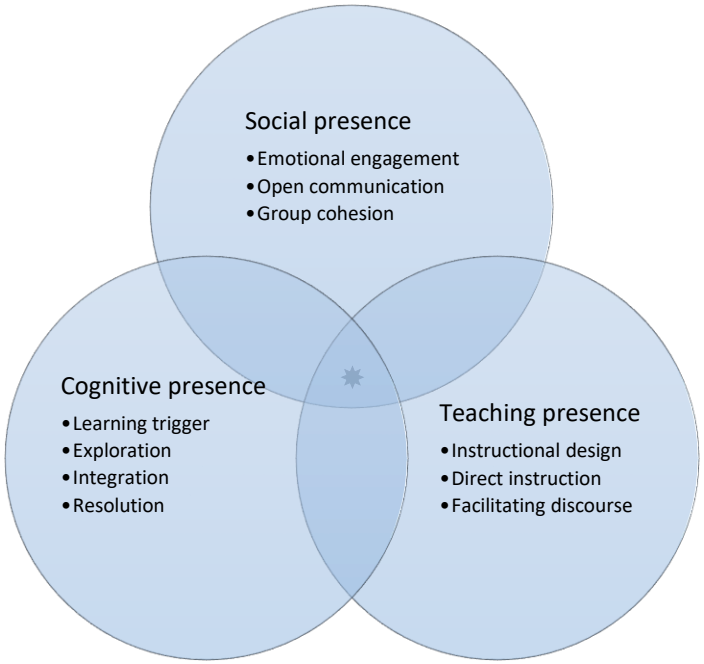
Designing Online Learning from the Ground Up

These questions are intended to guide a discussion regarding your online learning program and course design as well as online teaching and learning practices. They can be considered by individuals but are best explored as a program teaching group to consider the students' learning across a program. Where possible, we have embedded links within the questions to further resources you may wish to explore.

The questions are organized using the Community of Inquiry (COI) framework, which summarizes the relationships in the teaching and learning space and outlines ways in which these can be replicated and enhanced in the online environment (Garrison, Anderson & Archer, 2000). In this framework, teaching and learning relationships are conceptualized as 'presences.' Social presence is the sense of community and safety developed in the learning environment that allows students to engage with their learning and with others (Garrison, 2009). Teaching presence points to the activities guided by the teacher, including design, facilitation and directing the social and cognitive processes of the students, all of which lead to meaningful learning outcomes. Finally, cognitive presence refers to the process by which learners construct and sustain new learning through engagement and reflection (Anderson, Rourke, Garrison, & Archer, 2001).

The three presences dynamically interact to create the **learning experience (✸)** of our students:



Questions to consider

Given the emphasis on context in the Community of Inquiry framework, there is no prescription for developing a high-quality online learning experience. Developing an online course requires reflection on the teaching and learning techniques with which you may already be familiar, engagement with teaching and learning with which you may not be familiar, and additional flexibility and digital fluency skills required by the use of new technologies. The delivery of an online learning experience must be designed with reference to the students taking the course, the amount of experience they have with different types of learning environments and their access to technology (Cleveland-Innes & Wilton, 2018). (Click on the hyperlinks to be guided to further information and explanation.)

Start here:

1. What philosophies/pedagogies inform your teaching and learning processes?

Social presence:

2. Does the use of technology effectively increase the level of the following interactions:
    a. peer-to-peer?
    b. faculty-to-student?
    c. student-to-program?
3. How do you communicate expectations regarding communication and engagement to students?
4. Does the use of technology provide students with feedback on their learning progress?

Teaching presence:

5. What Educational Technologies (e.g. LMS, social media apps, polling software) are used across your program? Do these promote access and return on investments for students? Can these be streamlined by using EdTech tools across multiple courses?
6. How does your program familiarize students with technology? How do you evaluate the effectiveness of this process? How do you evaluate students' access and technological skills to determine the fitness of digital expectations?
7. How has your curriculum design planned for potential barriers and mitigation of these? What roles does technology play in this process?
8. How do you balance the use of synchronous and asynchronous learning based on learning needs and resources?

Cognitive presence:

9. How do students develop expert learning in accessing, navigating and assessing technology-use in your program?
10. What opportunities are embedded within program and course design for learner choice, agency, customization and/or self-regulation?
11. How might technology change the ways in which learners can demonstrate the learning outcomes?
12. How do you effectively design and assess students' multimodal work? How can rubrics (and other evaluation tools) account for multimodal work?

A Sampling of Pedagogies/Philosophies

Curriculum design decisions are influenced by the teacher's, program's, institution's and discipline/field's pedagogies. When we focus on the pedagogy (instead of solely the technology), the design and delivery should provide quality outcomes and high student engagement and satisfaction (Sharples, 2019). Some key pedagogies/philosophies to consider are:

- **Connectivism:** Often referred to as the learning theory for the digital age, connectivism posits knowledge in the connection between 'nodes' of a network. Knowledge exists beyond the space of any single individual and is not controlled or created in any formal way. As a learning theory, connectivism shifts our underlying understanding of what knowledge is and how it is created – or not (knowledge as construct vs. knowledge as thing). A connectivist theory allows for the everchanging and evolving nature of knowledge in the digital age to be captured. It brings forward the spaces of creation, shared understanding, and emergence and de-emphasizes the notions of transferring knowledge. "[Connectivism] emphasizes the learner's ability to navigate information: the pipe is more important than the content within the pipe." (Siemens, 2005)
  Connectivism would argue that previous learning theories are outdated as they have not taken into account the new environment of the information age. All previous learning theories seated knowledge within individuals and sought to explain its transfer between them. Even as knowledge grew and shifted, it was always housed within the individual. Connectivism seats knowledge outside the individual – beyond the individual. This is what makes connectivism the learning theory for the digital age – it has allowed knowledge to transcend its linear transference and exist in the space around us, in our connections, and in our connected spaces.
  Siemens (2005) identifies the principles of connectivism as follows:
  - "Learning and knowledge rests in diversity of opinions.
  - Learning is a process of connecting specialized nodes or information sources.
  - Learning may reside in non-human appliances.
  - Capacity to know more is more critical than what is currently known
  - Nurturing and maintaining connections is needed to facilitate continual learning.
  - Ability to see connections between fields, ideas, and concepts is a core skill.
  - Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities" (Connectivism, para. 2)

- **Indigenous perspectives:** The intersections between Indigeneity and digitalization are complex. Digitalization has the potential to expand Indigenous representation and connect Indigenous communities in solidarity and strategic alliance (Beltrán & Begun, 2014). Indigenous knowledge systems, including innovations, can become more readily available to learners (teachers and students) through technology. However, they must be understood within the context of the communities from which they originate (Archibald/Xiiem, 2018; Hopkins, 2006).
  Digital pedagogies situated within Indigenous methodologies can help Indigenous youth to develop sensibilities (voice) and technical skills to engage in the digital economy and digital citizenship. However, machine technologies and infrastructures are largely colonial in design and ownership (Hearne, 2017). Aspects of digital media, including its modularity, fragmentation and dispersion also structure racism and racial representation (Byrd, 2014; Hearne, 2017). Despite this, there is a long history of Indigenous digital engagement that has subverted the colonizer's indoctrination (Hopkins, 2006) in order to preserve and evolve cultural knowledge, counter colonial narratives and connect diverse Indigenous communities in solidarity (Lucas, 1996; Michel,

2019).

- **Open Pedagogy:** Open pedagogy adoption is not just about Open Educational Resource (OER) adoption; embracing OERs requires the institution to commit to fostering an open culture (i.e. give faculty time to develop OER resources for their discipline, creating PD for faculty on how to embrace this as a practical teaching and learning strategy, and thinking differently about how we involve learners in content creation, curation, and assessment). Open pedagogy asks us to consider the creative commons space and our justifications for an open approach within a larger context. Adoption of open material can be about saving students money, but there are other contextual variables that might be affected. What are the access limitations of moving material to a digital space? Is it wrong to assume that students are only concerned about their financial bottom line when it comes to their education? What is the trade-off of cheaper resources? What is the quality impact of a move to OERs? Without these considerations, it's likely a decision to move to OERs could significantly impact the student experience and translate to zero return on investment (ROI) for students (DeRosa and Robinson, 2017).

- **(Critical) Digital Pedagogy:** This pedagogical approach explores the degree to which Critical Pedagogy operates in the digital teaching and learning space. It considers the way in which reflection, community, agency, and democratization can be supported in a digital space and how this support can ensure representation and access across age, race, culture, gender, ability, and geography. Teaching and learning that is guided by Critical Digital Pedagogy necessitates an emphasis on positioning learners as digital citizens and making sure they have all the technological and metacognitive abilities for full participation in this role. Stommel (2017) outlines that Critical Digital Pedagogy:
  - "centers its practice on community and collaboration
  - must remain open to diverse, international voices, and thus requires invention to reimagine the ways that communication and collaboration happen across cultural and political boundaries
  - will not, cannot, be defined by a single voice but must gather together a cacophony of voices
  - must have use and application outside traditional institutions of education.
  - demands that open and networked educational environments must not be merely repositories of content. They must be platforms for engaging students and teachers as full agents of their own learning" (para. 15)

Interactivities

Technology has facilitated the expansion of the number of interactivities in the learning environment which potentially increases the number of interactions teachers have to facilitate, monitor and potentially assess (Diagram below from Anderson, 2008). The social opportunities in some of these interactivities are key to learning as it is socially-embedded (Dumont et al., 2012). For example, students and teachers can interact synchronously and/or asynchronously; students can interact with other students; students and teachers may interact with content in multiple ways. Therefore, digitalization requires teachers to add a third skillset to their pedagogical and content knowledge domains (TPACK model; also see ISTE Standards for Educators). Digitalization also requires students to be digitally fluent; see ISTE Standards for Students. The infrastructure of the institution must support this skills development of both educators and students sufficiently; see ISTE Standards for Educational Leaders.

A key area of focus for any online environment are the ways in which the relationships (often taken for granted in face to face environments) are translated to the online space. In the digital space, it is important to acknowledge the relationships between the people in the space as well as the relationships between people and technology. Bates (2014) reminds us to consider the Learner – Materials (technology) relationships as exemplified in simulations, adaptive learning software, textbooks, LMSs, YouTube Videos, and Podcasts; Learner – Teacher relationships as

exemplified in synchronous seminars, online discussion forums, and email; and Learner – Learner relationships as exemplified in MOOCs, virtual worlds, group work, social media, and wikis.

Clear communication

Here are some ways to clearly communicate expectations to students: Create a detailed syllabus with documented learning outcomes, descriptions of technology devices, clear delivery methods, explicit engagement opportunities, and assignments aligned with learning outcomes. Create a syllabus with a course schedule that clearly communicates when and where students will engage with content and learning activities. Online learning requires the development of self-directed learning and time-management skills, so students need to know what the expectations and deadlines are. Consider what you will do and what your students will do, and when and where (CAST, n.d.).

Feedback

Technology affords new avenues for student engagement and feedback. "Technologies such as voting systems, online discussion forums, wikis and blogs allow practitioners to monitor levels of understanding and thus make better use of face-to-face contact time. Delivery of feedback through digital audio and video, or screen-capture software, may also save time and improve learners' engagement with feedback" (HEFCE, 2010, p. 21). The first step towards delivering feedback in the digital space is to have a clear understanding of the type of feedback you want to provide and the purpose of that feedback. For some general tips on getting started with feedback, you can visit the Feedback Module in the OAE Teaching modules series.

Return on Investment

Engaging with technology requires an investment of time to learn the technology, sometimes money and always a consideration of the technology tool's impact on the user's data security and privacy. All of these need to be considered when we ask learners to engage with a particular technology for their coursework (Kim, 2018).

Digital Expectations

These include both the access expected to use a certain technology (bandwidth, storage capacity etc.) as well as the digital skills students will need to use the technology effectively (JISC, 2009). Assessing students' readiness to use technology is key as a baseline check. Of course, individuals' skills will vary within a course and across a program. This is where a UDL perspective might help by offering different technology options and connections to training resources for these technologies. Once a baseline has been established, students can build on their digital fluency through intentional teaching and learning practices (JISC, 2009).

Using UDL to mitigate potential barriers to learning

Keys to success in using technology in education depend primarily on *how* technology is used and *with what intentions* rather than *if* it is used. From a Universal Design for Learning perspective, technology can help teachers to design learning for barrier mitigation. However, technology can also present barriers to learning. Learning goals come first; technology use in the classroom is in service of these. Technology and UDL are complementary but not codependent. UDL principles can be used to inform technology choices (Black & Moore, 2019).

UDL suggests designing for learner variability (Stanford University, n.d.); in a technology-enhanced learning space, this means considering how best to utilize technology for multiple means of engagement, accessible representation and action/expression. This may result in a high-tech offering, but could just as easily be low-tech (Lombardi, 2019).

Here are a few ways you can use UDL in an online space to increase access, engagement and learning outcomes for students.

Multiple Means of Engagement

- Allow learners to make choices where *possible.* This may include using polling to allow students to choose what to focus time on; where the assessment is flexible, allow students to suggest formats.
- Build in time for learners to share their goals for the course.

Optimize individual choice and autonomy

- Provide multiple interactivities in the course.
- Allow for synchronous and asynchronous activities.
- Provide time for students to connect with you.
- Provide opprtunity for small group break out sessions.
- Involve students in leading these interactivities.

Foster collaboration and community

- Vary the ways students must engage socially.
- Allow students the option between asking questions verbally or through the chat.
- For presentations, allow them to do a voice over of images or appear on screen. Can they submit a recording?

Minimize threats and distractions

- Provide clear instructions for how students can access help. Is there a discussion channel dedicated to peer support? Should they email you directly through the LMS for support? Where can students access technical support?
- Create a supportive learning space. Offer opportunities for students to transition from their busy lives into the online classroom space (i.e. question prompts that orient them to the topic).

Facilitate personal coping skills and strategies

Multiple Means of Representation

- Allow space for students to introduce themselves using a self-selected medium.
- Use the LMS tools to create student-owned or student-directed spaces for continuous connection, reflection, peer support, and sharing their experiences and connections.

Activate or supply background knowledge

- Provide an outline of the course from beginning to end – consider using both a written and graphic representation of the flow of your course.
- Consider how you arrange the online space. Draw attention to the most salient features using clear folder and file identification.

Highlight critical features, big ideas, and relationships

- Consider opening your full course from the start and include support for students to craft their own path through the material
- Consider using data from your LMS to identify best time and format of communications and adjust the delivery plan for the learners in front of you.

Guide information processing and visualization

- Build in multiple exemplars of concepts and use common material that would be found in the applied setting,
- Connect new concepts to learners' past experiences
- Use problem or scenario-focused learning and WIL experiences wherever possible.

Maximize transfer and generalization

- The use of tools such as adaptive learning or flashcard programs provide space to practice new terminology or engage in remedial work if needed.
- Digital resources allow for embedded vocabulary help make the flow of learning seamless.

Language & Symbols

- Digital presentation of materials allows easy transfer of resources between modalities.
- Accessible documentation means that learners can activate third party technology to translate material into their preferred format or language.
- Enhance collaboration options.

Perception

Multiple Means of Expression

- Think about the physical interactions being required from learners. What kinds of sensory and motor obligations do your assignments, activities, and resource postings require?
- Consider using tools that allow for multiple means of physical interaction to reduce the response effort for your learners.
- Embed tool teaching in your course to ensure learners can use them.

Physical Action

- Compose and share ideas using tools that help attain learning goals.
- Consider how students can show their learning in innovative ways.
- Consider how you can utilize the tools, and social spaces to increase formative feedback for students on their learning.
- Learners value the chance to become partners in assessment design where possible.

Expression & Communication

- Develop and act on plans to make the most out of learning.
- Provide estimates of effort, time, and resources required to complete each task you assign.
- Collect exemplars / non-exemplars of the task you're requiring so you can provide them as models
- Provide checklists, graphic organizers for concepts and templates for notes.

Executive Functions

Asynchronous and synchronous learning

There is no magic ratio for what portion of the course or program is synchronous compared to asynchronous. It will depend on your learners' needs and your own technological access and skills. The followed table, adapted from Cleveland-Innes & Wilton (2018), may help you decide on the right mix for your program or course.

	Synchronous Learning	Asynchronous Learning
Pros	• Discussion and collaboration in real time • Immediate feedback • Time and cost savings • Instructor assessment of learning via observation • Increased engagement and motivation via social presence	• Anytime, anywhere learning • Convenient access to course process and materials • Time for research and reflection before responding • Instructor assessment of learning via reflection and thoughtful response • Written expression more thorough and detailed
Cons	• Requirement to participate in the same place at the same time • Can require advanced technical infrastructure and skill • Quality of engagement depends on facilitator skill • Learner self-pacing less available	• Potential for feelings of isolation, lack of connection • Self-pacing requires increased levels of self-direction • Quality of engagement depends on facilitator skill • No immediate access to instructor
When?	• Discussing less complex issues • Getting acquainted • Planning tasks	• Reflecting on complex issues • When synchronous meetings cannot be scheduled because of work, family or other commitments
Why?	• Students become more committed and motivated because a quick response is expected	• Students have more time to reflect because the sender does not expect an immediate answer
How?	• Use synchronous means such as videoconferencing, IM and chat	• Use asynchronous means such as email, discussion boards and blogs
Examples	• Students expected to work in groups may be advised to IM as support for getting to know one another • Instructor wants to present concepts from the literature in a simplified way by giving an online lecture using videoconferencing	• Student expected to reflect on a course topic and maintain blog journal • Students may critically assess their peers' ideas through a discussion forum

Expert learning through adaptive expertise

Cleveland-Innes and Wilton (2018) encourage educators to "choose your technology carefully so that all learning activities […] are well suited to the needs of the subject matter and the students.[…] Comfort and competence with the technology has to be demonstrated before the learning activities commence. Technology that supports [online] learning will support (1) flexibility and personalization for students, allowing them to learn in their own way at their own pace, and (2) activity monitoring by the teacher through learning analytics and electronic assignment submission. Consider what is to be accomplished by using learning technologies: sharing of course content, group work, peer assessment, question facilitation, fostering community (p. 21)."

To increase development of adaptive expertise, Dumont et al. (2012) recommend a combined approach of: guided learning, active learning and experiential learning. In this model, learning becomes increasingly self-directed. Adaptive expertise harnesses emotion and motivation to enhance cognition. It also diversifies learning to include self-study AND collaboration. Including assessment FOR learning is also crucial.

UDL and Executive Functioning

Online learning, perhaps more so than face-to-face learning, requires students to be more independent. There are many ways to support students' development of executive functioning in the online environment. At the beginning of a course and program, it's important to develop shared expectations for how to engage in the learning environment. These ideally support the learning goals of the course or program, both the course and program outcomes and what students are hoping to achieve through their learning. The adaptive expertise model discussed above in the Expert Learning section is another way to think about scaffolding learning across and within courses. The following chart summarizes some other teaching strategies that support executive functioning in three key areas (CAST, n.d., *Supports for Executive Functioning Online* section):

Strategies to Support Executive Functioning Online	
Planning & Organization	Design clear, interactive course headings and icons. Group content into logical learning units and divide information into small segments. Limit modules to 8–10 pages in length.
Goal setting, Prioritizing & Progress Monitoring	Provide checklists for making progress. Provide self-check quizzes. Give immediate feedback on quiz responses and activities.
Applying Learning Strategies	Provide options to create notes, annotate material, and organize materials and resources. Provide models and hints to help students get started on a problem.

Assessment

Research has proven that assessment of students, not content, shapes their understanding of the curriculum (JISC, 2007). A move to digital assessments influenced by a strong digital pedagogy can have significant benefits for students such as well-scaffolded summative assessments, more frequent formative assessments, technology-enhanced feedback of learner progress with lower effort on the part of faculty, the ability to address students' misconceptions more quickly, more efficient plagiarism checks, and increased marking consistency and inter-rater reliability (JISC, 2010). Technology can aid the assessment process by capturing stages of skill or product development that can later be used as points of

reflection. Additionally, simple digital artefacts (quiz, survey, prompt, discussion question) can provide students with formative assessment checks and instant feedback on their current understanding. These formative assessments are not only useful feedback mechanisms for learners to direct their learning journey but also enhance student motivation (JISC, 2009).

Modern learners often have high expectations of their institution's learning environments; they depend on the convenience of using their own devices, the flexibility of a personalized learning timeline, and the agency they experience as a result of partnering on learning objectives and assessments. Assessing in the digital space should be considered across a few dimensions:

- ***Communication and Learning Cycles:*** Communication technologies are used towards multiple ends including community building activities and formal learning and assessment activities. Interaction can take place using many technologies (forums, blogs, emails, videos, etc.) and should always be viewed as a cycle of inquiry. Community is built and learning occurs at the closing of any cycle. The digital space allows these cycles to begin, overlap, and close in quick iterative experiences. Technologies such as voting software, mind mapping, and collaborative whiteboards can open space for learner-directed, in-the-moment clarifications and guidance for remedial work and further exploration (JISC, 2010)
- ***Authenticity, Self-Direction, and Hidden Learning:*** Assessments embedded in industry technologies or simulations often provide a deeper and more enriching learning experience and teach students skills associated with the use of industry tools. Online blogs, e-portfolios, and journals provide space for learners to reflect on their achievements and feedback over the length of a course which can help promote ownership over their learning and develop higher-order cognitive skills. Assessment format options can be expanded in the digital space and open opportunities for student choice which promotes deeper inquiry and engagement. This approach can lead students to expanded depth and breadth and greater confidence in finding their autonomy and identity in assessment strategies and products. Assessment design opportunities available in the digital space can bring to light elements of learning that had previously been hidden. The digital space affords more tools for the tracking and evaluation of learning process as well as product and can do more to capture the complexity of the learning experience (JISC, 2010).
- ***Feedback, Course Design, and Quality Measures:*** Learners report that feedback received via digital tools (audio or video) is more personalized, contains more details, is easier to recall, and is more easily interpreted – it adds to the learners' experience of personalization. The use of analytics in your assessments (or assessment on your assessment) can provide valuable information for your iterative course design process. Using a digital system (such as a learning management system) to deliver and manage your assessments can provide more timely (if not instant) feedback to learners but it also produces data you can use in curriculum review and quality assurance processes. (JISC, 2010)

Multimodal work

Digital considerations, where assessments are concerned, apply to design, delivery, and management but also extend to rubrics. Many students find the language used in rubrics and grade descriptors to be "subjective and vague, [however], providing more detailed criteria can paradoxically increase students' anxieties and lead them to focus on sometimes quite trivial issues, with some students leaning heavily on rubrics and exemplars as recipes"(Rossity, 2018, para. 6). The research in this area suggests rubrics use clear language and focus only on those

criteria connected to the learning outcomes they are assessing; this focus is even more important when assessing digital assignments of varying modalities due to the embedded complexities of multimodal work.

Rubrics that assess complex multimodal tasks need to reflect the efforts and skill development students engage in to complete the task. “A digital assignment isn’t a throwaway task – it often involves substantial learning, work and creativity, and its weighting within the course – in terms of time and assessment – needs to be carefully considered” (Rossity, 2018, Findings para. 4). When these assignments also require public sharing (i.e. posting to YouTube, Flipgrid, etc.) the risk to student’s privacy and identity management increase and should be considered as mechanisms for submission and review are determined. In addition, the complexity of the task increases as does the skill set required to adeptly evaluate it, resulting in a need for faculty to develop a nuanced understanding of the “complex ways in which technical skills, composition elements, modes, and meaning interact” (Curwood 2012, p. 242) in student work.

Further Resources

Community of Inquiry

For more information: Garrison, D. R., Anderson, T., & Archer, W. (2000). The Internet and Higher Education, 2(2-3), 87-105. / Coding template / Concept map

Decision-making Frameworks

The implementation of technology in service of learning requires careful consideration of a number of factors, many of which have been captured in existing frameworks. For example, the SECTIONS framework, updated by Bates (2014), is intended to be used by educators and educational leaders in collaboration to make decisions regarding educational technology. An alternate rubric for educators when making decisions regarding implementation of technology in their teaching is the *Rubric for eLearning Tool Evaluation*. "eLearning tools are defined as any digital technology, mediated through the use of a computing device, deliberately selected to support student learning. The rubric supports a multi-dimensional evaluation of functional, technical, and pedagogical aspects of eLearning Tools. " (Anstey, L.M. & Watson, G.P.L., 2018, p. 1)
In addition to those frameworks the **ADDIE model** (Analyze, Design, Develop, Implement, Evaluate) offers a useful process for considering the move to the digital teaching and learning space and all the corresponding design considerations. You can review the process in more detail here and may want to consider engaging the assistance of Instructional Designers.

Learning Analytics

At the heart of using learning analytics to design and monitor your course should be the notion that “In the hands of educators, data-based visualizations of how and what a student is learning can assist instructors to develop customized instructional strategies and curricula” (Jones, 2019, p. 2) and that “education (and to an even greater extent EdTech) has misrepresented itself as objective, quantifiable, apolitical” (Stommel, 2017). The sentiments of possibility and apprehension in these quotes make it important to always consider the use of technology and learning analytics from a critical (not dismissive or pessimistic) lens. It is of paramount importance that data users understand the embedded and underlying assumptions in the analysis of this kind of data.
The intersection of learning analytics and Universal Design for Learning can provide some encouraging and thoughtful ways to incorporate the use of data into your course design. You can find excellent resources for using data to inform course design in this UDL on Campus article.

**Note: The document makes the overall assumption that all of the information and considerations contained in the document begin with privacy for students and faculty as a main driving force for pedagogical adoption of educational technology. It is recommended a policy and procedure document exist at institutional and program levels that identifies the rights and protections that exist for anyone using the embedded technologies and includes all instances of data collection, tracking, and usages of all collected information (active or passive).

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