

Challenges and Opportunities in Adhering to UDL Principles to Design Online Courses

Ahmed Lachheb, Victoria Abramenka-Lachheb, & Lesa Huber

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Universal Design For Learning

Designer's Reflection

Instructional Design Practice

Design Tools



In this article, we share the opportunities and the challenges in adhering to the Universal Design for Learning (UDL) framework to design higher education online courses. We highlight specific instructional design examples to discuss the opportunities and challenges that we have encountered. We conclude by reflecting on UDL as a design tool and ponder the following question: Do design tools guide or serve us? By reflecting on our combined 40 years of design practice experience, we believe we offer valuable design knowledge of the UDL framework to scholars of design, educators, and practitioners.

Introduction

The knowledge of design practitioners has always been valuable, benefiting design theory, education, and practice (Cross, 2001; Nelson & Stolterman, 2014; Stolterman et al., 2009; Schön, 1983, 1987). Scholars rely on designers' knowledge to understand design practice *in situ*, to introduce design tools grounded in practice, to develop signature pedagogies for educating future designers, and to suggest ways that can improve design practice. Designers' knowledge in the instructional design and technology (IDT) discipline is also valuable, as contemporary IDT scholarship emphasized (Boling et al., 2017; Gray et al., 2015; Lachheb & Boling, 2018; Rowland, 1992; Sentz et al., 2019; Sentz & Stefaniak, 2019; Smith & Boling, 2009; Tracey & Boling, 2014). In that spirit, we—the authors who work as instructional and learning designers—share in this article the challenges and opportunities in adhering to the Universal Design for Learning (UDL) framework to design online courses in graduate and undergraduate higher education settings. We do so by relying on our repertoires of design precedents (Boling, 2021) and by reflecting on our combined 40 years of instructional and learning design experience.

What UDL Means to Us?

Broadly speaking, a *design prescription* is a recommendation for how to design something that is authoritatively put forward by a group, organization, and/or entity in the design profession. From our practitioner perspective, the UDL framework fits this definition of a design prescription. It is packed as a set of design guidelines and grounded in the ‘authority’ of scientific knowledge and principles, which mandates to design instruction in a way that results in: (1) multiple types and means of learning materials; (2) multiple opportunities for student engagement; and (3) multiple options for students to demonstrate mastery of learning. Further, adhering to the UDL framework allows designers to comply with accessibility standards as mandated and authoritatively put forward by Section 508 of the Rehabilitation Act and to design successful learning experiences. The UDL framework—including its sets of design guidelines—could also be an *instructional design theory* that fits the learner-centered paradigm of instructional design theories and models (Reigeluth et al., 2017). In this sense, UDL is a *theoretical* design tool (Lachheb & Boling, 2018; Yanchar et al., 2010).

Throughout our design education and professional training, we have been introduced to UDL through foundational literature (e.g., CAST: Center for Applied Special Technology, 2018; Moore, 2007; Spector et al., 2014). We recognize that UDL has roots in the idea of *barrier-free design* that emerged in the 1950s across the world (Moore & Ellsworth, 2014). Such roots evolved later in the 1990s when Ron Mace, a Professor of North Carolina State University, introduced *Universal Design* to advocate for designing physical buildings and environments to accommodate all users, particularly those with physical limitations and disabilities. The most comprehensive definition of UDL that we recognize is by Moore (2007):

Using a set of principles for design, it [UDL] takes diversity of the learner population into account from the start and builds features into the learning materials, environment, and system that allow a broad set of learners to access the learning (both the content and the instructional strategies) and accomplish learning goals. (paragraph 4)

The Center for Applied Special Technology (CAST)—where the UDL framework originated—defines UDL as a “design approach to curriculum, that minimizes barriers, and maximizes learning for all learners” (CAST, 2010). When we consider these definitions, we can frame UDL as a design framework that advocates for multiple means of engagement, representation, and action and expression. This framework is based on the notion that there are separate networks in the brain (recognition, strategic, and affective) and ponders how these networks should be thought of when designing instruction. A UDL-guided design expects a great variability among students’ needs, preferences, and capacities. Thus, it refutes the idea of one “typical” student persona.

Design Opportunities with UDL

One of the core values that we cherish is that the learning experiences and instructions that we design should be inclusive and responsive to students’ diverse needs. After all, we all remember that one class or learning experience where we felt unnoticed, underappreciated, or neglected. We do not wish for any student to experience the same when they interact with what we design. The UDL framework, in this sense, provides our design work with opportunities to put our core design value into practice, so no student we design for is left behind. Being informed with UDL, we designed—and continue to design—online courses that include multiple types and means of learning materials that can speak to the diversity of students’ preferences, multiple opportunities for students’ engagement, and assessments that include multiple options for students to demonstrate their mastery of learning. Throughout the next sections, we highlight relevant examples to the nine UDL guidelines, as highlighted by CAST (2018). The following table (Table 1) is a graphic organizer of the UDL guidelines and checkpoints, and the corresponding examples and figures referenced in the next sections.

Table 1

Graphic Organizer of the UDL Guidelines and the Corresponding Figures

UDL Guideline/#	Guideline & Checkpoint	Corresponding Figure
#1: Perception	Interact with flexible content that doesn't depend on a single sense like sight, hearing, movement, or touch.	
	●CHECKPOINT 1.1: Offer ways of customizing the display of information	Figure 4
	●CHECKPOINT 1.2: Offer alternatives for auditory information	Figure 1
	● CHECKPOINT 1.3: Offer alternatives for visual information	Figure 2
#2: Language & Symbols	Communicate through languages that create a shared understanding.	
	● CHECKPOINT 2.5: Illustrate through multiple media	Figure 2
#3: Comprehension	Construct meaning and generate new understandings.	
	● CHECKPOINT 3.1: Activate or supply background knowledge	Figures 5a & 5b
	● CHECKPOINT 3.2: Highlight patterns, critical features, big ideas, and relationships	Figures 6a, 6b & 6c
	● CHECKPOINT 3.3: Guide information processing and visualization	Figures 3a & 3b
#4: Physical Action	Interact with accessible materials and tools.	
	● CHECKPOINT 4.1: Vary the methods for response and navigation	Figures 7a & 7b
	● CHECKPOINT 4.2: Optimize access to tools and assistive technologies	Figure 8
#5: Expression & Communication	Compose and share ideas using tools that help attain learning goals	
	● CHECKPOINT 5.1: Use multiple media for communication	Figure 9
#6: Executive Functions	Develop and act on plans to make the most out of learning.	
	● CHECKPOINT 6.1: Guide appropriate goal-setting	Figure 11
	● CHECKPOINT 6.3: Facilitate managing information and resources	Figures 10a & 10b
#7: Recruiting Interest	Spark excitement and curiosity for learning.	
	● CHECKPOINT 7.2: Optimize relevance, value, and authenticity	Figures 12a & 12b
#8: Sustaining Effort & Persistence	Tackle challenges with focus and determination.	
	●CHECKPOINT 8.3: Foster collaboration and community	Figure 13
#9: Self Regulation	Harness the power of emotions and motivation in learning.	
	● CHECKPOINT 9.1: Promote expectations and beliefs that optimize motivation	Figure 14
	● CHECKPOINT 9.3: Develop self-assessment and reflection	Figure 15

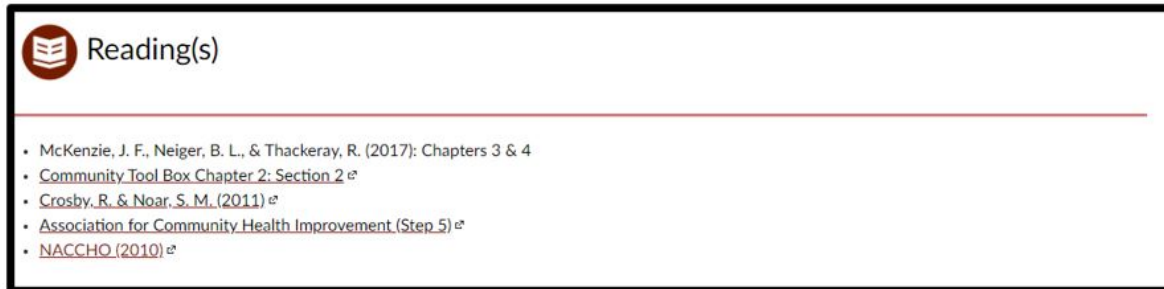
Multiple Types and Means of Learning Materials

One of the most important points that we discuss in our initial design meetings is the design and development of learning materials. Often, faculty come to us with a predetermined decision about what specific kind of learning

material they wish to present to their students (e.g., a paid textbook, a collection of journal articles, and/or only video lectures, etc.). Through negotiation and by presenting to them the idea that *learning material variability increases the quality of their course design*, we eventually design and develop multiple types and means of learning materials for the online courses we designed. For example, we search for open educational resources (OERs) and advocate for their use instead of (or in addition to) using a textbook (Figure 1). We rely on videos available online and on the institution's repository of video archives to present rich audiovisual content for students (Figure 2).

Figure 1

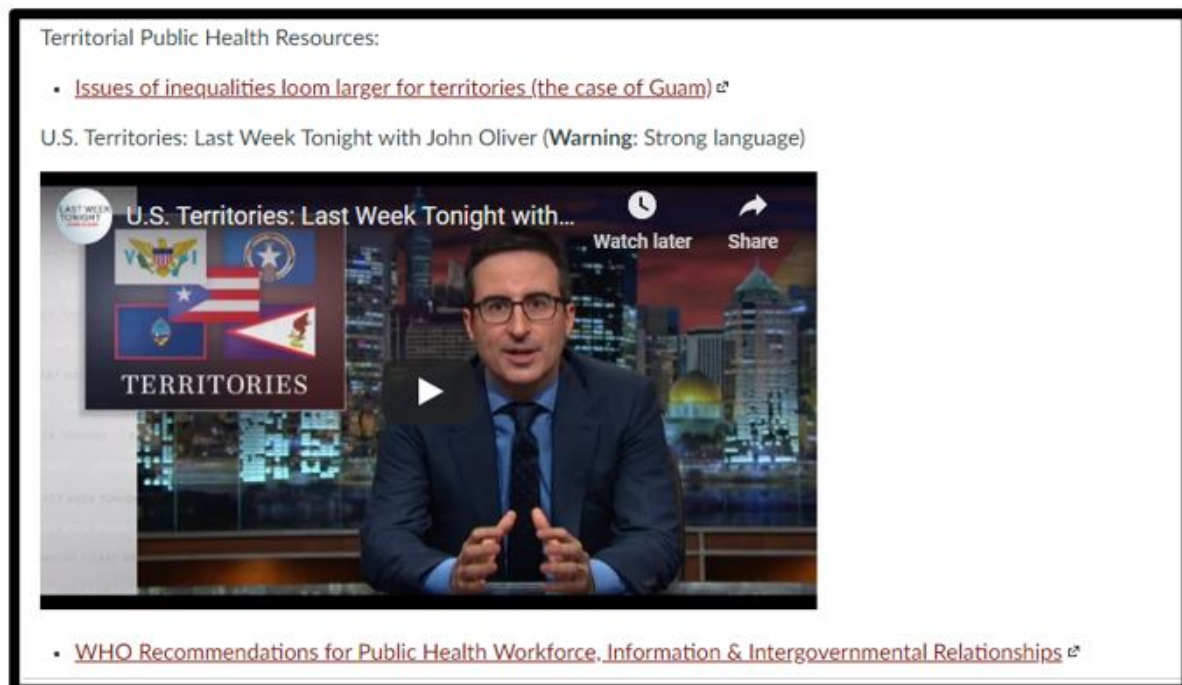
Weekly Readings



Authors Note: *In addition to the video lecture and the course textbook, weekly readings are drawn from OERs (2-5 bulleted points) (UDL guideline/checkpoint 1.2: offer alternatives for auditory information).*

Figure 2

Open Educational Resources Used and Provided



Authors Note: *Videos from HBO YouTube channel and a news articles are provided to students as "lecture supplements" (UDL guideline/checkpoint 1.3: offer alternatives for visual information; UDL guideline/checkpoint 2.5:*

illustrate through multiple media).

Additionally, when we produce a video lecture, we always provide the students with a copy of the slides as a 'presentation handout,' giving them the freedom to watch the lectures, read the slides, or do both (Figure 3a and Figure 3b). Additionally, students are provided with options regarding how they can interact with the learning materials by choosing to focus on the slides or the video feed of their instructor (Figure 4).

Figure 3a


Slides are Attached Under the Video Lecture



Authors Note: *Slides used in the lecture are available for download in a PDF format (UDL guideline/checkpoint 3.3: guide information processing and visualization).*

Figure 3b

Alternative Summary of the Video Lecture is Provided

 **Video Presentation**

This presentation discusses what competencies should be met and what field-based products (artifacts) can be created to demonstrate attainment of certain competencies throughout the practice experience.

To request edited captions for the deaf/HOH, see <https://kb.iu.edu/d/adad>




[Download Presentation Handout](#)

[List of Competencies by Concentrations](#)


Authors Note: Slides used in the lecture and an alternative summary of the video lecture are available for download in PDF format (UDL guideline/checkpoint 3.3: guide information processing and visualization).

Figure 4


Option to Customize the How to View the Video Lecture

 **Week 2 Overview Video**

In this video I provide an overview of what you'll be learning during this week.

Click on the arrow  to toggle between the presentation slides and the videos.

To request edited captions for the deaf/HOH, see <https://kb.iu.edu/d/adad>

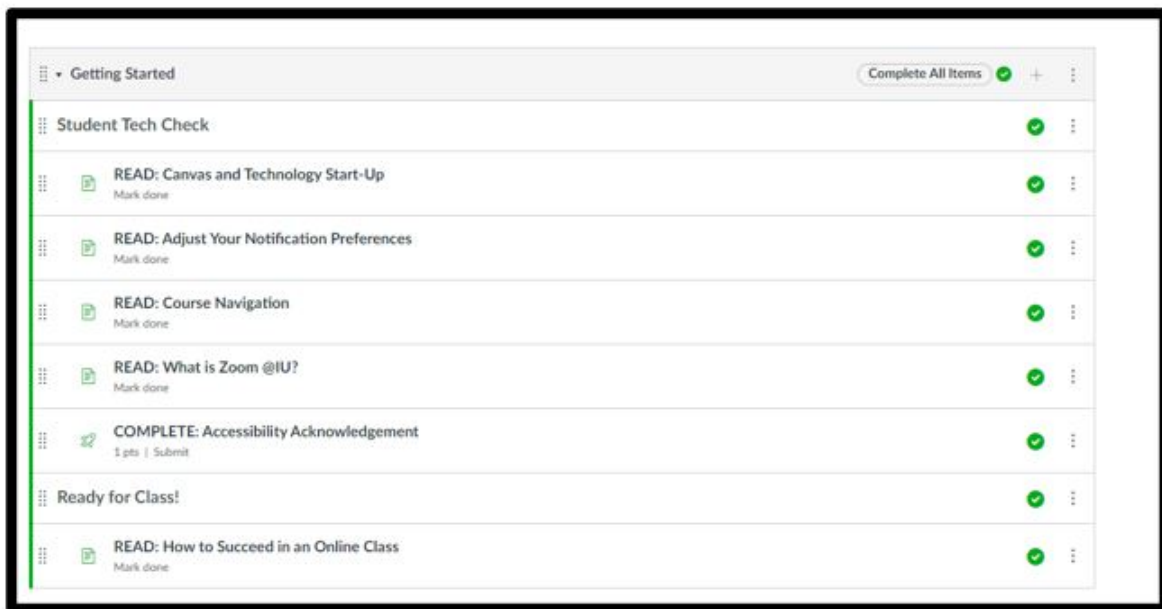


Authors note: *Students are given the option to customize the way they can view the video lecture (UDL guideline/checkpoint 1.1: offer ways of customizing the display of information).*

In addition, given that most courses we design are graduate-level and tailored to specific degree programs, we design activities and materials to activate or supply background knowledge needed for the course ('Getting Started' or 'Pre-Requisite Knowledge' module, Figure 5a and Figure 5b). In the design of learning materials, we work with faculty to highlight the patterns, critical features, big ideas, and their relationships through creating a detailed course syllabus (Figure 6a), custom course structure and navigation (Figure 6b), and module overviews (Figure 6c).

Figure 5a

Getting Started Module for Students to Complete



Authors Note: *The 'Getting Started' module is for students to complete before starting the course (UDL guideline/checkpoint 3.1: activate or supply background knowledge).*

Figure 5b

'Civics Refresher' Module for Students to Complete

Civics Refresher

Review of Concepts

Understanding public health policy and politics in the United States and elsewhere requires an understanding of the authoritative government(s) and the source and scope of authority. This section provides a review of the structure of the U.S. government and the Constitutional authority for government and power.

Why do we need to know about public health authority?


Public health is what we **collectively** do to assure the conditions for populations to be healthy (IOM, 2002). The nature of collective responsibility in the United States is expressed in the U.S. Constitution, federal and state laws and local ordinances. It is also interpreted in judicial decisions. Another word for collective responsibility is authority. The government's authority is an expression of collective responsibility.

Example: Think about smoke free air. Without authority to "do" public health, we could not accomplish the change in conditions necessary to reduce second hand exposure to tobacco smoke. Restaurants are privately owned, so how can we require owners to ban smoking in their restaurants? Even if doing so would benefit the health of their employees and customers, by what authority do we require indoor clean air?

Think about this as you proceed through the module.

Forms of Government

The government of the United States is organized in a certain way. This short video will describe five forms of government and their relationships.



Authors Note: *The 'Civics Refresher' Module is for students to complete before starting the course (UDL guideline/checkpoint 3.1: activate or supply background knowledge).*

Figure 6a

Course Syllabus

8. Course Schedule			
Week/Date	Topics	To Do	Deadline
Week 1 Jan. 7-14	Course Introduction, Overview of Community Health Assessments and Program Planning	Readings: CDC Community Health Assessments & Health Improvement Plans Self-Introduction Discussion Quiz #1 Mini-Project # 1: Choosing Health Topic	8:00 AM ET (1/14)
Page 3			
Week 2 Jan. 14-21	Methods of Community Health Assessments, Prioritization of Public Health Issues	Readings: McKenzie, J. F., Neiger, B. L., & Thackeray, R. (2017), Ch. 3; Community Tool Box Chapter 2: Section 2: Crosby, R. & Noar, S. M. (2011); Association for Community Health Improvement (Step 5); NACCHO (2010) Discussion #1 Quiz #2 Mini-Project # 2: Creating PRECEDE/PROCEED Model	8:00 AM ET (1/21)

Authors Notes: *The course syllabus shows the course schedule pattern for each week (UDL guideline/checkpoint 3.2: highlight patterns, critical features, big ideas, and relationships).*

Figure 6b

Course Homepage

 Professional Practice Experience Course Structure & Content



Module 1: First Semester – Fall

Start



Module 2: Second Semester – Spring/Summer

Start



Module 3: Third Semester – Fall

Start



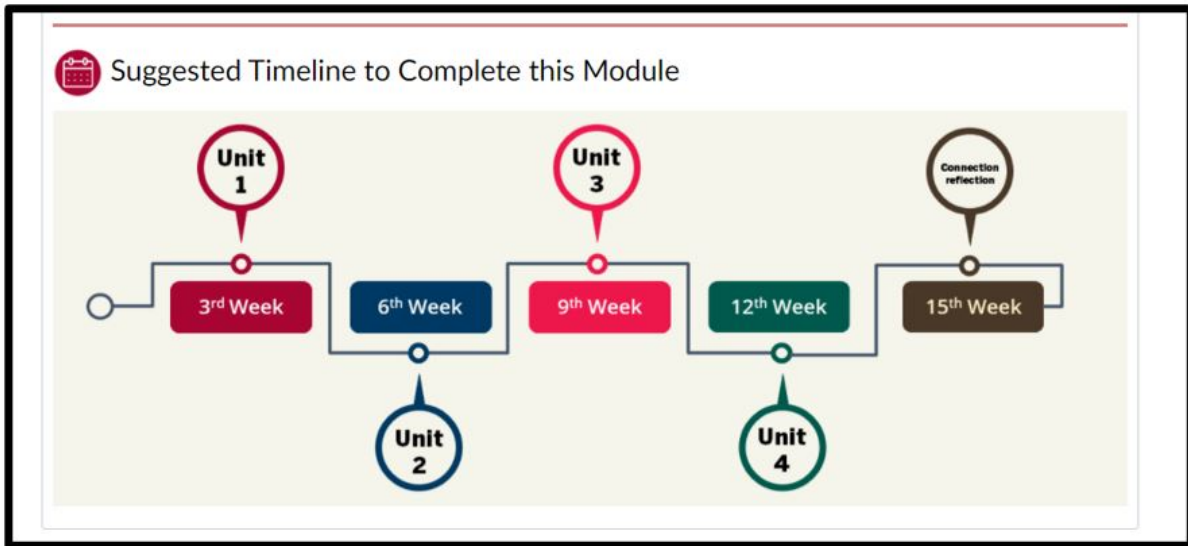
Module 4: Fourth Semester – Spring

Start

Authors Note: *The course homepage shows a custom course structure/ navigation (UDL guideline/checkpoint 3.2: highlight patterns, critical features, big ideas, and relationships).*

Figure 6c

Timeline for Module Completion



Authors Note: *In an online graduate course module, a suggested timeline for module completion for students is listed (UDL guideline/checkpoint 3.2: highlight patterns, critical features, big ideas, and relationships).*

Multiple Means of Action and Expression

Being informed with the UDL framework helped us design multiple means for action, expression, and communication from students. For example, when designing a course site, we ensure that students can easily access the necessary resources and do not have unnecessary items in the navigation menu (Figure 7a). Additionally, we ensure that the course home pages include key information about the course, faculty contact information, and course resources. We do this so that students have different methods for navigation (Figure 7b). Each course we design has a separate module called 'Getting Started' that includes sections about accessibility and information on where on-campus students can receive help (Figure 8).

Figure 7a

Course Navigation Menu

Authors Note: *A screenshot from an online graduate course that shows a customized navigation menu (UDL guideline/checkpoint 4.1: vary the methods for response and navigation).*

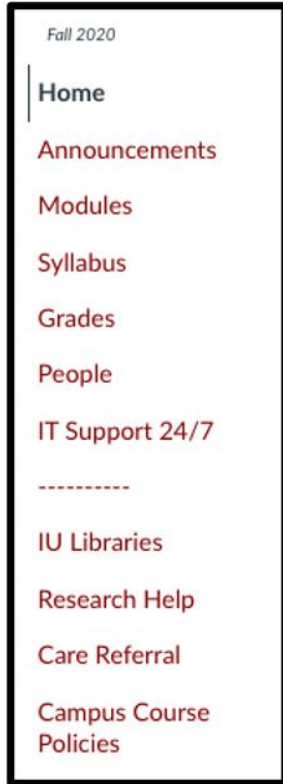


Figure 7b

Graduate Course Homepage

Course Description

Welcome to This course is designed specifically for those who will work largely in the field of public health including, but not limited to, students majoring in community health, dietetics, exercise science, and health education. This course provides the student with a general overview of the most important aspects of public health communication. Topics covered include multilevel communication strategies and interventions, public speaking, social marketing, media campaigns, websites, risk messages, interpersonal communication, audience analysis, and ethics.

Course Prerequisite: This course has no specific prerequisites.

Instructor Contact Information

Please feel free to contact me using the information below:

- **Name:**
- **Email:** [Canvas e-mail](#) is my preferred means of contact. I will return your e-mails within 48 business hours. In case of emergency only email me at Please be clear in the subject line as to what the message is concerning.
- **Phone:**
- **Office Hours:**
 - **Method:** Zoom
 - **Time:** by Appointment
 - **Signup instructions:** Feel free to send me a Canvas message if you'd like to schedule a meeting with me
- When new material is added to the site, I will notify you by a Canvas announcement . Please check your email and Canvas messages.
- **Weekly Touch point (optional):** Wednesday 2:00PM EST via ZOOM
ZOOM Room:

To Begin the Class

1. Complete the [Getting Started module](#).
2. Read the [syllabus](#) - located in the left sidebar navigation.
3. Complete the [Week 1 module](#).

Course Flow

The class is broken into modules. For each module you will have an overview page that provides a summary of what to be covered during each week, with a list of activities and assignments to complete. Click [Modules](#) (can be also accessed from the navigation menu on the left) to proceed with the rest of the course modules.

Technical Support

[Knowledge Base](#) ¹²

A comprehensive database for all technology questions at IU.

UITS Support Center - available 24/7

Phone: 317-274-4357 | Email: [support@iu.edu](#) | Chat: [Chat](#)

Authors Note: Various methods of course navigation in a course homepage (UDL guideline/checkpoint 4.1: vary the methods for response and navigation).

Figure 8

Accessibility and Adaptability Technology Resources

COMPLETE: Accessibility Acknowledgement

ⓘ This is a preview of the published version of the quiz

Started: Sep 30 at 4:24pm

Quiz Instructions

Getting Started

Accommodations for Students with Disabilities

is fully committed to ensuring its websites and online course material are both accurate and accessible to everyone. Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision, neurological, etc.).

If you require accommodation, please contact [your campus office](#) as soon as possible. Work with them to establish your eligibility and obtain needed support services. Please know that these services are confidential, may take time to put into place, and are not retroactive.

Note: Should you require exam accommodations, video captioning, alternate media, or other accommodations you will need to make a request as soon as possible to ensure timely delivery of this service. Captions and alternate media for print materials may take three or more weeks to get produced.

Read more information about [campus disability resource office](#) for students with disabilities.

Question 1 1 pts

I read the Disability Accommodations statement and acknowledge that I should make a request through AES as soon as possible if I require future captioning or other accommodation.

True

False

Authors Note: *The page includes resources to accessibility and adaptability technology resources (UDL guideline/checkpoint 4.2: optimize access to tools and assistive technologies).*

When we design courses, we ensure that faculty have different options to communicate with their students, specific during emergencies. Thus, as informed by the UDL guidelines on expression and communication, we work with faculty to consider multiple communication means that students can use to communicate with them. For instance, students can email their faculty, send a message through the learning management system, call a faculty office number, or meet via Zoom. These means are usually listed on the course homepage and the syllabus' first page (Figure 9).

Figure 9

Faculty Contact Information Section

Instructor Contact Information

Please feel free to contact me using the information below:

- **Name:**
- **Contact:** Canvas e-mail is my preferred means of contact. I will return your e-mails within 48 business hours. *In case of emergency only email me at*
Please be clear in subject line as to what the message is concerning.
- **Phone:**
- **Office Hours:**
 - **Method:** via zoom -
 - **Time:** Wednesdays @ 9:00 a.m.
- **When new material is added to the site, I will notify you by:** Canvas announcement. Please watch your messages.

Authors Note: *in the course homepage, the faculty contact information is listed (UDL guideline/checkpoint 5.1: use multiple media for communication).*

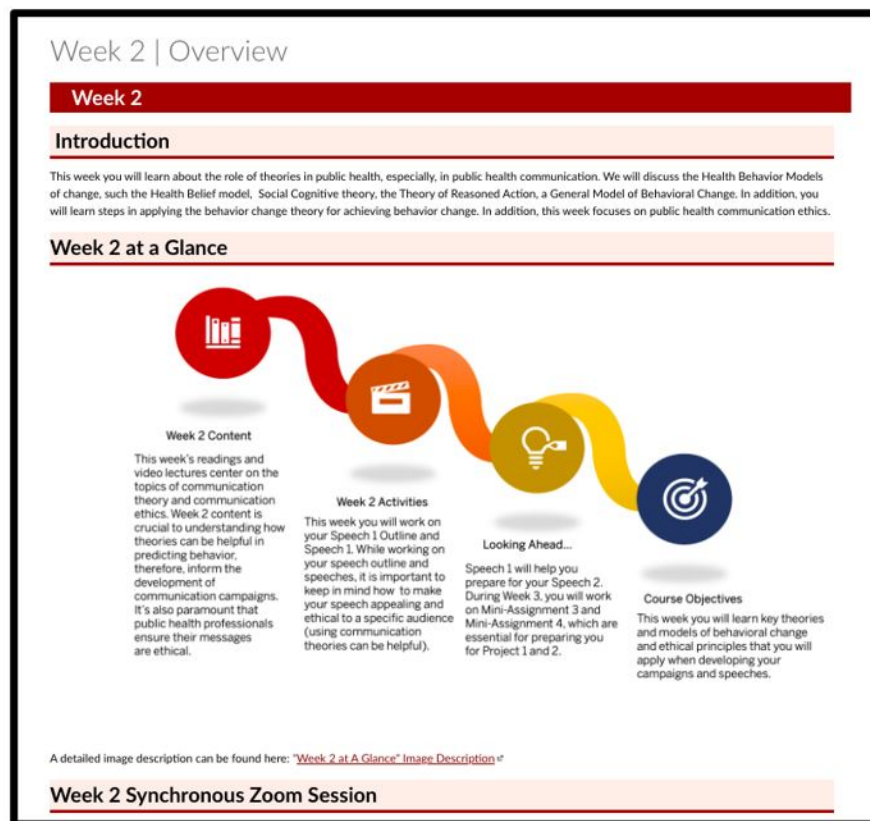
Further, we believe that it is critical that instructional designers and faculty consider and integrate various tools aligned with students' learning needs and can foster students' learning. For instance, we work with faculty to adopt multiple technologies (e.g., Quick Check formative assessment tools, assignments tools, and two different discussion tools; or embedded within the learning management system and the other as an external tool). We see firsthand how these tools have fostered learning, community building, and engagement.

In addition, being informed of the UDL framework has helped us design and integrate different types of scaffolds. Such scaffolds have been necessary to guide students through authentic projects, which has required them to apply their knowledge and skills in real-life settings. For instance, in an online course in which students are assigned to conduct their own population needs analysis, they are offered to complete this project in chunks. That is, students' major project is chunked into several deliverables. The rationale behind this is to engage students in a progression of tasks and provide students with opportunities to track their progress with timely faculty feedback.

Informed with the UDL executive functions guidelines, we provide students with checkpoints and checklists to help them track their learning progress. For instance, each course has an overview page of each module that lists learning objectives, learning materials, and assignments. The rationale for including those overview pages is to help students see the purpose behind each learning activity and assignment and to mentally organize the presented material into a coherent structure (Figure 10a).

Figure 10a

A Screenshot from an Online Undergraduate Course that Shows a Section of a Week Overview Page Home Page (UDL Guideline/Checkpoint 6.3: Facilitate managing information and resources)



Authors Note: *The module includes an overview chart (UDL guideline/checkpoint 6.3: facilitate managing information and resources).*

Additionally, being informed by the guidelines of facilitating the management of information and resources, the online courses we design typically include detailed descriptions of all course assignments. We also provide templates that students can use to get started on their thought process and organize their ideas to complete their assignments (Figure 10b). Students can also find a brief description of learning materials, such as readings and to-do lists. At the end of each module, students can find a checklist for each week to help them track their progress (Figure 11).

Figure 10b

Assignment Description

Week 2

Purpose

Imagine you are building a new house, you will most likely need a certain plan or a blueprint which would precisely show where each element of the house would be located, such as windows, walls, stairway, etc. Just as blueprints are important and instrumental to house builders, speech outlines are crucial to effective speakers. The key purpose of this assignment is to help you think through and organize your informative speech,

Task

- Write a clear outline for your informative speech that should include:
 - Title
 - State the specific purpose of your speech. The specific purpose of your speech should be sufficiently narrowed and written as a full phrase, such as "To inform my audience about the effects of lack of exercise"
 - State your central ideas. Your central ideas are similar to thesis statements you write in your essays, meaning that you need to succinctly write about key topics your speech with cover.
 - Label distinct sections of your speech, such as body, including main points, subpoints, transitions, and conclusion. Make sure to include bibliography

Resources

Examples of speech outlines can be found in [Chapter 15: Informative Speaking, pp. 15-5-15-7](#) ¹²

Feel free to use this [Speech Outline Template in Google doc](#) ¹³ (make sure to make a copy of it to your Google Drive) or [Word doc](#) ¹⁴ to write your informative speech outline.

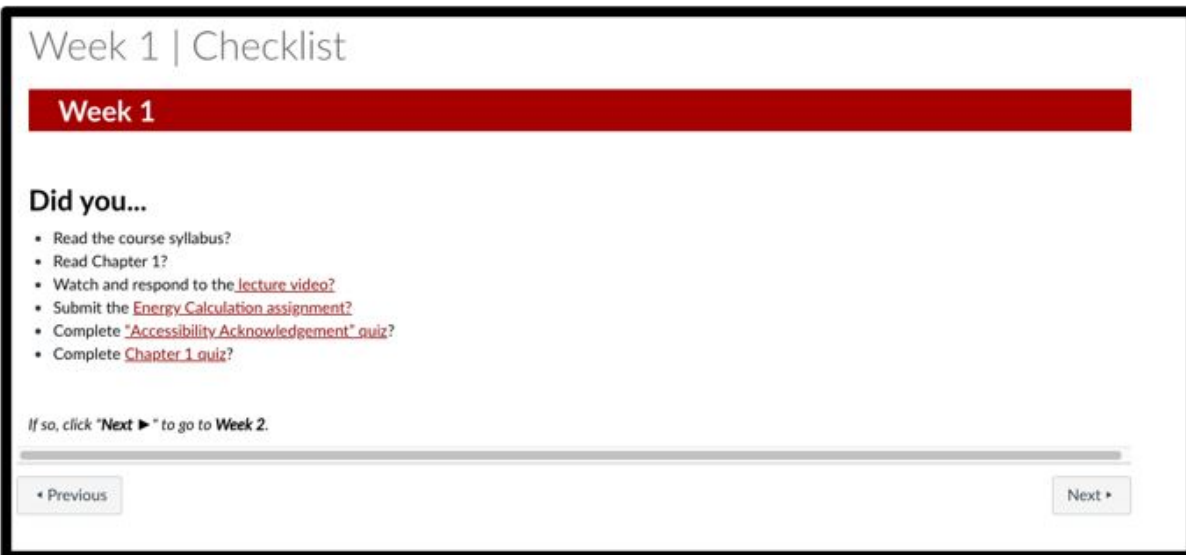
Criteria for Success

Please see the rubric below to see the evaluation/assessment criteria.

Authors Note: A page dedicated to show the assignment description (UDL guideline/checkpoint 6.3: facilitate managing information and resources).

Figure 11

End-of-Module Checklist



Authors Note: A screenshot from an online undergraduate course that shows an end-of-module checklist (UDL guideline/checkpoint 6.1: guide appropriate goal setting).

Multiple Opportunities for Student Engagement

We assert that high student engagement with course materials, activities, faculty, and other students is key for a successful learning experience and, thus, a successful course design. We believe in active learning approaches, which contribute to students taking ownership of their own learning. To this end, as instructional designers, we ensure that learning materials, activities, and learning interactions are designed for high student engagement. Informed with UDL guidelines of engagement (guidelines 7-9), we design various activities to ensure high student engagement. Graduate courses that we design are often competency-based courses. Such competencies are authentic to the students' future professional practice (e.g., public health practitioner). To optimize relevance, value, and authenticity of the course, we developed video testimonials from former students (Figure 12a) to address the 'So what?' question of learning activities (Figure 12b).

Figure 12a

Video Testimonials from Program Alumni

Unit 1: Professional Practice Experience Student Testimonials

Introduction: MPH Alumni

In the video below students share their experience of internship. Particularly, students share where they did their internship, what they did and learned during their internship.



◀ Previous

Next ▶

Author Note: *The video testimonials from program alumni highlights the value of the learning experiences the students are about to start (UDL guideline/checkpoint 7.2: optimize relevance, value, and authenticity).*

Figure 12b

Rationale for Assignment

2. Rationale for a Needs Assessment

A needs and assets assessment can be defined as the process of collecting and assessing data that describe the nature and magnitude of a community's needs, as well as its resources or assets (financial, organizational, intellectual, institutional and people) that can help with program planning. The needs and assets assessment is a resource that will help to assist school corporations, community-based organization, faith-based agencies, health care facilities, etc. to help decide the priority outcomes related to the health issues of a specific target population. Specifically, the priority outcomes also help to decide the critical health content and skills that need to be included in the intervention. The assessment is the first step communities take in the program planning process because it helps develop appropriate goals and objectives. It also provides current and relevant data that can be used to develop funding proposals and to justify to funders why resources are needed to support programs and interventions ("Building Skills for Health Literacy- Human Sexuality," Wisconsin Department of Public Instruction).

Information collected through needs assessments need to be able to address the following:

1. The extent, magnitude and scope of the problem in the community;
2. Current efforts to address the problem;
3. Gaps in existing services;

Authors Note: *The page contains a rationale for the assignment and why it is important (UDL guideline/checkpoint 7.2: optimize relevance, value, and authenticity).*

We also rely on group projects and discussions, as well as projects where students work with community groups, to not only foster collaboration and a sense of community but also to increase the authenticity of the learning experiences (Figure 13). Last and not least, to increase self-regulation and to optimize individual choice and autonomy for student we designed discussion activities in an open-ended way (Figure 14), and we provided multiple formative and informal assessment opportunities for students to check their own understanding of the course materials (Figure 15).

Figure 13A

Screenshot from an Online Graduate Course Group Assignment Where Students Are Asked to Work with an Organization from the Community (UDL Guideline/Checkpoint 8.3: Foster Collaboration and Community)

Purpose

A capstone objective of the X561 course will involve a group presentation near the end of the semester (December 15). Each presentation must thoroughly address the many elements of financing that are emphasized throughout the semester in class. Students will be assigned to small groups, and each group will be required to make an "executive summary" presentation to the class about a chosen health-related facility -- and to specifically focus on how the facility is being developed financially.

Task

Each group should identify a hypothetical health-related facility based on group members' interests. The presentation will require a careful and in-depth analysis of issues and factors related to the facility's financial development and organization.

The presentation should precisely address these ten items below. Structure your presentation according to this format.

Authors Note: *A group assignment where students are asked to work with an organization from the community (UDL guideline/checkpoint 8.3: foster collaboration and community).*

Figure 14

Course Discussion

SHARE: Please Introduce Yourself

All Sections

Getting Started

Introduce Yourself

Let's take a few minutes to meet each other. You will **post a 1-2 minute video** in which you introduce yourself. You can record/upload your introduction video with one of the following tools:

- "Express Capture" - With Kaltura's Express Capture, you can record directly into this discussion using your computer webcam. [Check out this IU Knowledge Base article on how to use Express Capture.](#)
- "Kaltura Upload" - You can record a video through any device of your choosing, then upload it into the discussion using Kaltura. Check out the IU Knowledge Base article, ["How to use the Embed Kaltura Media tool in the Canvas rich content editor"](#) to learn how to do this.

In your 1-2 minute video, please include the following information:

- Your name, year in the program, and hometown
- Share something interesting about yourself
- What is your current career? What do you hope to pursue?
- Share how you are feeling about this course right now.

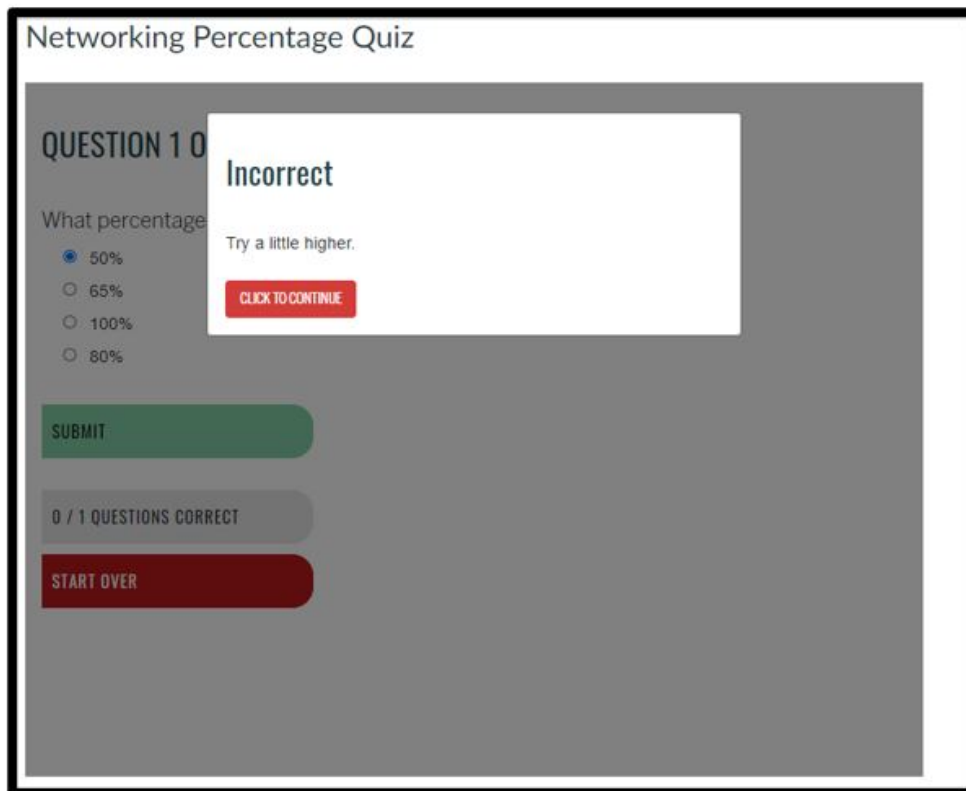
Respond To Your Peers

After you introduce yourself, reply to at least three of your peers by the end of the first week of class.

Authors Note: *In an online graduate course discussion, students are free to choose between two formats of introduction posts—a video or a written post (UDL guideline/checkpoint 9.1: promote expectations and beliefs that optimize motivation).*

Figure 15

Formative/Ungraded Quiz



Authors Note: *A formative/ungraded quiz is included in online graduate class (UDL guideline/checkpoint 9.3: develop self-assessment and reflection).*

Challenges of Adhering to the UDL Framework: Obstacles & Opportunities

The opportunities that the UDL framework provides for our design work also come with challenges. Throughout the next sections, we highlight a few challenges that we encountered, framed as obstacles in adhering to the UDL framework, and we comment on how we addressed each obstacle. These obstacles, despite their immense complexity, challenge our design practice but do not make us less committed to the core values and principles of the UDL framework.

Interpretation of the UDL Guidelines: Obstacle & Opportunity

While each UDL guideline's explanation is provided on the CAST website, these explanations are rather broad, which opens room for ambiguous interpretation—an obstacle that we faced in adhering to the UDL framework. We have witnessed how each designer in our team can interpret these guidelines differently, based on their tacit design knowledge and their core design judgments (Boling et al., 2017). As a result, the variety among the UDL framework's interpretations led to inconsistent practices and design structures. For example, we had feedback from faculty about how their experiences in designing courses varied as they heard conflicting and inconsistent design ideas and suggestions. It was challenging for us to make sure the framework was applied with the same purpose for which it was designed.

To overcome this obstacle, we dedicated multiple design meetings and conducted double peer-reviews of course design to calibrate our interpretations of UDL guidelines. For that reason, we believe that instructional designers should have a clear understanding of the UDL guidelines, engage in constant reflection on their design practice (Lachheb & Boling, 2021) with UDL guidelines, and operate using the same terms to design appropriate interactions conducive to learning.

Time Commitment: Obstacle & Opportunity

The time commitment that we faced in adhering to the UDL framework was another obstacle. Following the UDL framework can help ensure that courses are accessible and responsive to diverse student learning needs. However, it requires significant time to follow UDL guidelines and apply its principles. We all want to employ a thoughtful, slow, and rigorous process for course design. Such a process requires enough time for ideation, iteration, high-quality media production, and formative assessments of our design work. However, with the reality of instructional work in higher education—specifically, when all modes of instructions need to shift to an emergency mode of remote instruction—we are forced to pick efficiency over effectiveness and appeal (Honebein & Honebein, 2015) and to design a minimum viable product (MVP) in which UDL principles were minimally applied.

To overcome this obstacle, we agreed as a design team on what we call ‘negotiable’ and ‘non-negotiable’ design practices. We agreed that designing accessible and ADA compliant course is a non-negotiable design practice; every course we design must be accessible and ADA compliant. For example, we collaborated with on-campus units that provided us with tools to generate video captions, thus, taking this workload away from faculty and designers. As for the UDL framework, it was negotiable to some extent; time and resource allocations are the main two factors. Additionally, to save time, we include many UDL-informed design ideas in our design templates, as well as design instructional materials that are reusable.

Resistance to Follow the Guidelines and Design Failures: Obstacle & Opportunity

While working with different faculty on course design, we noticed certain resistance to following UDL guidelines—a th obstacle we faced in adhering to the UDL framework. The main reason for this resistance is that each faculty approached their course design project with their own teaching philosophy and ideas on teaching. After all, most of the faculty we have worked with are excellent teachers with impressive experience. For example, one faculty pushed back against the idea of multiple means for action and expression when we suggested giving students multiple options to submit their assignment of an ‘elevator pitch.’ They cited a legitimate concern—it will result in an unlevel playing field for students, and thus, it could be an inequitable and a non-inclusive practice. Another faculty was willing to implement the ideas we suggested that are informed with UDL. Still, they insisted on having an efficient process of grading students’ artifacts and not worrying about technical issues they may encounter with the students’ multiple formats of deliverables.

Additionally, in a few design projects, we have experienced design failure partially due to our advocacy for UDL. For example, one design project had to be completed in a short period, and we lacked the needed resources to empower the course design with UDL guidelines. The design project eventually got scrapped. This project could have been successful if we did not face obstacles in collaborating with the faculty, who, in their defense, could not afford to dedicate the time to the course design project that we wanted. Adhering to UDL in this project caused design constraints, thus introducing modes of design failure. In general, most faculty we work with find the UDL framework enriching and good, but it could make the course design experience more intensive and time-consuming. As we understand, time is a luxury for some of our faculty who do not get fairly compensated for their design efforts and the multiple tasks they have to complete; thus, they deserve our utmost empathy and compassion.

To overcome this obstacle, we had to rely on our repertoires of design precedents (Boling, 2021). We showcase to faculty good examples from their peers to increase their motivation and interest in adopting UDL-informed practices. We also cite personal experiences with teaching and learning to bring more credibility to our UDL-informed design

suggestions. We treat each faculty and their course design project as a unique situation in which we address their concerns through empathy and respect.

Conclusion

The challenges we faced adhering to the UDL framework do not make us less committed to designing equitable and inclusive learning experiences. After all, design work is by nature always constrained, challenging, and requires—sometimes difficult—tradeoffs. As we commented throughout the paper, we appreciate the core values of UDL, and we continue to embrace them. We think that we are able to strike a *happy balance* between the opportunities we have and the challenges we encounter in adhering to UDL; thus, we do not have to sacrifice efficiency over effectiveness and appeal (Honebein & Honebein, 2015).

We firmly believe in the following idea: design tools, such as UDL, serve us and do not guide us. UDL, like any other theoretical design prescriptions, must be put in the service of designers' judgments to design rich, inclusive, and responsive learning experiences. We believe that designers should adopt a *designerly* approach to design tools' selection and use (Lachheb & Boling, 2018; Stolterman et al., 2009). This approach means that design tools are serving what the designer needs and not scaffold or direct their design in a predetermined way. This approach also mandates designers to grow a good ability to evoke strong *instrumental judgments* that help them select what design tools to use, how, when, and why (Lachheb & Boling, 2018; Lachheb & Boling, 2021).

Eventually, designers in our discipline can face the challenges—such as we listed earlier with UDL—by coming up with *design* tools for themselves, informed by their tacit knowledge and the reality of their design practice. Relying solely on scholarly tools as offered in traditional IDT literature will not get instructional designers far enough in facing their intricate design problems and wicked practice. With a designerly approach to design tools, we can “[. . .] contribute to advancement in the field robustly and affect positively the types of instructional design problems we can take on and the ability of our designers to flex with the nature of those problems” (Lachheb & Boling, 2018, p. 49).

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Ahmed Lachheb

University of Michigan

Dr. Ahmed Lachheb is a design scholar, a design practitioner, and a design educator. He serves as a Senior Learning Experience Designer at the University of Michigan's Center for Academic Innovation. His research interests include design practice, designers' design knowledge, and actions, design theory, and design pedagogy. Ahmed has earned his Ph.D. in Instructional Systems Technology from Indiana University Bloomington. He serves on the Editorial Board of the International Journal of Designs for Learning ([IJDL](#)). More about his work can be found on his website: www.lachheb.me



Victoria Abramenka-Lachheb

University of Michigan

Victoria Abramenka-Lachheb is an award-winning learning designer, scholar, and educator. She earned her Ph.D. in Instructional Systems Technology from the School of Education, Indiana University Bloomington with a minor in Human-Computer Interaction from the Luddy School of Informatics, Computing, and Engineering. She is passionate about designing authentic and inclusive learning experiences, conducting design research, and improving human learning and performance in diverse contexts. She has 15 years of professional experience in higher education, including in the area of learning design, learning technology, and training.



Lesya Huber

Indiana University

Dr. Lesya Lorenzen Huber is a Clinical Associate Professor in the Indiana University School of Public Health. Her primary research interests include the potential of new technologies to support independent living in later life, and how older adults understand digital privacy and security and the role that caregivers play in supporting older adults' use of technology.



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