

Universal Design for Learning: Strategies for Blended and Online Learning



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SECTION ONE

Curricula as Disabled

An important perspective in UDL is understanding that the curriculum we designed is not perfect, and in fact it often fails at meeting the needs of the diverse body of our students. Rather than seeing students as incapable or disabled, we reframe the problem as *curricular disability*. Curricula can be disabled in the following ways, according to the CAST (2011) guidelines:

1. Curricula are disabled in WHO they can teach. Curricula are often not conceived, designed, or validated for use with the diverse populations of learners who actually populate our classrooms. Learners “in the margins”—those who are gifted and talented, those with special needs or disabilities, those who are English language learners, etc.—often bear the brunt of curricula devised for the fictional “average”, because such curricula do not account for learner variability.

2. Curricula are disabled in WHAT they can teach. Curricula are often designed to deliver or assess information, or content, without considering the development of learning strategies - skills learners need to comprehend, evaluate, synthesize, and transform information into usable knowledge. Mainstream curricula remain largely constructed around print-based media, which are good at delivering narrative and expository content. However, they are not ideal for information that requires an understanding of dynamic processes and relationships, computations, or procedures.

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

The idea of curricular disability is crucial in a shift between face-to-face environments to blended or online environments because the needs, preferences, and strategies change when educational environments shift. The who, the how, and the what of curricula can change in both positive and negative directions as we move between face-to-face, blended, and online formats.

Learning as Strategic and Contextual

Human learners are, at our core, strategic beings. When we are confronted with a task we broadly evaluate three things:

- We consider the knowledge we already have and can transfer to the task at hand
- We consider procedures we need to follow or create in the learning environments
- We consider how likely we will be successful and how we know we are successful

Of course, these three things are wrapped up in how interested we are in the task, previous educational experience, whether we have learned or did anything similar before, and what kind of feedback we are likely to get. Our minds work at lightning speed to integrate all this information, **but effective learning (especially in a new environment) often means both slowing down this rapid and automatized process and considering carefully some alternate strategies.**

Our learning strategies are rich, nuanced, and context-driven. Contexts are quite complex by the time students reach post-secondary because they encompass past school experiences, family experiences, successes, failures, learning goals, and career thoughts. For instance, consider a common message instructor hold around students: why can one student get an A effortlessly while another student struggles to get a C? We likely chalk it up to a difference in intellectual ability or being suited to a particular field.

Understanding learning contextually means that, instead of resorting to only an **ABILITY** explanation, we also resort to an **EXPERIENCE** explanation, such as

- Sometimes I reflect my learning well and activate all the experience I have in appropriate ways; other times I lack background knowledge or relevant information;
- Sometimes I do not see connections between ideas and cannot connect the dots;
- I struggled with the one online class I took before because it was hard to get organized
- I know that I learn well in classes where I can connect with my instructor and peers.

By developing a contextual understanding of learning, both students and instructors have the opportunity to acknowledge how the learning environment can afford the opportunity to learn, and to support the development of expert learners.

Multiple Paths to Success

Recall that UDL is a design framework that advocates for multiple means of engagement, representation, and expression. It was developed to account for the jaggedness of learners. Research in the last 40 years has shown that, contrary to being a *tabula rasa* (blank slate) that is gradually filled with knowledge as a bathtub fills with water, human learning is a constructivist enterprise in which we use everything we have learned to structure and make sense of everything we continue to learn (Vygotsky, 1978; Packer & Goicoechea, 2000).

Since our experience, learning preferences, aptitudes, and sense-making are different, we are bound to take different paths in the journey of learning. The idea that we learn along multiple paths means that we:

1. Identify diverse learning approaches

- Need to develop one set of skills before we can learn another set of skills
- Have developed particular ways of achieving accessible experiences
- Need to develop background knowledge
- Learn through reading, writing, watching, storytelling, building, or testing

2. Recognize schooling can be disruptive

- Start post-secondary studies later than expected (e.g. gap year)
- Switch programs of study suddenly
- Integrate school with work
- Learning remotely and/or online

3. Develop and mobilize practical knowledge

- Negotiate the best ways to demonstrate learning
- Work strategically to transfer learning

The idea of multiple paths also implies that those paths change depending on the subject matter, a shift in goals, time constraints, and resources. The strategic aspect of learning shows up in these multiple pathways. For more ideas and examples on multiple paths, please check [UDL on Campus](#) published by CAST.

Thought Experiment

Consider a situation in which you have observed a different path to success, either for a student or for yourself. Ask yourself:

- How did success look in that situation?
- What was unexpected or what made the path different?
- Who defined that it was different?
- What actions were taken to support the different path?
- And what was the result?

Jot down your notes here

SECTION TWO

Understanding Barriers in a Digital Age

Another important aspect of Universal Design for Learning is to anticipate barriers and design for those barriers in advance, but barriers vary not only according to the learner but also according to the learning environments.

Tony Bates (2018), in his continuum of teaching, suggests that there are primarily three type of delivery mode: face-to-face, blended, and fully online. For this guide, we adapted the continuum into the following categories and definitions:

1. Face-to-Face Learning

- Classroom teaching with no technology at all, which is very rare nowadays.
- Classroom teaching with some aids, e.g. presentation slides.

2. Blended Learning

- Technology-Enabled: use of learning management system to assist teaching, such as uploading course materials, submitting assignments, or grading.
- Flipped Classrooms: carefully designed pre-class activities to assist students to learn key concepts in a self-pace manner and engage them in discussions and problem-solving during class that lead to the synthesis and application of the key concepts (University of Adelaide).
- Hybrid: the majority of learning occurs online and only specific activities is in person. For example, an online course (80%) with consistent live office hours and some in-person simulation exercises (20%) would be a hybrid course.

3. Fully Online Learning

- Also known as distance learning which has no face-to-face components. Depending on the design, instructors and learners may communicate through online conferencing tools.

As you see, learning in a digital age has created new contexts, which requires students to re-strategize their learning process and procedure. Instructors also need to adapt to different delivery modes and design proactively to remove barriers that are posed by digital learning environments.

Remember, effective learning (especially in a new environment) often means slowing down our nearly automatized process and considering carefully some alternate strategies.

In the following sections, we will provide some examples in blended and fully online learning environments.

Addressing Barriers in Blended and Online Learning

There are some key points to keep in mind in supporting blended and online learning based on UDL framework.

1. Look at accessibility as a fundamental starting point. It is critical to inquire specifically about the accessibility of course content, layout, expectations, and communication in online and blended learning environments. Asking explicit questions and gathering feedback on accessibility from students at the beginning and throughout the course will afford students the opportunity to engage with each other and enable troubleshooting at all points.

2. Employ clear communication. Clear communication through multiple channels supports students in a number of ways. Clear communication includes the establishment of routines, a means of contacting the instructor, and a means of collaborating both formally and informally. It means that students feel welcome to express confusion, to ask questions, and to have a voice in some of the decisions in the course.

3. Create clear structure and guidelines. Describe the guidelines, create a summary of the guidelines and quick references. Describe what the expectation of the course are and give both positive and negative examples. Remember that your design has to target clear, elaborate representations of content and expectations. Examples, samples, pictures, and videos are key in reducing barriers.

4. Offer students (limited) choice. A key aspect of the UDL framework is offering choices to students about how they engage, how they learn content, and how they demonstrate what they have learned. For example, students may present information through a paper, a blog post, or a storyboard; or help shape a writing project by choosing a meaningful topic. Offering choices does not mean letting students do what they want. Rather, it means you can identify several pedagogically sound options for engaging, learning, and assessment.

5. Encourage personal and social connections. Your enthusiasm, openness, and willingness to take risks, get excited, and communicate your love of your field of study are key to getting students on board. Actively encourage connection, excitement, play, and joy. Alongside your content-related questions, create a space where students can be frivolous, where they can share memes, photos, stories, and make connections with content that might feel too risky in discussions.

6. Create small groupings. Organizing students into pods or small groups decreases the threat of participating a whole class where student reactions cannot be guaranteed. Humans work the best in small collaborative groups where they can readily develop communication systems, swap ideas, and resolve complaints. Smaller groups tend to be less of a barrier to learning since students can enter a space where they are more likely to feel known and understood.

An Example of Blended Learning

[INDC-1110 Essential Skills for Training & Facilitation](#) is a blended course at JIBC. In this course, participants are asked to do 3 hours of pre-work before attending 3-days of face-to-face in-class instructions. The course is structured in the following ways:

- Pework includes reading articles about adult learning principles, watching videos about the course, and posting online introductions to the cohort in the learning management system (LMS).
- 3-day face-to-face activities include participants taking turns practicing facilitation skills, and opportunities to critique and evaluate each other's facilitation techniques.
- Throughout the course, recordings of facilitated sessions during the day are posted in the LMS for review and additional reflection.

Short Analysis

This blended course has the appeal of working independently online and with peers face-to-face where learners could gain valuable social connections. Learners also have the chance to engage with course content, peers, and the instructor in multiple ways.

But we must not forget that any pedagogical approach has its strengths and weaknesses. Blended learning can remove certain barriers but also create new ones. These barriers can be technological, social-emotional, and cognitive.

Read the example again, and ask yourself:

- What may be some of the barriers in this blended learning course?
- If you are the instructor, how might you address the barriers using UDL framework?

Jot down your notes here

Applying UDL to Blended Learning

Let's think specifically about how UDL principles can create a better experience in blended learning.

From an engagement standpoint, UDL has three priorities:

1. Recruiting interest
2. Sustaining effort and persistence
3. Supporting self-regulation

Here are some ideas for your design:

1. Recruiting interest is concerned with the way we ignite curiosity, find our place in the class, and connect with prior knowledge. This might include asking students why they are taking the course and what knowledge they have that they can apply to make sense of what they are expecting to learn, but it can also incorporate academic and career goals or ideological goals (e.g. I feel I should know more about conflict, or how to be a better person).

2. How will students keep up the good work when it gets tough? Designing for persistence and effort is important. It can be tied to a sense of community where students trust that they can ask questions, be met with positive regard, and receive reliable, timely feedback from their instructor and peers. It can mean having candid discussions about what aspects of the content are difficult, why they are difficult, and developing problem-solving strategies. Designing so that students can take multiple approaches to problems with patience and unassessed attempts can be key.

3. Self-regulation refers to the ability to control learning which can include evaluating learning, planning on next steps, and soliciting information and help (e.g., Winne & Perry, 2000; Zimmerman, 2000). A blended learning course grounded in UDL principles supports students in setting goals. In a blended learning environment, explicit work on setting goals is an important feature since students have more time and autonomy in making sense of the course structure and the content. Help students set weekly goals, reading goals, skill and performance goals and bake them into the course design. Have regular check-ins and help students assess whether they are approaching their goals or avoiding them and develop some options for learning differently to stay on track.

From a representation standpoint, UDL has three priorities

1. Providing options for perceiving and learning new information
2. Provide choice for the language and symbols students use to represent their ideas
3. Support learning through multiple means for comprehension

Here are some ideas for your design:

1. The main way that we convey new information is through reading to “download” content followed by discussions to process or integrate information. Blended learning, for its combination of in-person and online components, has the capacity to offer many more options: reading, discussion, constructing models, interactive H5P slides, collaborating on open educational resources (OER), watching videos, creating videos, synthesizing images across social media platforms... the list is endless.

2. Moving beyond reading and discussing can mean helping students create vocabulary banks, diagrams, heuristics, flow charts, and mind maps. It can mean students use different languages, concepts, and vocabulary to observe connectedness among ideas. Be prepared to have open discussion about what aspects of language, symbols, signs, and pictures are helpful for students in representing the content.

3. Comprehension can be developed in many ways and the UDL framework urges us to move beyond testing. Designing learning activities around perspective-taking, argumentation, negotiating, curating, and collaborating means that students have to learn the content and operate upon the content. A key aspect to engagement is active learning – using and manipulating information to engage in another activity. Ask yourself – are students learning the content or are they learning to do something more?

From an action & expression standpoint, UDL has three priorities:

1. Provide options for physical action
2. Support students in creating alternatives for expression and communication
3. Support students in goal-setting, planning, and managing and monitoring workload

Here are some ideas for your design:

1. Consider how software can expand the way students immerse themselves in learning and offer options for responding to instruction and navigating the informational landscape. Blended learning environments are ideal for helping students learn, use, and grow assistive technology such as text-to-speech functions, adapting page layouts, using animations, storytelling, and mind-mapping tools.

2. In a blended learning environment, we have the opportunity to enable students to exploit both in-person and online options. Students have the option of engaging in both face-to-face environments and internet-based expressions such as blog posts, animated presentations, videos, storyboards, voice-over presentations. Investigating student preferences and being open to different options for developing and expressing learning is key to exploiting the strength of blended learning environments

3. Particularly in post-secondary settings, instructors tend to lay out a syllabus or course outline which implicitly constitutes the goal structure for the course: complete all these readings, activities, tests, and exams and you will have completed the course successfully. In a UDL framework, we go a step further and help students recognize that goal structure while supporting them in goal setting. Students may have additional goals for your course and it is a good idea to tap these goals to enrich learning. Help students develop the capacity to monitor progress, adjust learning strategies, solicit help, and connect with peers.

An Example of Online Learning

Semester-based, asynchronous online courses offer students much flexibility to take on 3-credit courses that fulfill their elective requirements as part of their degree or certificate programs. A few samples of online courses at JIBC are [ENGL-1100 Academic Writing](#), [BUSN-1100 Business Communications](#), [PSYC-1100 Intro to Psychology](#), and [RESM-2100 Research Methods](#).

- The courses span across a 14-week semester period and roughly require 3 hours of work per week.
- Instructors may/may not offer synchronous sessions.
- The courses all have a consistent look and feel, and templated course syllabus and assignment guidelines are applied.
- Each week there is at least one or more online learning activities (e.g. discussions, quizzes, short written assignments, journals).
- At the end of the course, there is typically a final assignments/projects.

Short Analysis

These online courses offer a high level of flexibility and allow learners to work independently online. Syllabus and assignment guideline documents are always available, which allows learners to plan out their 14-week at the start of the course. Weekly modules follow a consistent design template and create a predictable learning experience for all students.

However, because it is fully online, it may not contain an in-person face-to-face component. The barriers that emerge can be related to feelings of community and connectedness, to self-regulation, and to mapping the course structures.

Read the example again, and ask yourself:

- What may be some of the barriers in this online course?
- If you are the instructor, how might you address the barriers using UDL framework?

Jot down your notes here

Applying UDL to Online Learning

Let's think specifically about how UDL principles can create a better experience in online learning.

From an engagement standpoint, UDL has three priorities:

1. Recruiting interest
2. Sustaining effort and persistence
3. Supporting self-regulation

Here are some ideas for your design:

In online environments, the temptation to teach to the screen instead of through the screen can feel even more challenging. Change the frame to see yourself as a culture-creator – creating connections and a safe learning home.

Provide a forum for regular feedback, decision-making, synchronous meeting times, and frequent opportunities for students to make choices, steer their learning, and collaborate with others.

Give students a clear schedule of your availability and help them feel welcome and included by asking questions, being open to tangential thinking, and providing opportunities to play.

Provide choices in assignments – some students like longer, in-depth assignments while others prefer shorter, more frequent assignments. Regardless, take the opportunity to help students connect course content to the real world through linked tasks that deepen understanding and broaden the conceptual frame.

From a representation standpoint, UDL has three priorities

1. Providing options for perceiving and learning new information
2. Provide choice for the language and symbols students use to represent their ideas
3. Support learning through multiple means for comprehension

Here are some ideas for your design:

The best first move is asking students what kind of devices students have at home – phone, laptop, desktop, etc. Once you have a sense of what students have access to, you can start planning ways that students can represent information beyond reading and writing tests.

Pre-teach vocabulary, show students how to map concepts, and how ideas in the course link to each other and beyond, to other courses, concepts, and current and historical events.

Provide access to multi-media presentations, animations, and social media sites that can help students see, hear, feel, reflect, and construct meaning.

Provide a visual mapping of course expectations and assignments. Checklists and calendars that are colour-coded are a boon for organizing the course content and deadlines.

From an action & expression standpoint, UDL has three priorities:

1. Provide options for physical action
2. Support students in creating alternatives for expression and communication
3. Support students in goal-setting, planning, and managing and monitoring workload

Here are some ideas for your design:

In an online course, there are many choices that you can provide around how students want to demonstrate their learning and it is critical to solicit feedback from students on these preferences.

You can ask students how they would prefer to receive feedback as well – audio and video feedback allow students to feel more connected to you and to each other. Hearing voices not only helps students feel connected but directs attention in the way a spotlight can light up the sky (Posey, 2019).

You can provide samples and examples that also have a spotlighting effect and give students a sense of how to refine their understanding and how to engage in deep, multi-modal thinking about the course content.

SECTION THREE

UDL Strategies for Blended and Online Learning

Here is the list of strategies for blended and online learning adapted from teaching resources at Oakland University.

Engagement

1. Build in opportunities for learners to provide their input on how tasks are designed.	<ul style="list-style-type: none">• Create space (e.g. survey or poll) for periodic, informal feedback during synchronous or asynchronous learning.• Let students decide whether certain tasks (e.g. group discussions) will occur online or offline.
2. Integrate learners' experiences, identities, backgrounds and cultures.	<ul style="list-style-type: none">• In example scenarios or problems, use a variety of names, settings, or cultural references.• Design assignments or activities in a variety of social, professional or cultural contexts.
3. Build activities that ask learners to engage with the real world.	<ul style="list-style-type: none">• Ask students to interview a community leader or attend public events (e.g. court proceedings) in an online course.• Ask students to identify the potential real-world audiences or applications they see in their work.
4. Divide long-term course or assignment goals into smaller short-term objectives.	<ul style="list-style-type: none">• Break final projects into a few stages over the semester with diminishing support from the instructor.• Ask students to create a manageable timeline for their projects.
5. Require learners to reframe course objectives and set their goals	<ul style="list-style-type: none">• Set up an online journal where students could create their learning goals based on the course description and objectives.• During and at the end of the course, ask students to reflect (in writing, in discussion, or video) on their progress, strategies, and goals.

<p>6. Construct linked tasks with varying degrees of difficulty that require learners to work toward similar learning outcomes.</p>	<ul style="list-style-type: none"> • Build small (e.g. activities) and large (e.g. papers, exams) tasks that address course outcomes. • Provide different levels of difficulty with the same assignment. • Offer optional challenges and provide relevant incentives (e.g. extra credit).
<p>7. Provide opportunities for frequent and timely feedback</p>	<ul style="list-style-type: none"> • Provide feedback using rubrics - this may expedite assessment while clearly indicating students' progress. • Stagger assignments' due dates if possible to reduce feedback load. • Pair students to provide formative peer feedback based on a rubric or task guidelines.
<p>8. Give learners resources to help them cope with “subject phobias.”</p>	<ul style="list-style-type: none"> • Share support resources such as writing center, library help, and online resources. • Emphasize a growth mindset, replacing “I’m not good at X” with “I’m still learning about X.” • Share concrete, discipline-specific examples of how past students have coped with challenging learning situations or experiences.

Representation

<p>1. Pre-teach key vocabularies or concepts</p>	<ul style="list-style-type: none"> • Design interactive key words exercise at the beginning of each unit or module. • Offer a searchable glossary of key terms. • Link to online resources where students can find definitions of key terms.
<p>2. Support learners in accessing and using multiple representations of the same information.</p>	<ul style="list-style-type: none"> • Use a variety of representations to demonstrate a complex concept (e.g. map, video, graphics, stories). • Provide links to resources that address the same ideas for varying levels of learners.

3. Give learners videos or animations with control in sound and speed	<ul style="list-style-type: none"> • Record welcome videos via Kaltura. • Record live lectures and send students the link for review. • Ask students to find and share helpful online resources.
4. Provide transcripts for video clips.	<ul style="list-style-type: none"> • Transcribe videos when possible; review automatically-generated transcripts and correct errors. • Upload PDF transcripts for videos when possible.
5. Map the relationships between important components or ideas.	<ul style="list-style-type: none"> • Use a concept map to highlight relationships between course ideas. • Provide short videos that emphasize or highlight relationships between course concepts, especially when introducing new ideas. • Have students connect key ideas or themes in discussion forums.
6. Chunk information into smaller pieces to help learners process information	<ul style="list-style-type: none"> • Use dividers to break online course content into shorter pieces. • Release course modules adaptively to prevent information overload.
7. Provide a high-level checklist for content, activities, and assignments	<ul style="list-style-type: none"> • Design checklist so students can easily map the course structure for the day or the week. • Assign a group each week to create a checklist for the class.

Action & Expression

1. Build opportunities for learners to demonstrate their knowledge in different formats.	<ul style="list-style-type: none"> • Create tasks that can be done entirely or partly in writing or through presentation (e.g. online or video presentations).
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	<ul style="list-style-type: none"> • When appropriate, ask students to come up with ideas on how they want to demonstrate their learning.
2. Provide learners with examples of ways to solve problems with real-life and/or academic examples.	<ul style="list-style-type: none"> • Offer instances of disciplinary knowledge being used to solve real issues. • Pose problems and ask learners to identify ways that others have solved them. • Ask students to write or speak about how they might apply knowledge in the real work.
3. Give feedback in different formats (audio, video, written).	<ul style="list-style-type: none"> • Provide feedback using free screen capture tools like Jing or Screencast-o-matic. • Record audio feedback via your phone or computer. • Offer synchronous sessions to meet with students to discuss progress.
4. Provide samples that learners can refer to for content organization and assignment	<ul style="list-style-type: none"> • Design templates for content organization and assignments. • Share student work samples (with permission) to illustrate course outcomes.
6. Pose questions for learners to reflect and self-monitor progress.	<ul style="list-style-type: none"> • Ask students to reflect on their learning at the end of each class. • At key points, prompt students to consider how they have met course outcomes. • Create a task that asks students to regularly reflect on their learning, such as a reflection journal.
7. Wrap up courses with activities or interactive assessments	<ul style="list-style-type: none"> • Have students to summarize key take-aways and share with each other. • Create low-stake short quizzes as a way to summarize key concepts and assess learning.

Case Study #1

Paola is teaching a first-year Communications course. She has taught face-to-face classes for four years and enjoys teaching enormously. She has enjoyed being flexible with students and has established strong relationships with her students who describe feeling like she really cares about them and their success. This semester, Paola was asked to start teaching a blended course with a lot of emphasis on the flipped classroom model. Most of the class is online and students meet in person for a three-hour evening class every two weeks. Paola is excited for and comfortable with a flipped classroom model but she is reluctant to have so little in-person contact with students. She knows that her students likely have good access to technology but she is concerned that teaching Communications with so much online content will be frustrating for both her and students.

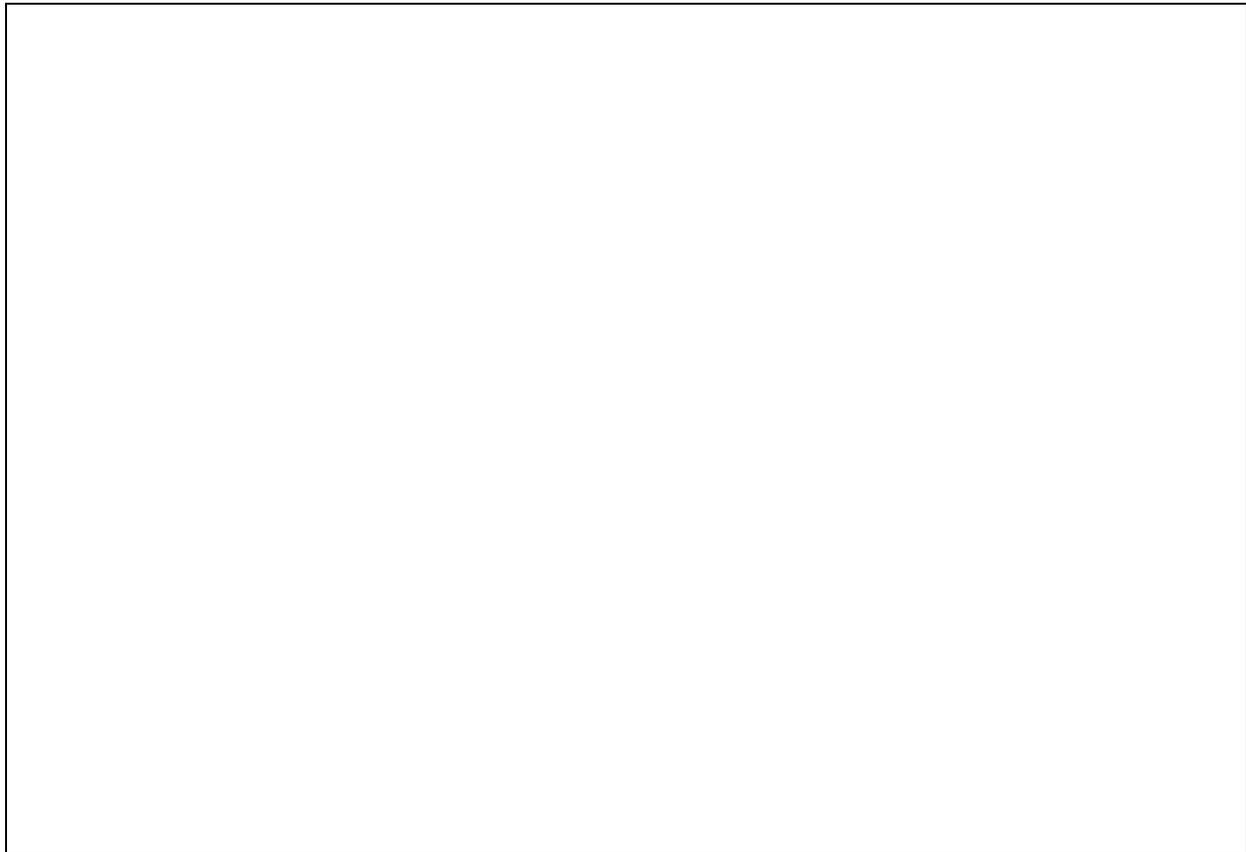
Paola decides to use UDL principles and takes five steps to support both her teaching and her students' learning and sense of feeling imbedded in a community:

1. Paola introduces herself in a 5-minute video, giving a brief overview of the class, showing pictures of her cats, talking about a recent kayak trip to Haida Gwaii and describing her favourite part of the course. She invites students to introduce themselves by way of a quick note or video in the LMS.
2. Paola creates a module to describe the flipped classroom model and gives examples of what previous students have liked and disliked about the flipped classroom. She follows it up with a survey to solicit information specifically on accessibility concerns for the course.
3. Paola describes her rationale around activities designed online and the activities and feedback designed for the in-person time which include structured questions, and a problem-solving activity.
4. Paola includes one community-building activity each week of the course and creates a dedicated space on the LMS where the community-building activity can take place. Students can work together and with her to develop other community building activities that intersect with the content of the course or that are frivolous (e.g., do you eat or drink smoothies?)
5. Paola draws out a colour-coded map of the course content week by week, including readings, videos, hands-on experiments for home and class, suggested questions to guide in-class work, and gives students options for both learning content and expressing their knowledge. She includes a section below the map where she reminds students that her goal is to help them become content experts and experts on their own learning.

Practice: Analyze and Design

You've read and analyzed Paola's Communications course and you have devised some preferences and design approaches with your own courses in mind. How might you add to the design of Paola's course?

- Would you support the flipped classroom model differently?
- Would you take additional steps to support comprehension?
- Would you support engagement or community-building differently?
- How might you support students' interest?
- Can you think of additional ways to help students demonstrate their knowledge in the course?
- What tools, resources, or knowledge would you need to do this work?



Case Study #2

Xinli is an Emergency Management instructor. She has recently moved her class online and her first concern was the fact that students required hands-on practice. Normally she would supervise that hands-on practice and work with students very closely as they navigated scenarios. Xinli took several steps to remove barriers:

1. She sent an email to all students prior to class starting with a survey to get an idea of previous emergency management knowledge as well as the aspect of emergency management they found most compelling.
2. She thought carefully about the best way of learning procedures and how to represent that information in picture and video format, offering multiple opportunities to practice and improve without being assessed.
3. She decided to provide choices for students to practice and consult with one another by pairing them together. They would rank each other and themselves on how confident they would feel in executing the emergency management procedures under a variety of conditions.
4. Finally, Xinli created a final project where students could identify areas that they would like to practice, improve upon, or expand their expertise such as scenarios around riot management or explosives.

UDL principles helped Xinli to key into the knowledge students were bringing into the course, how they could mobilize that knowledge and develop meaningful content understanding in turn. By pairing students she created a method of immediate feedback and rehearsal. Providing multiple means of representation is key in conveying procedural knowledge by offering pictures, videos, and opportunities to reflect, observe, and rehearse what they have learned.

Practice: Analyze and Design

You've read and analyzed Xinli's Emergency Management course. How might you add to the design of the course?

- Would you take additional steps to support the ways students learn emergency management procedures?
- Would you support engagement or community-building differently?
- How else might you support students' interest?
- Can you think of additional ways to help students demonstrate their knowledge in the course?
- What tools, resources, or knowledge would you need to do this work?



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