Designing and Facilitating Optimal LMS Student Learning Experiences: Considering Students' Needs for Accessibility, Navigability, Personalization, and Relevance in their Online Courses

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Abstract

Higher education institutions seek to provide instructional opportunities that challenge students with a high level of academic rigor founded in a robust curriculum. Recognizing that learners are more diverse than ever before, and instructional formats are shifting away from traditional in-person learning experiences and toward online learning, it is clear that new technologies, delivery platforms, and pedagogies are required. Further, for online learning to be successful, both courses and the platforms on which they are hosted must not only meet institutional goals, but also serve the unique needs of students by providing online learning that is accessible and navigable as well as providing learners with relevant and personalized experiences. The authors aim to provide research-based practices to support stakeholders who are interested in techniques that translate to a more beneficial and accessible student experience in online learning and help instructors engineer their course design with artful, targeted purpose.

Keywords: learning management systems, online education, accessibility, research-based practices, higher education

Introduction

Meeting the changing needs of 21st-century learners has been an increasing focus for post-secondary institutions for decades (Golden & Katz, 1999; Mintz, 2017). U.S. higher education has been evolving from institution-centered to learner-centered through a shift in purpose from "mass production" and "one-size-fits-all" paradigms to the student-centered focus institutions strive for today (Lagemann & Lewis, 2012; Mintz, 2017). Currently, we have a growing student population of diverse learners, including working adults, non-traditional students, students working full time while taking classes, lower-income students, second language and bilingual students, students seeking continuing and professional education, degree-seekers, and learners wanting flexibility in when, where, and how they take their courses (Murray, 2017). Further, with the onset of COVID-19 at the beginning of 2020 and the need to provide remote learning, higher education has adjusted its purpose, delivery, and support to meet the needs of today's learners (Bettinger & Loeb, 2017; Labaree, 2017; Mintz, 2017).

One approach higher education has taken to address students' diverse needs is to add online and blended learning options to make traditional learning more accessible, improve pedagogy, and increase learning quality (Al-Sharhan et al., 2020; Katoua et al., 2016; Zanjani, 2017). To organize the online student learning experiences, many post-secondary institutions have adopted learning management systems, or LMSs, to provide a centralized system for teaching, learning, and managing online courses to increase stakeholder success (Godwin-Jones, 2012). Student success within LMSs requires artful and purposeful design of online experiences using research-based practices that both enable students to access and navigate content and provide experiences that are personal and relevant for all learners (Cavanagh, 2020; Picciano, 2015).

To begin our discussion of research-based teaching strategies and advice for designing and facilitating optimal LMS student learning experiences, we provide an overview of LMSs, including common platforms and features. Next, we define and discuss four areas of online learning that impact students' learning experience: accessibility, navigation, relevance, and personalization. Lastly, we offer evidence-based practices aimed at maximizing the student LMS experience related to these areas. The practices suggested are designed to help instructors engineer their courses with targeted purpose to maximize learner and instructor online experiences.

Learning Management System Overview

Defining the Learning Management System (LMS)

To manage and deliver instruction and report on learners' progress, education institutions often rely on learning management systems. Turnbull et al. explain that LMSs are "web-based software platforms that provide an interactive online learning environment and automate the administration, organization, delivery, and reporting of educational content and learner outcomes" (2020, p. 1). Berking and Gallagher define the scope of the LMS as "…a key enabling technology for 'anytime, anywhere' access to learning content and administration" (2013, p. 6). In short, LMSs afford learners and instructors a virtual platform, available 24/7, that enables engagement with and completion of course content and offers a more accessible way for learners to fulfill course requirements.

Adoption and use of LMSs in higher education and K-12 school systems have grown particularly in response to COVID-19 and the need to provide continuous instruction off site, in safe ways (Alturki & Aldraiweesh, 2021; Coman et al., 2020). However, having access to an LMS does not guarantee that learning occurs or that learners will have positive, successful

learning experiences (Chaw & Tang, 2018; Sim, 2021). Identifying the best LMS depends on the institution's rollout, support plans, and clientele needs. Institutions also need to consider cost, flexibility, adaptability, e-learning initiatives, and third-party integration with social and application tools (Kunju, 2020).

Types of LMS

LMSs vary in function and purpose. There are two main types of LMS: installed vs web-based. Installed LMSs are available for onsite use only, whereas web-based systems allow access anywhere there is internet access or cloud capability (Kunju, 2020). Other categories of LMSs include hosted vs. SaaS, open source vs. closed source, free vs. commercial, course creation vs. non-course creation, and integration capable vs. non-integrated (Kunju, 2020).

Figure 1

Comparison of LMS Types and Features

Type of LMS	Installed on computers	Cloud hosted	Cost-effective	Easy upgrades	Need for in-house IT team
Installed	Y	N	N	N	Y
Web hosted	N	Y	Y	Y	N
Open Source	Y	Y	Y	Y	Y
Commercial	N	Y	Y	Y	N

Note. Adapted from Kunju, 2020

LMS Platform Comparisons in Adoption and Usage

While a variety of LMS options are available, educators and administrators seek a platform for various reasons including easing development and facilitation of course content,

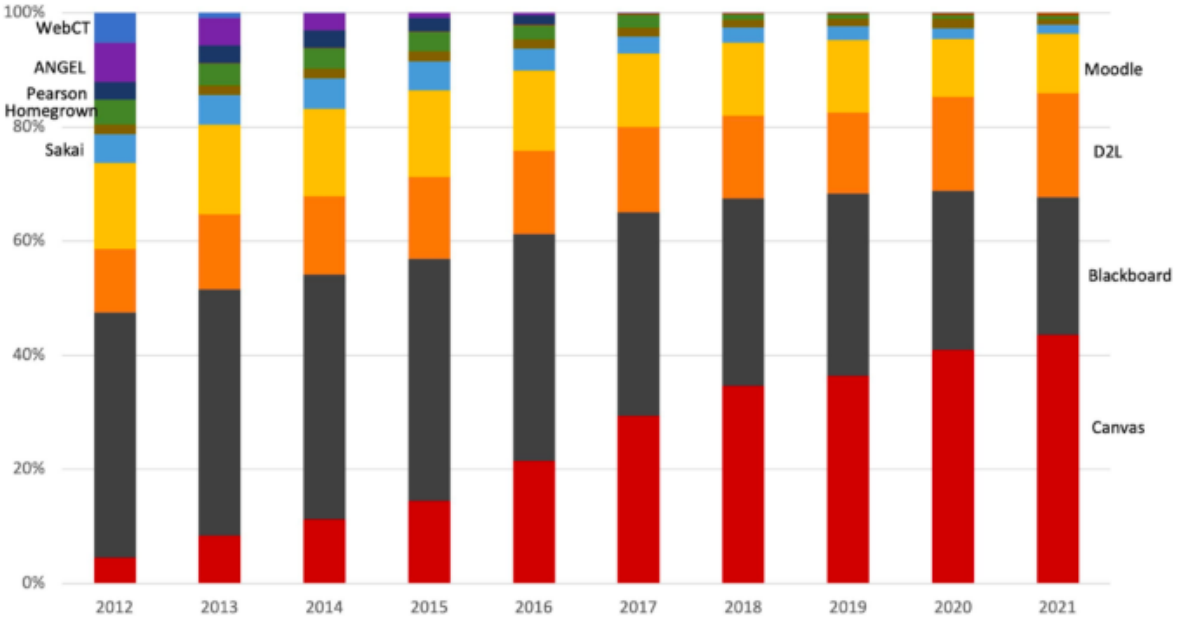
tracking and evaluating student growth, and documenting and communicating student outcomes (Fenton, 2018). Further, platforms may be selected based on cost, LMS support for faculty and students, cloud capacity, accessibility features, security, and teaching and learning tools.

The most widely adopted LMSs include Canvas, Blackboard, D2L Brightspace, and Moodle. Use of these popular LMSs has been relatively consistent as a proportion of the online marketplace, with the exception of Canvas, whose growth in popularity and use has solidified its place as a leader among online LMSs.

Figure 2 below shows the trends of the past 10 years for LMS market share in North American higher education systems as scaled by enrollment (Hill, 2022).

Figure 2

North American LMS Market Scaled by Enrollment for 2012-2021



Note. Data above were pulled from each institution's Integrated Postsecondary Education Data System (IPEDS) with Instructure, Blackboard, D2L, Moodle, and Schoology as current subscribers to Mindwires LMS Market Analysis service. From PhilonEdTech. 2022

These LMSs have similar features; all are able to manage teaching, learning, and student data practices (Dobre, 2015). The platforms include a variety of integrated tools, as well as connections to third- party tools, that allow online delivery of content; interaction and collaboration; and recording and reporting student participation (Rhode et al., 2017). Commonly used LMS tools include announcements, gradebook, folders, modules, files, assignments, web links, feedback features, plagiarism detection, discussion boards, quizzes, tests, video/audio recording, text, graphics, gamification features, student participation analytics, assignment submission, text in various languages and sizes, and accessibility features like screen readers and the ability to caption images (Borboa et al., 2017; Rhode et al., 2017; Sim, 2021). Universities use LMSs to enhance collaboration among students and between students and instructors (Mhouti & Eradi, 2018; Zanjani, 2017).

Many learning institutions have adopted LMSs because of their ability to help educators provide flexible online learning experiences and programs to their learners so students can learn regardless of location, device, or time (Fabito et al., 2022; Morze et al., 2021). Rahman et al. (2019) explained that LMSs act as a platform for online content, providing online learning delivery that can be asynchronous and synchronous-based and support a variety of uses, adding to its ability to be flexible and meet more teacher and student needs.

Designing and Facilitating Successful Course Experiences on LMS

Ensuring online courses are successful for students requires a multi-pronged approach that includes an understanding of pedagogy, content knowledge, instructional design, and how to meet diverse learners' needs and interests. Teachers must also ensure courses are in compliance with the Americans with Disabilities Act (Burgstahler, 2017). Designing courses so all students, including students with disabilities, can equitably and easily understand, collaborate, participate,

and navigate all elements of the courses' learning tools without barriers is a critical task for teachers (Tovuti, 2021; WAI, 2016). Tovuti explains that "accessibility deals with discriminatory aspects connected to a learner's experience, especially, for people with disabilities" (2021, para. 8). Creating effective course experiences requires teachers to build and facilitate courses that enable access for all students. This access is achieved by reducing potential barriers to learning and making learning meaningful.

Fortunately, LMS platforms offer a variety of tools, including integration of non-LMS third-party tools assisting with the design and implementation of essential practices that provide equitable access to online courses and materials that are easily navigated, include all learners, and make learning personalized and relevant. In short, using research-based accessibility and navigation practices, while ensuring courses are meaningful and personalized, affords learners maximal opportunities to succeed. When implemented effectively, these methods can increase success for all students, including those with disabilities or unique needs (Bastedo et al., 2013). While teachers can meet many students' needs in a face-to-face learning environment, LMS platforms with additional tools give teachers the ability to meet more of students' individual and unique needs (Coman et al., 2020; Morze et al., 2021).

Addressing Accessibility

Teachers can use various recommended accessibility practices teachers to plan and facilitate effective online learning via the LMS. Among the most commonly adopted are Universal Design for Learning (UDL) principles that seek to improve accessibility for learners by giving all students equal opportunity to succeed. UDL gives students flexibility and choice in course materials and how they demonstrate understanding and skills, while using diverse approaches to engage students (CAST, 2018; Mancilla & Frey, 2021; Rao, 2021; TEAL, 2010).

UDL's approach enables all students to have equal access to all materials without having to disclose disabilities or encounter barriers to students with differing needs and experiences, whether those be academic, cultural, geography, socioeconomic, or technological (Kieran & Anderson, 2018; Mancilla & Frey, 2021; Verdinelli & Kutner, 2016). Effectively adopting and implementing UDL principles and practices can reduce barriers to learning, increase support for all learners, and help students feel heard, valued, and connected (CAST, 2018; Harris et al., 2020; Rao, 2021). In addition to UDL practices, Schroeder (2020) suggests being empathetic to learners' needs as you design and facilitate learning, creating a community of learners, and using effective design principles.

LMSs have a variety of tools to help increase a course's accessibility, with most platforms having comparable accessibility checkers. Canvas, for example, has a built-in accessibility checker in its rich content editor that checks course content for issues such as color contrast, image alt text, proper heading structure, and proper table markup. Teachers can also use third-party tools to identify errors and receive suggestions to improve accessibility. For example, teachers can use a tool called Universal Design Organization Inspection Tool (UDOIT) to check accessibility issues for content built in Canvas directly, such as use of headings in page structure, alternative text for images, table headers, color contrast, descriptive link text, and video captions in platform features such as assignments, discussions, files (html, pdf, mov), pages, syllabi, and module URLs. Blackboard Ally is another third-party tool that can be integrated with Canvas and other LMSs to check accessibility issues in uploaded documents and provide alternative formats for students.

Accessibility checkers, in tandem with a teacher's selected pedagogical practices aimed at reducing accessibility issues, can help students have optimal learning experiences.

Accessibility Practice Recommendations

Research offers numerous suggestions for practices that can increase course accessibility. In their *Accessibility Playbook*, Thompson and Spielmaker (2020) suggest specific practices course designers can use to increase a course's accessibility that echo some of our students' preferences. Their suggestions address the use of headings, lists and paragraphs, links, tables, color, text selection and font size, PDFs, slides, and other media. Also included are resources for checking PDF tags, captioning videos and creating transcripts, and designing Google Slides, as well as accessibility checkers to ensure course elements are accessible to all students. In addition to the strategies suggested above, we also advocate for:

- presenting materials in a variety of formats where students can access content on diverse platforms, which impacts their ability to access material;
- purposefully using color (using contrasting colors and not too many of these), images (that enhance learning and provide information, are captioned, and are not used to fill space), text (using same font families, adjusting font sizes for various tasks, and using purposeful headings), and page layout formats to enhance the look and function of the course;
- including transcripts of closed captioning for videos;
- providing information to students to ensure they know how to ask for accommodations and support if the course or its content are not accessible;
- consulting with accessibility experts on campus to make sure you follow best practices and guidelines.

Addressing Navigability and Usability

Navigability

Navigation is conceptualized in terms of actual maneuverability within an online course (Young et al., 2012). The focus is broadly on ease of use and organization. Navigation is different from accessibility in that it is an evaluation of technical functionality and the literal operation of the online environment. Navigation is almost universally measured by the look and flow of a course and requires a structure to enable students to have a comprehensible online course experience (Young, 2006). Evaluation instruments of online courses consistently point to navigation as an outcome of proficient course design (CCEC, 2020; NSQ, 2019; CVC-OEI, 2020; Baldwin & Ching, 2019). Universal Design suggests three key areas for teachers to address when considering course navigation: perception, executive function, and recruiting interest (CAST, 2018).

Perception addresses a design goal of providing simple and intuitive courses so students can access materials and content regardless of their needs and abilities (CAST, 2018). In practice, this is manifested as uncomplicated course design, often in a modular format with streamlined homepages, presentation of content in clear and distinct categories, and use of descriptive headings and consistent organizational sequencing (Schroeder, 2020). Further, content within each course should be presented in predictable formats and easily accessed with direct hyperlinks and embedded shortcuts.

Executive functions focus on creating an online learning environment that requires minimal physical effort from students to manipulate and utilize course materials effectively (CAST, 2018; Cavanagh, 2020). Functionality means students can access all links, tools, and content without difficulty and use them as intended. For example, teachers can design and

facilitate effective online learning via the LMS using navigational buttons like “Next” and “Previous” to create multi-page modules rather than long scrolling pages (Fredericksen et al., 2000). Clear navigation is needed to reduce the stress students may experience as they try to figure out the practical function and expectations of multiple courses on top of content mastery (Hosler & Arend, 2012; Jaggars & Xu, 2016). Additionally, to improve student navigation, teachers can provide checklists to help students know what has been accomplished and what has yet to be completed, provide information about where to go and how to access support for the LMS or class, and use LMS templates, if offered by the institution, so students have a more consistent experience (Mancilla & Frey, 2021; Tovuti, 2021; WAI, 2016).

Recruiting interest prioritizes using size and space on each page of an online course appropriately (CAST, 2018). Teachers must consider the location of course components on each course page as they determine whether content is located in a logical spot (CCEC, 2020; NSQ, 2019; CVC-OEI, 2020; Baldwin & Ching, 2019). Arranging the learning environment is like arranging furniture; the placement depends on the function and purpose of the room and the goal is that the user can effectively navigate the space and make the most of each item available to them. In designing placement of course content, teachers should divide spaces into small, manageable chunks and arrange all components for simple access that does not need additional supports or cause any barriers to learning (CAST, 2018; Fredericksen et al., 2000; Mehta et al., 2017; Schroeder, 2020).

Students deserve online learning experiences that incorporate the unique qualities of engaging instructors who present easily navigable courses. Navigational techniques should encompass functionality and organization while also complementing the instructor’s personal

style. True navigability in online learning is attained through both intelligible design and intentional personalization.

Addressing Usability as a Facet of Navigability

Like navigation, usability is about designing an experience that increases users' satisfaction and learners' perceptions that their experience was effective and efficient (Kerry, 2021). Phillips and Colton explain that a main tenant of usability is “paying attention to who needs to be included in the context of the content being used and ensuring everyone who wants to have a seat at the table will have one” (2021, p. 12). WAI explains that usability typically impacts everyone and does “not disproportionately impact people with disabilities.” However, addressing course usability “often does not sufficiently address the needs of people with disabilities” (2016, para. 4). Usability impacts navigation but speaks more to increased and equitable access, whereas navigation addresses the aesthetics and organization of course delivery and components. Usability is essentially the bridge between navigation and accessibility. Students must be able to easily use LMS and online course features so they can navigate courses and access materials, learning experiences, assessments, and their community of learners.

Kerry explains that adjusting the contrast of a screen, a usability feature, benefits all learners, including students who have eyesight challenges and those who just prefer to adjust the contrast for reading in low light. Similarly, captions are a usability feature, as they help deaf users but are also beneficial in both noisy and quiet settings (2021, para. 5). Additionally, teachers can design course introductions that use clear language, without jargon or unfamiliar acronyms, making it easy for all students to understand and use the course content in support of their learning. Ultimately, usability is a function of navigation, providing accommodations that facilitate course navigation on both technically and on the level of accessibility.

Navigability and Usability Practice Recommendations

Students must be able to navigate their online courses and engage with all course-related materials. If they cannot, opportunities for learning can be greatly impacted. Research offers numerous suggestions for practices that can increase course navigability and usability:

- Include detailed instructions so students know where to find all course components and materials as well as understand course and assignment expectations (QM, 2020). A succinct course tour video available on the welcome page, approximately 2–6 minutes long, can help students learn how to navigate the course more effectively (Lake, 2016).
- Organize course content and experiences chronologically in sequential learning modules or week-by-week pages to reduce searching or minimize accessing the incorrect content for a particular week (Lake 2016).
- Present links, files, pictures, and icons in clear, informative, meaningful terms (QM, 2020)
- Provide consistency across the course and within each module or learning experience so students can become familiar and comfortable with the course layout and design (Lake, 2016). Looking at other related online courses students may take in their programs of study and using similar design elements can help improve consistency across courses.
- Include ‘shortcut’ links and embed videos in the course to reduce clicking to find pages, modules, materials, or assignments (Lake, 2016).

Addressing Personalization

Designing a course with personalization in mind recognizes the opportunity to tailor the online experience to create and foster a sense of identity for both student and instructor. While many instructors typically don't see themselves as instructional designers, creating and implementing lessons in an online learning environment carries significant responsibility (Godwin-Jones, 2012; Rao, 2021). Teachers assume a fundamental role in the process, both in the way they make the content available and in the design of the content to meet individual student needs (Brito & Dias, 2020). To provide effective, inclusive learning experiences for students, instructors must consider the full range of human experience, focus on student needs, and offer instruction that can be integrated into students' complicated lives (Phillips & Colton, 2021). Additionally, instructors must seize opportunities to show their own humanity by infusing their identity and interests into the online learning environment so that it reflects their unique teaching style and personality, but also do so in a way that attracts students instead of turning them off (Wolpert-Gawron, 2019). Teachers who share appropriate personal information give students opportunities to see commonalities between themselves and their teachers, which can strengthen teacher-student relationships, often reducing the achievement gap, particularly for underserved students (Wolpert-Gawron, 2019). Traditional face-to-face learning provides more opportunities to develop these personal relationships. Teaching on an LMS can diminish teacher and student presence due to computer screens and requires teachers to purposefully personalize learning (Timothy, 2016).

Increasingly, students begin online or blended learning experiences already accustomed to immersive online interactions where users take on multiple online roles and identities (Godwin-Jones, 2012). Thus, students are likely to hold high expectations that instructors have

the technological literacy necessary to create similar, personalized online learning experiences, often expanding outside the basic functions of a given LMS (Godwin-Jones, 2012). However, some students come to online learning with minimal to no experience in navigating LMSs. For these inexperienced students, there is a steep learning curve to successfully maneuver, access, and use online course components (Alenezi, 2018). The difficulty of personalization within an LMS is the idea that "the system must be sufficiently intelligent or flexible to adapt to the user and not the other way around" (Brito & Dias, 2020, p. 2). Instructors must create learning environments and experiences that meet students where they are, regardless of their online experiences, attitudes, and preferences.

Student Personalization

Personalized courses within an LMS evolve by providing opportunities for students to express themselves, to demonstrate their knowledge, and to resonate with the material on a personal level. The crux of UDL is that it is learner-focused, facilitating online instruction and creating an online learning environment conducive to impactful learning for every student (Kieran & Anderson, 2018). In practice, this is accomplished through the understanding that there is not one means of action and expression that will be optimal for all learners, so it is essential to provide options for students (CAST, 2018). A benefit of online courses is the availability of tools and features that provide options for students to express themselves and represent who they are (Rao, 2021).

Pedagogies utilizing learning paths and mastery plans are often used to offer personalized support to students, providing remedial contingencies or more challenging options for the spectrum of learners in the online learning environment (Kieran & Anderson, 2018). In the context of online teaching evaluation instruments, student choice and individualized learning

require instructors to create uniquely paced individualized learning opportunities where students can essentially "choose their own adventure" within the course (CCEC, 2020; NSQ, 2019; CVC-OEI, 2020; Baldwin & Ching, 2019). Personalization techniques encourage diverse practices that enable students to be actively involved in selecting their learning strategies and evaluating their progress (Kieran & Anderson, 2018). Students can be given options to choose how they want to be assessed, what format they want to use when turning in assignments, or who they want to work with during the course. By encouraging personal self-awareness, instructors give students opportunities to explore practices that work for them, thereby increasing interest and motivation in the course (Kieran & Anderson, 2018; Rao, 2021).

Instructor Personalization

Despite the diverse ways in which students contribute to and engage with course materials, it is still the instructor who literally constructs the online learning environment (Godwin-Jones, 2012). By placing value in understanding student expectations, instructors can have a direct impact on student satisfaction with online learning (Trammel & Aldrich, 2016). Consequently, instructors devote considerable effort to recruit and keep learner attention and make learning come alive (CAST, 2018).

Undoubtedly, students appreciate organizational prowess, subject matter expertise, and strong teaching skills, but interestingly, they also seek instructors who are genuine and enthusiastic (Trammel & Aldrich, 2016). Students consistently report that instructor presence impacts their satisfaction with their instructor and how much they feel they are learning (Richardson & Swan, 2003). Social presence can be facilitated through active and regular communication with students (Rao, 2021) and through passive communication such as creating a personal identity in online learning environments.

Of particular note are design aspects that "reveal the instructor" and accomplish different types of personal interaction in the online learning environment (Anderson et al., 1999; Paquette, 2016; Wise et al., 2004). Instructors are encouraged to express their individual sense of humor, exhibit emotions through the use of emoticons or text style, or share personal details about their “real” life (Anderson et al., 1999). Further, using words like "we" or "our" and personal vocatives (e.g., participants’ names and preferred pronouns) can help instructors create a sense of cohesion and connection (Anderson et al., 1999; Goldman, 2017). Creating a virtual representation of the instructor through avatars or bitmojis can enhance familiarity and help build rapport with learners (Minero, 2020). Experiencing an instructor’s presence in an online class can influence student satisfaction and increase student feelings of a more personal course experience (Cobb, 2009).

Inclusivity

Teachers who design online courses that take into account students’ personal needs create learning experiences that breathe humanity into courses, so students feel seen and heard, and thus able to participate meaningfully. Teachers who “deliberately cultivat[e] a learning environment where all learners are treated equitably, have equal access to learning, and feel valued and supported in their learning” are said to create inclusive course experiences (UMCRLT, 2020, para 3). Instructors who design inclusive courses see learners as individuals and value their backgrounds and experiences (Harris et al., 2020; UMCRLT, 2020).

Creating inclusive online courses is not easy. It requires commitment, time, and a desire to continue finding new and improved ways to provide students with effective learning experiences (Harris et al., 2020). However, there are many research-based inclusive approaches teachers can use to plan and teach effectively on an LMS. Schroeder (2020) suggests that

teachers provide help menus and student resource guides to support students who have less online learning experience. Additionally, providing course content that meets individual students where they are in the learning process can be impactful. Other practices include: creating a class environment where all students feel a sense of belonging**;** providing clear and explicit expectations, directions, and evaluation criteria; incorporating course material that recognizes and acknowledges diversity; and designing course elements for accessibility that also provide experiences where students feel that courses meet individual preferences and needs (Columbia CTL, 2020; Harris et al., 2020; Rao, 2021; Sathy & Hogan, 2019).

Personalization Practice Recommendations

Personalization in online courses can promote the development of community and has the potential to make learning more engaging, relevant, memorable, and actionable for learners (Feldstein & Hill, 2016). Below are evidence-based practices that can increase course personalization:

- provide options and choice for students to individually engage with the materials and build understanding based on their own experiences and knowledge (Tanis, 2020);
- solicit feedback and reflection from students to ascertain which learning experiences are most significant and impactful (Oller et al., 2021);
- utilize feedback creatively to tailor the impact and purpose of the communication, imparting coaching, dialogue, and encouragement (Jensen et al. 2021), in addition to correction; and
- embrace your agency in creating powerful learning environments that showcase your personality and teaching style (Baier et al., 2019; Richardson et al., 2015) by using

creative design, avatars, familiar language, and LMS profile and characterization tools.

Addressing Relevance

Evaluating what is necessary and truly beneficial within the context of the online learning environment is the essence of relevance. In some ways, relevance parallels accessibility in that content should be thoughtfully included and appropriately supported with necessary accessibility features (Kieran & Anderson, 2018; Rao, 2021). Fundamentally, instructors focus on clearly relevant components like curriculum, accreditation compliance, alignments, and the scope of their courses, but online learning creates the unique challenge of continuing technological innovation that requires increasingly seamless integration of tools and use of a variety of online programmatic elements (Cavanagh, 2020; Coman et al., 2020; Rhode et al., 2017). LMS platforms support countless native and synchronous tools, customizable based on pedagogical approach and design preference (Godwin-Jones, 2012; Zanjani, 2017). Integration of these tools, however, introduces significant questions about learning design, accessibility, computer literacy, and pedagogical philosophy (Godwin-Jones, 2012).

Pairing the right kinds of resources and tools with the academic content and material is necessary for students to be best positioned to learn (CAST, 2018). By being selective in the integration of tools and materials, instructors can focus on the quality rather than the novelty of the interaction. Integrating a tool or material resource requires consideration of technical functionality, student aptitude, how it supports students, whether it creates more meaningful access or comprehension, and how it complements the instructor's pedagogical approach (Rao, 2021). With purposeful integration, instructors can construct online environments replete with content, activities, and tools that support course objectives and strengthen learning experiences

(Kieran & Anderson, 2018; Rao, 2021). The integration of any approach or tool in an online course should be thoughtfully selected for its value and depth so it contributes to the overall understanding of the course objectives (Rao, 2021).

Discerning value and measuring utility are the key factors of relevance. Through established rubrics, instructors can work through the process of vetting the content of their courses (Cavanagh, 2020), but evaluation rubrics that highlight integration enable instructors to fully realize the complexity involved in creating a course with true relevance. Any integrations incorporated into the course should reduce cognitive load and be familiar so students feel comfortable and supported rather than confused and unsatisfied (Cavanagh, 2020). Schroeder explains, “empathy in design is crucial. Put yourself in the shoes of your learners and you will put them first in your design” (2021, para. 3). Through design editing, restraint, and balance, instructors can ensure appropriately relevant student experiences. Relevance is accomplished through selective use of tools and materials to create a meaningful, rich, and efficient online learning experience.

Relevance Practice Recommendations

Online course design requires restraint and finesse with the inclusion of environmental features and content that are tailored and purposeful to support student learning and development (Dumford & Miller, 2018). Below are evidence-based practices that can increase course relevance:

- design online classes carefully, with specific attention to learning outcomes, assignments, assessments, media, and external tools, so that materials are cohesive and meaningful when combined (Tanis 2020);

- select materials that are current, socially and culturally relevant, and interesting to exemplify and discuss learning objectives (Darling-Aduana et al., 2020);
- demonstrate enthusiasm and continued exploration of your area of expertise so that students can readily observe professional and personal investment in the subject matter (Richardson et al., 2015); and
- integrate LMS features and external tools with intention and clear purpose, using the most effective tool and approach for a given lesson and for specific student needs (Martin & Martin, 2015).

Limitations

The recommendations stated in this paper are based on the authors' review of existing research and literature and the authors' personal teaching experience and professional development in online teaching. Further, while the evidence-based practices recommended within are considered valuable today, the field of instructional technology, as well as practices that enable student accessibility, evolve quickly, with new practices and tools emerging that may not be captured here.

Conclusion

There is no one right way or one-size-fits-all solution to meeting every student's needs in any classroom environment. Even following the most well-intentioned best practices may not meet all students' needs. While offering e-learning through an LMS is a valuable addition to traditional learning opportunities (i.e., face-to-face), using only basic LMS functions for online learning is not enough to meet student needs and accessibility requirements. Teachers must use research-based practices that provide relevant learning experiences that are accessible,

personalized, and “optimize the educational cycle” for teaching a class on a LMS (Dobre, 2015, p. 320).

Addressing student needs, especially online, is not easy. It requires time, ongoing monitoring, revision, and often a large shift in our pedagogical practices and mental paradigms of what effective online learning should be (Oswal & Meloncon, 2014). Yet by designing courses with learners’ needs in mind, taking into consideration best practices and student input, teachers can provide online course experiences that “have great potential to reach new and diverse populations of students who might otherwise not have access to those learning opportunities” if barriers that impact student learning are reduced or removed (McKeown & McKeown, 2019, p. 1). Teachers using a variety of purposefully selected and integrated tools, practices, and materials can enhance a course's overall experience and ultimately increase students’ opportunities for success (Brito & Dias, 2020; McKeown & McKeown, 2019; Phillips & Colton, 2021).

In addition to the recommended practices above, we suggest instructors engage in action research as they teach to continually reflect on their courses and students’ experiences to find ways to change practices and improve student outcomes (Manfra, 2019). Further, we encourage student participation in course or assessment design. Involving students can occur by offering learners choices in topics or materials to review and products to produce to show proficiency, or through eliciting students’ feedback at the start of, or during, the course (Birgbauer, 2016). The true artistry of teaching and student experience is that course design should be the pursuit of a masterpiece with the acceptance that it will always be a work in progress.

Resources

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