



Supporting Multilingual Students in Higher Education by Implementing Universal Design for Learning in Online Courses

The COVID-19 pandemic impacted traditional pedagogies and modalities for facilitating instruction to all students, including those enrolled in higher education courses. Given the disruptions to in-person learning and the growing interest in distance education, higher education institutions are increasing the number of asynchronous online and blended courses in educational programs. This increase also coincides with the growing numbers of diverse students, including those from multilingual backgrounds, across college campuses in the United States. Student diversity calls for more inclusive instructional delivery modes. This article describes Universal Design for Learning (UDL), a framework designed to enhance teaching and learning for all students. It also explains how university faculty can implement UDL in online courses in higher education and in preservice teacher preparation courses. Finally, the article discusses the implications of UDL implementation for multilingual students enrolled in higher education courses.

Keywords: Universal Design for Learning (UDL), multilingual students, online learning, higher education, innovation, instructional technology

Introduction

The increase in student demand for asynchronous online and blended classes in the United States mirrors the growing interest in online learning taking place internationally (National Center for Education Statistics, 2022; OECD, 2016). In fact, online and blended courses in higher education have grown exponentially in the aftermath of the COVID-19 pandemic (Hodges et al., 2020; Kim & Olesova, 2022). A recent survey indicates that students enrolled in college courses during the pandemic reported that exploring digital tools and interacting with various technologies resulted in a greater likelihood of taking fully online or blended courses in subsequent semesters (McKenzie, 2021). The survey data also show that the pandemic not only led to a surge in student demand for online courses but also to growth in the number of students enrolling in online course offerings at U.S. universities.

Currently, students are using social media communication and video collaboration platform technologies such as YouTube to edit, upload, and consume digital content. At the same time, faculty are using these tools more frequently to support online discussions, and half of the world's population reports pervasive social media usage in their daily lives (Greenhow et al., 2020; Koeze & Popper, 2020). As social media usage rises globally, online learning environments that offer access to content and promote digital communication have been growing exponentially among college students in the post-COVID-19 academic landscape (Hast, 2021).

Aim and Content

University faculty have an opportunity to support the growing student diversity on college campuses by implementing an inclusive instructional design framework that aligns with the growing number of multilingual undergraduate and graduate learners in the United States (Boothe et al., 2018; Dell et al., 2015; Rao et al., 2015). The purpose of this article is to describe the Universal Design for Learning (UDL) instructional framework and discuss its integration with innovative instructional technology tools in multilingual environments like universities in California. Specifically, by drawing on scholarship from the field of teaching English to speakers of other languages (TESOL) (Chan & Coney, 2020; Kayi-Aydar et al., 2022), the scholarly efforts of the Center for Applied Special Technology (CAST, 2018), and my own classroom experiences as an educational technologist and faculty in higher education, I will explain the UDL framework. The framework is designed to foster student access and availability to content, flexibility to complete assignments, and multiple ways to engage multilingual students by using various multimodal technology tools and resources.

Universal Design for Learning

The novel approach of UDL initially involved solving challenges associated with accessibility in public spaces and buildings to meet federal mandates set forth by the Americans with Disabilities Act (1990). The origins of the term “Universal Design” are traced to Ron Mace, an architect and developer who considered a wide array of needs that any individual may require to access emerging buildings, structures, and transportation hubs in society (Mace, 1998). Some of the early efforts for designs to add inclusivity for individuals with disabilities includes sloped sidewalks, ramps, and curb cuts at high traffic areas like intersections (Pisha & Coyne, 2001). Today, accessibility features like push buttons to enter bathrooms and rail guards in hotel showers represent modern evidence of universal design that are beneficial for all persons.

Currently, as a design framework, UDL can be defined as an instructional approach designed to enhance teaching and learning by making optimal decisions regarding the needs of all students (CAST, 2018). The groundbreaking work of CAST scholars and educators to develop the UDL framework is based on a simple premise: Design effective instruction by analyzing all student characteristics and needs while developing course curricula, materials, assessments, and environments that engage students consistently and repeatedly with each other (CAST, 2000; Meyer et al., 1991; Pisha & Meyer, 1998). Therefore, educators designing instruction for UDL must consider that not all students can understand and engage with various kinds of sensory data equally. Although often associated with instructional technology practices, UDL is a design framework that enhances instruction while reducing barriers to learning for all learners (King-Sears, 2009).

The UDL framework provides educators with scaffolds and supports that are critical to language and literacy development for multilingual students (Rao & Torres, 2016). The application of the framework in online learning is meant to reduce barriers to learning by focusing on greater options for students to demonstrate knowledge mastery and practice skills through audio, visual, or written resources. The UDL framework guides educational practice with an underlying assumption that student diversity exists and design considerations for instruction must account for the variability of all students (Pisha & Coyne, 2001). The framework includes guidelines structured around three main principles—engagement, representation, and expression of course content—with instructional checkpoints to help educators with lesson planning and delivery.

The three principles, which will be described in detail in this article, offer flexible options to help students develop skills and content mastery with multiple means of engagement, representation, and expression of course content (Rao & Torres, 2016). Given the variability of English proficiency and backgrounds of all students in any class, educators can face challenges in developing instructional materials while aligning content with core knowledge and skills (Lopes-Murphy, 2012). Faculty can meet

the needs of all students, including multilingual students, and undergraduate and graduate adult students in diverse communities, by implementing and adapting instructional strategies that align with both multilingual education and the UDL framework (Boothe et al., 2018; Gross & Crawford, 2021).

Universal Design for Learning Principles

As noted, UDL has three overarching principles: engagement, representation, and expression of course content. Engagement, the first principle of UDL, includes providing multiple means of engagement by offering students choices on how they can achieve learning objectives, complete assignments, and work with the tools or materials used to demonstrate learning. Instructors offering choices on the tools, sequence, or content for practicing skills can sustain student engagement through various collaborative projects. These could include, but are not limited to, participating in online discussions, or generating an online avatar to create a digital persona. Creating an avatar online can help establish a digital presence for students that supports enhancement, customization, and expression of their online learning experience. Avatars can also contribute to helping students build a community of support where they can freely express their digital identity. In fact, creating digital avatars has been found to address the overall decrease in student motivation that has been observed since the beginning of the pandemic (Biwer et al., 2021; Son et al., 2020).

Another example that supports engagement, scaffolding, collaboration, and critical reflection among students is a web-based embedded assessment, Thinking Reader, which combines reading strategy support with literature (Dalton et al., 2001). Using this technology tool reinforces reflective learning practices since it requires that students respond to prompts that can be saved for further analysis and discussion, a practice that reduces barriers to access and promotes the availability of content. Similarly, digital technologies such as YouTube and Vimeo allow students to upload videos online that can generate a threaded discussion on weekly course topics and where instructors can provide feedback to students on a digital platform online. In blended and online courses, instructors can provide asynchronous learning videos that supplement live instruction or synchronous communication among course participants. Providing these videos allows learners to review material iteratively when they cannot attend live sessions and promotes engagement with the course content throughout the semester. Educators can incorporate instructional strategies such as chunking and scaffolding online content, providing additional time for multilingual students to review course content in manageable sections, reflect on course content, and work at their own pace. Implementing these strategies and digital technologies can foster an inclusive learning environment that can support student engagement.

Representation, the second UDL principle, focuses on supporting students with course content through multiple means of representation. This principle is based on the notion that learner-centered design benefits all students, and it is crucial for instructors to present content that is theoretically sound and in line with design principles. One example involving multiple means of representing content includes pairing written words with links for audio pronunciation directly next to the words, adding hyperlinks to dictionaries and glossaries, or presenting graphics or animations that include support for the content presented. These practices contribute to overcoming barriers to accessibility for all students (Hitchcock et al., 2002) since they avoid the use of one mode of content representation. Educators can implement a digital avatar at the beginning of a course using Canva which is an online visual design, communication, and digital content sharing platform that can help students create a digital presence online. The avatar allows students to project their digital identity with an anonymous character. The use of an avatar can enhance the personalization of the learning experience, protect students from identity theft, or reveal information about undocumented students online.

The third principle of UDL involves multiple means of action and expression. The focus of this principle is on allowing students opportunities to demonstrate their knowledge by using various technologies, formats, and materials. Educators can introduce Screenpal which is a video narration

authoring tool that can help preservice teachers develop their communication skills, tell stories, pace their lesson plans, design and deliver presentations, and offer feedback supported by video images. Educators must recognize that there is no one correct way to demonstrate learning, and they should allow students flexibility on how to highlight their knowledge, skills, and abilities. Some students deal with language barriers, executive functioning, or movement impairments that can hinder learning (CAST, 2018). These students approach learning differently in terms of planning, organizing, and structuring their work. Providing students the opportunity to work with podcasts and narration tools like Screenpal allows them to express their understanding of content in diverse ways while also developing their technology and language skills. Such tools enable students to collaborate and co-construct knowledge on course content. For example, they may use a podcast to develop a personal diary of reflective concepts learned each week and share it with peers on a course management system like Canvas.

In my undergraduate and graduate courses, I am teaching and modeling how to implement UDL principles in multi-step culminating projects in which students complete each part of their projects according to their needs, choice of pace, and optimal mode for expressing their learning. Throughout the semester, students work on and edit their final projects by choosing a variety of media, such as digital outlines, multimedia videos, storyboarding, and audio files, and by discussing feedback online with peers to achieve learning objectives. Having students complete a range of assignments with a choice of different mediums (i.e., videos, written discussions, and oral presentations) allows multiple means for students to express their understanding of course content (CAST, 2018). For example, students can complete one assignment as a podcast, narration, written paper, artistic comic, or art strip-that describes what they have learned. Designing such an assignment allows learners to enact their agency when expressing their understanding of UDL, as an inclusive pedagogy promotes exploring using various technology tools. The assignment must indicate a step-by-step set of instructions and a set of learning objectives, assessment, and reflective evaluation. By implementing UDL principles with technology to facilitate learning, I can provide preservice teachers with meaningful experiences on how to implement UDL with technology in their own future classrooms while completing their preservice teacher program.

Implementing Principles of Universal Design for Learning in Online Courses

Scholarship in the field of online learning shows that students and instructors can explore novel approaches to interactivity and communication to personalize the learning experience (Greenhow et al., 2022; Moore et al., 2021). In my work with multilingual preservice teachers, I have found that allowing them to personalize how they consume and interact with online content can help support motivation by accounting for the diversity of English language proficiency. Supporting students with a learner-centered content delivery approach respects their diversity and activates skills that are needed to demonstrate content knowledge (Kasch, 2019). Student empowerment is a tenet of UDL, and while the design framework cannot accommodate the needs of every student, it is meant to support accessibility and availability of content to allow students to work at their desired pace (Boothe et al., 2018; CAST, 2018).

Instructional design frameworks such as UDL aim to enhance student interaction and collaboration while supporting a digital community where students can co-construct their knowledge through online discussion boards, converse synchronously or asynchronously using instructional authoring tools, or develop presentations using Google tools (Kim & Olesova, 2022; Lockee, 2021). Faculty can use UDL to support instructional strategies for language development like scaffolding, peer collaboration, and performance improvement through online interactions (Gross & Crawford, 2021; Kim & Olesova, 2022). Educators in TESOL can support online students in diverse communities by adopting UDL in their courses to facilitate instruction. Integrating instructional technology in a learning management system (LMS) like Canvas with instructional authoring tools such as Nearpod (an interactive online learning platform aligned with engagement) can support engagement, collaboration, and feedback.

Implementing UDL in online higher education courses, combined with low-cost technology tools and Open Education Resources (OERs), can help instructors reduce barriers to learning like those created by supplemental textbook costs and monolingual instructional manuals (Cioè-Peña, 2022; Tlili et al., 2021). Incorporating OERs such as collaborative document editors like Google Docs and streaming media platforms like YouTube or Vimeo allows students to revisit, share, and edit projects using course materials that cultivate a growth mindset towards learning. Faculty implementing this pedagogical approach offer students interactive learning experiences to develop cognitive skills and abilities while achieving program learning outcomes through practice, persistence, and feedback from the instructor (Griful-Freixenet et al., 2021; Meyer et al., 2014).

Integrating technology with UDL principles and OER in Canvas can include converting, scanning, or uploading costly traditional print-based materials into a digital platform like YouTube or Vimeo. These digital platform technologies are free to use, reduce financial barriers to learning, and offer accessibility features such as closed captioning to help students to choose from a variety of language subtitles. Both tools can be embedded into Canvas. Students can use the “alternative formats” feature found in Canvas, which is an accessibility feature that multilingual students can use to convert any pdf document into their preferred format (i.e., html code, electronic Braille, mp3 audio, or BeeLine reader—a technology that makes on-screen reading easier by adding color gradients to digital text—or Immersive Reader—a Microsoft tool that assists the readability of text).

The “alternative formats” feature available on Canvas fosters equitable teaching practices by removing power and control over access to course resources by the instructor; it further allows students to decide when, where, and how online content is consumed. Students can also transpose pdf documents and other text materials to electronic Braille or an mp3 audio file by opening the document in Canvas, selecting the alternative formats feature link, and downloading the file in the desired file format of their choice (i.e., html, ePub, electronic Braille, audio, Beeline Reader, or immersive reader). Students can toggle between multimodal formats when consuming content while using this Canvas feature, which also supports multiple means of representation. Canvas also allows educators to embed instructional media into a course by using a popular media platform such as YouTube. In my courses, I screencast, that is, I develop screen recordings of my lectures, and upload them to a YouTube account, which includes an option to select different languages for audio in the video along with closed captioning support for multilingual students. The purpose of using these accessibility features is to reduce any barriers to learning associated with audio or visual sensory impairments among a diverse population of students. The use of an LMS such as Canvas offers students the accessibility feature tools, multimodal resources, and a simple user interface to navigate course content online with multiple representations of content to build connections between concepts.

The process of designing and developing an online course environment that can sustain student motivation and engagement also requires student interactivity with multiple instructional technology authoring tools like Screenpal, which is a free video lecturing recorder available on PC and Mac devices. Authoring tools that can facilitate learning through various mobile devices, such as tablets, laptops, and smartphones, aid students with flexibility in completing tasks. Teaching preservice teachers to create lectures using instructional authoring tools like Screenpal is an effective way to help them find relevance to their professional careers. The benefits of this practice are twofold. Preservice teachers get to complete assignments that count towards their degree, and, at the same time, they can create video presentations of course content that they will be able to use in their own teaching.

Another tool aligned with engagement in UDL is Nearpod, a website (and an app) where students can share video files, upload media, design lesson plans, develop assessments, and create interactive polls. One of the first assignments preservice teachers complete in their courses requires creating a Nearpod account, which is an OER available for all educators. Preservice teachers can foster a collaborative learning community in Nearpod through Canvas, where novices can learn from experienced

technology users. Experts are encouraged to pair with novice users to develop cognitive apprenticeships through modeling, scaffolding, coaching, and offering feedback on collaborative assignments in Nearpod. In my teaching, I design a collaborative learning community in Canvas where students use Nearpod to upload work, have flexible due dates, discuss concepts for weekly readings, edit their work based on feedback, and co-develop knowledge that can remedy challenges faced by multilingual students (Brewer & Cartagena, 2020).

A technology software tool that supports language learning is Articulate, which includes the web application Rise 360, which offers a free 30-day trial complete with an interactive flashcard feature that can support vocabulary development. The flashcard feature in Rise 360 gives users choices on how to define terms and concepts, add images or scaffolds like hints, and customize which side of the flashcard has a word and which has the corresponding definition. The use of flashcards appeals to MLLs and students with diverse learning styles (Gobert, 2018). In addition, creating and editing flashcard blocks with Rise 360 offers engaging options to support vocabulary learning (Gobert, 2018; Heidari-Shahreza et al., 2014; Komachali & Khodareza, 2012) and helps preservice teachers enhance their repertoire to promote fluent language use for MLLs (Nation, 2008) by implementing multiple means of action and expression to practice their design skills.

Throughout the term, as preservice teachers receive feedback from their peers and me, they can edit their work and upload it to an ePortfolio. Each time they upload a completed assignment, it will highlight a newly learned skill and associated instructional technology tool. This process, which is repeated throughout their academic program, results in the preservice teachers' development of a timeline of worked examples of their learning over time and allows them to reflect upon their own growth. The iterative processes of design, editing, feedback, and evaluation are foundational practices of instructional technologists and serve as required concepts to master in the field of educational technology. The systematic design and delivery of content supported by consistent feedback also promotes reflective thinking throughout the program.

In the case of ePortfolios, students have the choice to select which technology website will store their digital content. Providing students with opportunities for agency when selecting their ePortfolio website is important to promote accessibility and inclusivity, as students can decide how to leverage technology to express their own individual digital identities. In their ePortfolios, students can customize fonts, alter text sizes, change colors, upload photos, add a resume, and document select assignments that best represent their skills and abilities. The option to allow students full customization using the website technology tool of their choice enhances student empowerment, while various accessibility features can meet the specific needs of each student.

The ePortfolio is a valuable tool that can help preservice teachers gain employment as future educators by displaying and cataloging their knowledge, skills, and abilities in a digital format. The ePortfolio is becoming more relevant for employers, as 80% of those in a large study indicated that it is useful to see documented evidence of student achievement in the areas of communication, content knowledge in their field, collaboration, problem-solving skills, and critical thinking skills (Hart Research Associates, 2015). The ePortfolio fosters reflective thinking and continuous performance improvement for students by connecting the importance of showcasing knowledge, skills, and abilities that meet workplace employment demands in academic and non-academic settings. Students in general and preservice teachers, are more likely to engage in content when they see the alignment between skills earned in a classroom with relevance to employment upon completing their degree.

The ePortfolio also affords an opportunity to highlight and connect the preservice teachers' best, polished, and revised work. The ePortfolio serves as a way for preservice teachers to gather and share their work, it also functions as a document of its own, telling a story about who they are as composers, students, and individuals. In my classes, I deliver instructions on how to create an ePortfolio by presenting digital resources in multiple formats (i.e., multiple means of representation), including a step-by-step

written guide, which includes an audio file and a YouTube video—supported by closed-captioning features—that shows how to set up an ePortfolio accompanied with audio and closed captioning features. Assistive features like speech-to-audio text and closed captioning are becoming common design features inherent to popular social media platforms used by college students. Using these tools allows preservice teachers to populate content on their ePortfolio that includes accessibility features to create an inclusive digital space.

Conclusion

In California, teachers who will be working with multilingual students can use YouTube to share videos in a variety of language subtitles to support accessibility using digital technology tools. Preservice teachers can use alternative formats features in Canvas (i.e., speech-to-text tools, mp3 audio, html) and embedded YouTube videos that include closed captioning to support learner variability. Google docs can be used to help students collaborate on group assignments or to backup all work to cloud storage. Students need to interact and gain experience with these instructional tools to develop audio, visual, and spatial skills through multiple modes (Vasinda & Pilgrim, 2022). One of the benefits of implementing UDL in preservice teacher preparation technology courses includes supporting current and future multilingual educators in California with experience on how to facilitate instruction efficiently and effectively while using instructional technology tools.

A growing number of preservice teacher educators in California are MLLs and will be teaching in school districts where most students are MLLs as well. The purpose of modeling UDL principles with the support of instructional technology tools in preservice teacher preparation is twofold; current preservice educators can learn how to implement UDL efficiently and effectively in their coursework and, upon graduation, be prepared as teachers to implement UDL in their future classrooms. The goal is to create a pipeline from K-12 to university instruction that prepares multilingual students and educators with meaningful experiences on how to integrate technology when teaching and learning with UDL principles.

Scholars agree that UDL is a framework that is suitable for preservice teacher and professional development because it fosters a collaborative community of interactivity, engagement, and knowledge sharing (Brewer & Cartagena, 2020; Lohmann et al., 2018). The framework can also offer guidance for future educators who may need to adapt learning materials for both in-person and distance learning. Online learning formats and variants of blended learning modalities are becoming popular in both academic and corporate environments (Graham, 2019). TESOL teacher educators can utilize UDL to better serve a diverse generation of students by representing content through multimodal learning formats. The increase in online course offerings at universities and the growing popularity of digital technology tools among students presents a unique opportunity for university faculty to implement a pedagogical approach that promotes equitable access, availability, and flexibility of instructional content to meet the needs of diverse students.

Online learning in higher education is more popular than before the pandemic, and college campuses are becoming more diverse across the nation. By incorporating principles of UDL when planning and designing course content, university faculty will promote access, availability, and engagement of content for all students (CAST, 2018). Faculty using the UDL framework can help their students foster intrinsic motivation through responsive instruction and feedback while providing an equitable approach to teaching and learning in education. University faculty must adopt instructional methods and strategies that can anticipate the needs of students in underrepresented and racially minoritized communities (Cioè-Peña, 2022). Moreover, given the growing needs of nontraditional and multigenerational students to maintain a full-time job in addition to being full-time students, it is imperative that university faculty implement a pedagogical approach that offers flexibility for online learning and promotes student empowerment.

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