major course assignments or activities. Sample course assignments should be developed and made available in the course to assist learners with modeling assignments and assessments. This provides learners with a visual example of a significant task in the course. Learners benefit from being able to generalize and transfer their learning of the concepts included in the instruction. This helps the learner transfer the knowledge they have gained completing the sample assignment into completing the actual assignment satisfactorily.

To ensure that content developed in this phase is accessible to all learners, instructors should focus less on the technical aspects of accessibility and more on how the attention to access positively affects the educational experience for all learners. The purpose of learning is not to make course content and materials accessible, but rather to teach learners how to transform accessible information into usable knowledge. The 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 (CAST, 2015). When course materials are developed with these concepts in

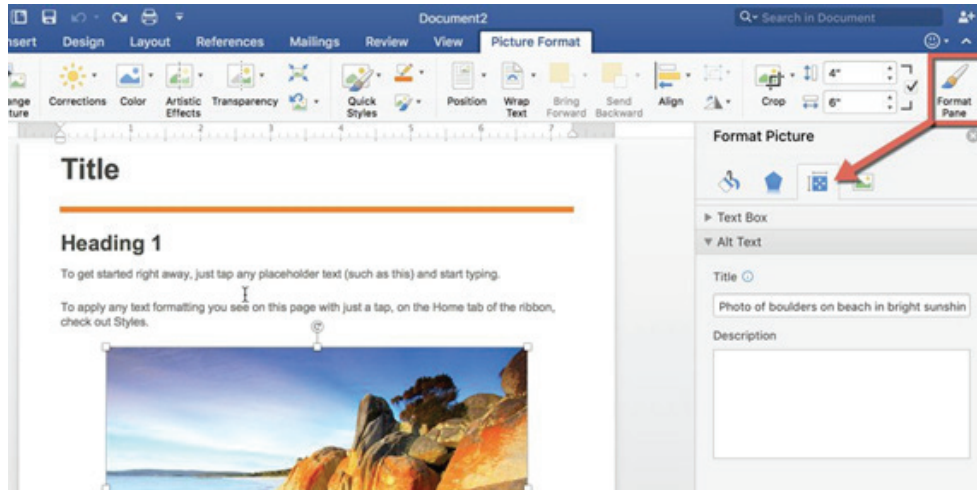


Figure 9. Using Alternative Text Descriptions

Table 1
Ensure a description of the content of all tables is provided via a caption or description.

Heading 1	Heading 2	Heading 3
Data 1	Data 4	Data 7
Data 2	Data 5	Data 8
Data 3	Data 6	Data 9

Accessible

Figure 10. Adding Titles And Captions To Tables

mind, it is likely that all learners will have access to the intended learning outcomes of the course.

Strategies implemented during this phase can all be measured by the degree to which they can make the materials and assessments of the course at the beginning of the course equally accessible to all learners. Learners with differing abilities, such as learning disabilities (LD) or other “invisible” disabilities (e.g., AD/HD, traumatic brain injury, or psychological disabilities) may be less likely to self-disclose their disability to the faculty of the course due to the impersonal nature of the online environment. As a result, these learners may be less likely to receive necessary accommodations in an online course (Hall, Cohen, Vue, & Ganley,

2015). The strategies are designed to eliminate the need for making a course accessible to all learners and will foster a more inclusive and diverse learning experience. Addressing accessibility as it relates to content creation in this phase of the course development process reduces the need to make costly or timely accommodations for learners during delivery.

DELIVERY

Course delivery is one the most challenging aspects of the online course development process. This phase of the process is centered around engaging and retaining learners and, most importantly, affirming the efficacy of the selected instructional strategies. Engagement in learning

is defined as “developing interest, purpose, motivation, and, most importantly, strong self-regulation as a learner,” (Rose & Meyer, 2002, pp. 200-209), meaning that learners feel a personal connection to what they are learning. To engage learners, faculty must foster communication with them regularly and frequently, and to retain learners, faculty must provide them with frequent and consistent feedback. When incorporating UDL into this phase, faculty should focus on meeting the goals established in previous phases as they broaden the faculty’s ability to accommodate learner variability. All strategies implemented are used to reduce or remove barriers that may hinder the accurate measurement of learner knowledge, skills, and engagement.

PHASE THREE: INTEGRATING THE UDL GUIDELINE OF MULTIPLE MEANS OF ENGAGEMENT INTO ONLINE COURSE DELIVERY

In the course delivery process of integrating UDL into the online learning environment, it is essential to focus on the UDL principle Multiple Means of Engagement, the “why of learning.” Learners in courses with more inclusive practices reported greater learning and engagement, according to new survey results released by the National Survey of Student Engagement (NSSE) (2017). To encourage learners to be more purposeful and motivated in the online learning environment, strategies for delivery should provide them with multiple means of engagement, including options for:

- a. managing their learning,
- b. persisting and putting forth effort into learning, and
- c. maintaining an interest in learning.

Integrating strategies that motivate and engage learners during the instructional process is an essential aspect of learning as skills and knowledge are established (Rao et al., 2015).

Managing learning

Engaged learning is a departure from the traditional model of learners being isolated individuals who listen to lectures, participate in discussions, write research papers, and take tests without the assistance of any kind from anyone except the instructor (Skorton & Altschuler, 2013).

Learners learning styles vary, and the online learning environment should motivate them to

engage with the course and others as they manage their individualized experience. Once learners acknowledge that they learn differently from others, they can make individual choices that inspire and motivate them to persist. This knowledge of self can then help learners to adjust and acquire new skills that make them more interested in challenging themselves to retain learning in the course. There is evidence that learners who believe they can learn will be more likely to succeed (Rose & Meyer, 2002). Encourage learners to find support and positive encouragement from friends and family who understand what motivates them and who will help them achieve their goals.

Persisting and Putting Effort into Learning

Course delivery should ensure that learners have a clear understanding of course goals and learning objectives. The consistently designed course modules or learning units created in the development phase of the course development process should include the learning goals and objectives for each week or module. Learners at all stages benefit from being aware of their own goals and the goals instructors and institutions hold for them (Simon & Taylor, 2009). Learners are most likely to persist when their goals are reflected in the materials and the content for knowledge and learning comprehension. If learners are unable to understand a specific concept or clarity is needed, there should be an easy way for learners to contact their faculty or peers.

Learners should be encouraged to collaborate with their peers and participate in the online learning community. Online learning communities can be educationally and personally fulfilling when learners approach their courses with a commitment to initiate, respect, value, and fully engage in the course and with their peers (Fidaldo & Thormann, 2017). Online peer communities recognize that, in addition to the content and materials curated by the faculty, learners are a vital source of knowledge in the online course. Learners should not be treated as passive receptacles to receive information; instead, they should be given more autonomy over their own learning experience. Giving learners an opportunity to be a member of a learning community gives them a chance to engage in learning activities, retain new ideas, and share meaningful perspectives and experiences relative to the course. This strategy is most effective when

learners are aware of this option at the beginning of the course.

Maintaining an Interest in Learning

To ensure that learners maintain interest in their success, the online course should include strategies that assist learners with maintaining high-performance expectations and the belief that they can succeed. Learners who believe they can learn will be more likely to succeed in the course. Support and positive encouragement received during the course either through the learning community or via instructor-led feedback can motivate learners to achieve their goals. Give learners an opportunity to self-assess or reflect on the materials they have learned and afford them a chance to dig deeper and expound on their knowledge beyond their individual assignments. For this strategy to be successful, these options should regularly be administered throughout the course.

Lastly, many of the strategies used to engage learners with the materials of the course and with one another will ultimately lead to communication and engagement with the faculty of the course. In the course design process, make explicit the instructions for peer to peer and instructor communication. should be include guidelines and revisit them in the course materials and instructions covered in the first half of the course. Learners should have a clear understanding of how their faculty expects them to communicate with them and each other. Faculty should engage the course multiple times a week or daily using both synchronous and asynchronous communication. This is vital for learners who require real-time interactive brainstorming and sharing discussions. Establish clear expectations in the course policies for when faculty will be present and when they will not. This increases the opportunities for success in all learners.

CONCLUSION

Universal Design for Learning helps meet the challenge of diversity in the online learning environment by promoting flexible instructional materials, techniques, and strategies that empower faculty to meet the needs of various learners (Brand, Favazza, & Dalton, 2012). Implementing UDL strategies into the online learning environment emphasizes experimentation,

exploration, and inclusive instruction. When the principles of the framework are integrated into the design, development, and delivery strategies of online course development, it has the potential to yield significant benefits for the instructional effectiveness of the course, the faculty, and the learners. UDL enables faculty to consider learner differences, preferences, and needs at the onset of planning and instruction (design) rather than after lessons have been developed for typical learners (development) and then modified to address individual students' needs (delivery) (Israel et al., 2014). When faculty understand the steps needed to integrate the principles into the phases of online course development, they can resist formulaic instruction and be encouraged to implement strategies to make learning accessible to all.

The UDL Framework, whose foundation includes over 800 peer-reviewed research articles, provides benchmarks to guide online educators in the development and implementation of curriculum. The modified curriculum can help address learner variability by shaping the design of flexible goals, methods, materials, and assessments that empower educators to meet varied needs (CAST, 2015). One of the significant benefits of the UDL Framework is that the options for accomplishing the modifications are diverse and robust enough to be used partially or entirely to provide sufficient instructional strategies that are beneficial to all learners. Even if used partially, the guidelines can serve as a tool with which to critique and minimize barriers inherent in the curriculum as educators aim to increase opportunities to learn.

When principles from the UDL framework are integrated into the design phase of the online course development process, online curriculum is designed from the outset to meet the needs of the highest number of learners. The strategies implemented in this phase ensure that the curriculum (i.e., course goals and materials, instructional methods, and assessments) is intentionally and systematically planned and designed to address individual learning differences.

When the UDL framework is incorporated into the development phase of the online course development process, the materials developed during this phase are created with sound instructional and accessibility best practices in mind. The items addressed in this phase are

designed to ensure that the needs of all learners are being fulfilled and to eliminate the need to make unnecessary, costly, time-consuming, and after-the-fact changes to accommodate learners in the course.

Lastly, when online courses employ UDL delivery strategies determined during the design and development phase of the course development process, course goals can be addressed explicitly and with a defined purpose. The goals of the course are aligned with the overarching standards that acknowledge learner variability and differentiates the course goals from the learner's ability to reach them, which enables educators to offer more instructional options and alternatives to learning. Courses are delivered with various pathways, tools, strategies, and scaffolds for reaching learning mastery that create possibilities for developing expert learners and set higher expectations for knowledge comprehension that are reachable by every learner.

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