

Universal Design for Learning Infusion in Online Higher Education

Noha F. Altowairiki
University of Jeddah, Saudi Arabia

Abstract

This qualitative case study explored the development of online teaching capacity to incorporate the universal design for learning (UDL) framework in an online graduate program. The participants in the study were purposefully selected from multiple levels at a Canadian university: (1) the program level, (2) the faculty level, and (3) the institution level. Using a series of semi-structured interviews and document analysis, four themes were identified: (1) leadership, (2) community of practice, (3) educational development, and (4) challenges. In addition to highlighting the roles of academic leaders in fostering UDL adoption in online learning, the findings also revealed forms of support that need to be in place to increase online teaching capacity. The findings from the study provide valuable input toward setting the stage for UDL to be meaningfully adopted in an online learning setting.

Keywords: community of practice, online learning, universal design for learning, higher education, online teaching capacity

Altowairiki, N. F. (2023). Universal Design for Learning infusion in online higher education. *Online Learning*, 27(1), 296-312. DOI: 10.24059/olj.v27i1.3080

The rapid and widespread growth of online learning in higher education necessitates thoughtful and pedagogical considerations to create an inclusive learning experience. “Online learning has grown to meet the need for increased continuing and professional education, increased retention and degree completion, and accessibility for new students outside their catchment areas,” according to Rudestam and Schoenholtz-Read (2010, p. 7). Contemporary online learning requires more than simply accessing learning materials; rather, it involves multiple types of interactions between and among instructors and students to acquire knowledge and grow personally and professionally from the learning experience. Online learning design should endeavor to “motivate learners, facilitate deep processing, build the whole person, cater to individual differences, promote meaningful learning, encourage interaction, provide relevant feedback, facilitate contextual learning, and provide support during the learning process” (Ally, 2008, p. 18).

Online learners vary in their abilities, experiences, expertise, languages, cultures, learning styles, and non-academic commitments. To attract varied learners and meet their needs, an inclusive and accessible learning experience needs to be designed. The Alberta Ministry of Education (2016) has defined inclusion as “a way of thinking and acting that demonstrates universal acceptance and promotes a sense of belonging for all learners” (para. 1). One of the educational frameworks that fosters inclusion is Universal Design for Learning (UDL) (Meyer et al., 2014). UDL provides a blueprint for educators to guide them in designing a flexible learning experience that meets diverse learners’ needs without reducing academic rigor.

UDL has been implemented successfully in higher education contexts, whether the courses are offered face-to-face, online, or through blended approaches; this has been clearly documented (e.g., He, 2014; Kumar & Wideman, 2014; Morra & Reynold, 2012; Ostrowski et al., 2017; Rao & Tanners, 2011; Rose et al., 2006). However, limited empirical research has investigated developing teaching capacity to incorporate UDL principles into teaching and learning practices (Hromalik et al., 2020; Westine et al., 2019). According to Westine et al. (2019), to broadly expand UDL adoption in the online learning context, investigating the faculty adoption process is warranted: “Exploratory research that identifies concrete examples of best practices . . . would be beneficial” (p. 37). Thus, this article highlights a qualitative case study exploring the development of online teaching capacity to incorporate UDL with the involvement of multiple stakeholders’ perspectives (e.g., academic leaders, educational development providers, instructors, and instructional designers).

Review of Related Literature

In the following sections, UDL is described followed by its implementation in higher education. Then, educational development for UDL incorporation in higher education is discussed.

Universal Design for Learning

UDL is a scientifically valid framework for creating a learning experience that (1) provides flexibility in the ways students are engaged, information is presented, and knowledge and skills are demonstrated, and (2) “reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students” (Scott et al., 2015, p. 101). The framework includes three main principles based on neuroscience and educational research. Neuroscience research has demonstrated how people learn based on the three brain networks: affective, recognition, and strategic domains. The UDL

framework principles are aligned with the three networks and supported with effective teaching and learning strategies to optimize learning for all (Meyer et al., 2014).

The first UDL principle, providing multiple means of engagement, is associated with the affective networks of the brain, which spark learner engagement in the learning process by prioritizing and motivating what to learn and do (Meyer et al., 2014). To support the affective networks, four teaching methods can be used: offering options in content and tools, providing adjustable levels of challenge, offering a choice of rewards, and offering choices of learning context (Rose & Meyer, 2002). The second UDL principle, providing multiple means of representation, is associated with the recognition brain networks, which are responsible for perceiving information and “transforming it into usable knowledge” (Meyer et al., 2014, p. 54). To support the recognition networks, Rose and Meyer (2002) recommended providing multiple examples, highlighting critical features, providing multiple media and formats, and supporting background knowledge. The third UDL principle, providing multiple means of action and expression, is associated with strategic networks, which support performing tasks, organizing ideas, and demonstrating knowledge (Meyer et al., 2014). To support the strategic networks, some effective teaching methods can be implemented, including providing flexible models of skilled performance, having opportunities to practice with supports, offering multiple ongoing feedback, and allowing flexible opportunities for demonstration and expression (Rose & Meyer, 2002). Although it that seems each of these brain networks works alone and has its own contribution, they work together throughout the learning process, beginning by sparking the interest to engage in the process and ending with expressing what has been learned (Meyer et al., 2014). Hence, UDL is not specified for creating accommodations for learners with disabilities; rather, it provides a blueprint for instructors to create an accessible learning experience that attempts to meet all learners’ needs through providing room for flexibility without reducing the quality of learning. For example, using an audio format of reading material can address a range of students, including those with visual impairments, those with learning disabilities, and those whose preference is auditory (Rao & Tanners, 2011).

Universal Design for Learning in Higher Education

Recently, UDL has become more common in higher education contexts. Davies et al. (2013) argued that UDL holds the potential to ameliorate some of higher education’s most pressing issues, including the intractably low rates of persistence, retention, and degree completion evident at most colleges and universities today” (p. 195). The literature on the current research shows that both students and instructors have positive attitudes with respect to UDL incorporation. It has been found the use of UDL principles affects students’ level of interest and engagement (Smith, 2012). Providing the multiple options of learning content, adjustable levels of challenges, and rewards were the main strategies that influenced students’ level of engagement. Using multiple formats of representation (i.e., recorded lectures, PowerPoint slides, hands-on presentations made by students, small group discussions, and videos) helped students to deepen their understanding of complex concepts (Kumar & Wideman, 2014). He (2014) conducted a case study to examine the design of an online course based on UDL. The findings showed that 57% of the participants reported that the use of synchronous sessions was their favorite part of the course and that being able to review the recorded sessions was appreciated. The majority (60%) of the participants identified that ongoing feedback and responses to their questions through multiple formats (e.g., emails, synchronous discussion, and individual and group Skype meetings) facilitated their online learning process.

Schelly et al. (2011) and Davies et al. (2013) found that instructors who received training sessions on UDL generally adopted its principles into their teaching practices. Specifically, instructors used seven strategies in their teaching practices that resulted from training: (1) using multiple means of representation, (2) relating key concepts to the larger objectives of the course, (3) providing an outline at the beginning of each class, (4) summarizing material throughout each class session, (5) using instructional videos, (6) highlighting key points of an instructional video, and (7) using well-organized and accessible materials (Davies et al., 2013). Westine et al. (2019) examined online instructors' familiarity, course design use, and educational development interest regarding UDL at a large university in the southeastern United States. They found that 71.6% of online instructors were familiar with at least one UDL principle. Also, instructors reported high to moderate interest in learning more about UDL, which included "even those with familiarity and high implementation" of UDL (p. 37).

UDL implementation in higher education "has faced significant hurdles" due to the complexity of change management (Fovet, 2020, p. 164). Thoughtful consideration needs to be given to facilitate the process of change in a "multilayered, complex, anchored in tradition and historical hierarchy" environment (Fovet, 2020, p. 164). Lack of faculty incentives (i.e., promotion, tenure) for quality teaching may inhibit instructors to develop their teaching capacity and invest their time for UDL implementation (Singleton et al., 2019). Top-down mandates along with recognizing and rewarding teaching excellence would foster UDL infusion across faculties (Singleton et al., 2019). In addition, adequately training, sufficient resources and ongoing support need to be in place to maximize teaching capacity for UDL incorporation (Hromalik et al., 2020).

Educational Development for Universal Design for Learning

UDL incorporation requires instructors to follow a heuristic procedure for the design and facilitation of learning experiences, which may create a challenge to make an instructional design decision that involves selecting an approach with an array of options (Hromalik et al., 2020). In other words, instructors are content experts, not expert instructional designers; consequently, appropriate support needs to be offered (Hromalik et al., 2020). From UDL point of view, multiple types of educational development opportunities (e.g., boot camps, seminar series, webinars, online recourses) would be offered to meet the individual learning needs of instructors (Borup & Evmenova, 2019). These multiple methods should address UDL principles, curriculum development, and technological tools (Fovet, 2020; Schmidt et al., 2016). Also, they should be "an ongoing activity, as 'shotgun' approaches often do little" (Slavit et al., 2003, p. 35). As noted by Hromalik et al. (2020) "given the complexity of the UDL framework, it is uncertain whether faculty or pre-service teachers are truly able to effectively use UDL as a heuristic tool after a brief training" (p. 93).

Effective educational development fosters collaboration between and among instructors to share their experiences, identify problems, propose solutions, apply their ideas, and reflect on their teaching practices (Hromalik et al., 2020). Moreover, coaching is an effective strategy to foster UDL integration (Lock et al., 2019).

Coaching can build will, skill, knowledge, and capacity because it can go where no other professional development has gone before: into the intellect, behaviors, practices, beliefs, values, and feelings of an educator. Coaching creates a relationship in which a client feels cared for and is therefore able to access and implement new knowledge. (Aguilar, 2013, p. 8)

To reach desired outcomes, instructors need more than acquiring a knowledge of UDL; they need to be guided throughout UDL implementation (Hromalik et al., 2019; Lock et al., 2019).

UDL incorporation in online learning environment requires a deep understanding of the relationship between UDL, technology, and online pedagogy to promote student learning (Benson & Ward, 2013; Koehler et al., 2004). UDL incorporation is more than designing an accessible material, it involves facilitating and assessing online learning process. Success in supporting online instructors is “dependent upon the availability of opportunities for learning how to teach online” (Schmidt et al., 2016, p. 8).

Reviewing the literature on UDL development practices in higher education revealed that limited studies have been documented. Westine et al. (2019) highlighted the importance of examining instructors’ teaching practices in terms of the UDL implementation process and their decision-making to ensure widespread adoption.

Research Design

This study aimed to explore a group of online instructors developing their teaching capacity to adopt UDL in their practices. The study was guided by the following two research questions:

1. What are the roles of academic leaders in supporting UDL incorporation into online learning?
2. How do instructors develop their teaching practices to implement UDL in the design and facilitation of online learning?

Methodology

A case study design was purposefully selected to deeply examine the development of online teaching capacity for UDL adoption in the higher education context. Case study research is “an in-depth description and analysis of a bounded system” (Merriam, 2009, p. 43). Creswell (2007) explained that, in a qualitative case study, “the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information . . . and reports a case description and case-based themes” (p. 73). A case study design allows the researcher to investigate the phenomenon from a holistic perspective through the involvement of multiple sources of data in order to gain a deep understanding and thus provide a rich description (Merriam, 2009). A case study research design is used when “the interest is in the process, rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation. Insights gleaned from case study can directly influence policy, practice, and future research” (Merriam, 1998, p. 19).

Case Description

A case study is “a bounded system” (Stake, 1995); thus, this case study was bounded to a specific group of instructors and academic leaders who designed, facilitated, and directly led an

online graduate program based on UDL for more than two iterations within a Canadian university. The online program consisted of four half-courses that were offered in a prescribed sequence within one year. The instructional design team of the program was formed by three sessional instructors and the program coordinator.

The participants in this case study were selected from three different levels within the university:

1. Online program level: three online instructors and the program coordinator.
2. Faculty level: three academic leaders (i.e., the Graduate Programs Associate Dean, the Distance Programs Coordinator, and the Professional Development Director).
3. Institution level: The Teaching and Learning Center Director and an instructional designer.

Involving participants from multiple levels was a means to gain a holistic picture of the types of support offered to the development of online teaching capacity. Pseudonyms were assigned to each participant, as shown in Table 1.

Table 1

Participants' Pseudonyms

Pseudonyms	Role
Nancy	Sessional instructor
Heather	Sessional instructor
Susan	Sessional instructor
Lisa	Program Coordinator
Karen	Graduate Programs Associate Dean
David	Professional Development Director
Julia	Distance Programs Coordinator
Sarah	Teaching and Learning Center Director
Jodi	Instructional Designer

Methods of Data Collection

The case study approach accommodates multiple data sources to enable researchers to gain a deeper understanding of the phenomenon under investigation. Thus, in this study, data were collected from multiple sources for two reasons: (1) to obtain a complete picture of how online instructors develop their teaching capacity to implement UDL effectively and (2) to cross-check information (Gay et al., 2009).

First, semi-structured interviews were conducted with each participant in the study. The interview focused on: (1) exploring each instructor's development practices in the use of UDL, (2) the understanding of academic leaders and educational development providers' roles in supporting online instructors' development practice, and (3) providing an opportunity for participants to offer suggestions and recommendations to foster UDL implementation in online higher education contexts (see Appendix). All the interviews ranged from 40 to 60 minutes, were audio-recorded, and then transcribed verbatim.

Second, documents were collected based upon the participants' consent as a source of data, including the program curriculum review (i.e., a critical examination of the program led by instructors and the program director to optimize the learning outcomes of the program, and improve the student learning experience); course outlines designed by instructors, and educational development resources offered by the participants. Such document evidence

provided background information on the types of support—and subsequent outcomes—that occurred throughout the participants' experience in this program.

Methods of Data Analysis

The data were analyzed using thematic analysis (Braun & Clarke, 2013). The thematic analysis process includes three steps: identifying emerging themes, analyzing the themes, and reporting patterns (themes) within the data (Braun & Clarke, 2013). It is important to highlight that data analysis stages are not linear but iterative (Creswell, 2007).

To start, data from different resources were prepared and organized in readiness for analysis. Interviews were transcribed verbatim and sent to all participants to give them an opportunity to review them for accuracy and clarity purposes. Collected documents were clarified and summarized using document summary forms (Miles & Huberman, 1994) to explore their significance. The summary form included a description of the document, the significance of the document, and a summary of the content.

Then, each dataset was coded, and codes were grouped to build initial themes that would be related to the research questions. Coding data and building initial themes, in this stage, were highly inductive. After that, each set of initial themes from different resources was reviewed and examined at two levels: (1) the level of coded data, to ensure all data under each theme formed “a coherent pattern” (Braun & Clarke, 2006, p. 20); and (2) the level of the themes, to identify the relationships between themes to ascertain if they reflected the meaning of the data and answered the research questions (Braun & Clarke, 2006). Microsoft Excel spreadsheets were used to display and analyze the data, which helped in building and examining the themes. Thematic maps were also used to identify relationships between the codes and themes, and between the different levels of themes (i.e., main themes and sub-themes). In the fourth stage, each theme was “defined and refined” by identifying its “essence” and to determine which aspect of data each captured (Braun & Clarke, 2006, p. 22), and to link each theme with the related research questions for the purpose of writing the case report. Once written, the case report was shared with the participants in the study to provide feedback and/or to add additional information to increase accuracy.

Ensuring Validity

Three strategies were employed to ensure the worthiness of the data. First, triangulation, which involves using “multiple sources of data” (Merriam, 2009, p. 215), was achieved through data collection from interviews and documents with the involvement of participants from multiple levels within the institution. Second, member checking reassured the accuracy of transcripts and interpretations of the collected data. In this study, each participant received a copy of their interview transcript to give them a chance to add or change any part of the transcript and provide feedback. Six out of nine participants did provide feedback on their interview transcriptions. In addition, the case report was sent to each participant with an invitation to read and provide feedback within ten days to increase the accuracy of the study. Seven out of nine participants did provide feedback. Most of given feedback was focused on copyediting; none affected the accuracy nor interpretation of data collection and analysis.

Results

Based on the analysis of the collected data from interviews and documentation, four themes were identified: (1) leadership, (2) community of practice, (3) educational development, and (4) challenges (see Table 2). Each of these themes is detailed discussed in the following sections.

Table 2

Emerging Themes from Data Analysis

Themes	Sub-themes	Coding	Sample Quotes
Leadership	(1) Macro level: institution	Clear vision Strategic plans Resources Rewarding scholars	“It’s kind of that advocacy across multiple levels” “Reconceptualizing, and creating a vision for people to work toward, and then strategizing to support that”
	(2) Meso level: faculty	Customized support Hosting open dialogue Building networks Technical and pedagogical supports	“Have a go-to person to go to, to be able to say: How did you set your course up?” “We can’t assume that even though instructors are passionate about UDL...they can figure out how to leverage all of the affordances within the LMS”
	(3) Micro level: department/program	Sufficient time Iterative process	“Each time I have taught the course, I have expanded pieces to make sure that it gets designed further to the edges”
Educational development		Formal sessions Informal sessions Short sessions Long program, Group support One-on-one coaching.	“Creating opportunities for instructors to come together to learn” “There were lots of opportunities for me . . . to take part in workshops, or receive one-on-one support” “Working at the elbow with the instructors”
CoP		Sense of belonging Regular meeting Shared goals Feedback	“We do have a sense of community” “We had this deep trust in what we were doing” “I did not feel isolated” “We really supported each other in designing our courses”
Challenges		Lack of knowledge Mindset and tradition Time Empirical research	“I think the biggest [challenge] is knowledge” “Mindsets aren’t changed if people are not required to change their mindset” “People are very busy.”

Leadership

Fostering UDL adoption requires effective leadership at multiple levels within the academic institution, which was mentioned by seven participants in the interviews. According to the participants' perspective, UDL implementation starts at the institutional level, the "macro level," through creating a clear vision and policy, offering resources, and rewarding scholars. David argued that the role of the institution is "reconceptualizing, and creating a vision for people to work toward, and then strategizing to support that." Sarah also explained that the institution level fosters UDL implementation through creating policies (e.g., vision, strategic plans, recognition, and reward system) and providing resources to enable UDL adoption. Instructors would adopt UDL if it is a part of the "strategic plans and part of what gets rewarded"; otherwise, "it's got a chance of success in little pockets here and there," as Karen reported.

Next, at the faculty level, the "meso level," sufficient and customized support needs to be offered, such as hosting open dialogue, building networks, and ensuring that technical and pedagogical supports are in place. First, hosting open educational conversations with instructors related to student variability and how UDL helps in designing an inclusive learning environment that addresses all learner needs is a necessary step, as explained by five participants (two instructors and three academic leaders). Lisa and Nancy reported that misconceptions regarding UDL exist in the field, such as that UDL is specified for disabled students. Offering professional dialogue opportunities aims to (1) increase awareness of UDL and (2) enable leaders to gauge instructors' receptiveness and attitudes toward UDL (Susan, Nancy, Lisa, and Sarah). These conversations need to be supported with evidence. As Sarah explained "we need to be able to communicate appropriate research-informed evidence that [UDL] actually makes a difference . . . in order to get appropriate buy-in." Having buy-in from instructors facilitates UDL implementation "much more smoothly," and that happens through conversations instead of telling instructors, "You need to do this by this deadline" Susan noted.

Second, building networks of colleagues for the UDL preparation phase was recommended by Lisa, Sarah, and Heather. The aim of networks is to provide an opportunity for instructors to support each other's practice and learn from and with each other. Lisa mentioned that networks allow instructors to "have a go-to person to go to, to be able to say: How did you set your course up? How did you wrestle with the issue when somebody asked a question about fairness, or equity? How did you assess these?" Sarah also explained that building a small network of instructors helps in transferring knowledge through significant conversations, so that change is likely to occur.

Third, ensuring technical and pedagogical customized support are in place was one of the local leadership roles at the faculty level, as mentioned by three participants. For instance, Mary, who is an academic leader, explained that one of her roles is to ensure sufficient resources are in place to support instructors. Sarah also concluded that faculty leadership plays an important role if and when action and change occur.

Last, at the program level, the "micro level," instructors are responsible for investing their time in developing their teaching practice and redesigning their course. UDL implementation is an iterative process; thus, the provision of sufficient time needs to be thoughtfully considered. Nancy explained that, although she has a deep understanding of UDL, she has adopted its principles gradually: "Each time I have taught the course, I have expanded pieces to make sure that it gets designed further to the edges." In addition, Sarah recommended that instructors should teach the same course more than once in order to better design and

redesign the course based on UDL over time. Also, providing ongoing feedback throughout the implementation process from designing a learning environment, facilitating the learning process, to assessing learning outcomes, was recommended by Susan, Heather, and Nancy. Instructors should not feel isolated; rather, they should be able to ask their leaders for advice and get feedback on their practice as mentioned by Nancy. Formative feedback would also be provided by colleagues as well as mentioned by the participants.

Educational Development

A variety of educational development opportunities need to be offered to develop online teaching capacity for UDL adoption, according to seven of the participants. These opportunities need to be flexible and customized to meet the needs of individual instructors. Lisa and Julia argued that a variety of educational development opportunities were offered, but the challenge for people became how to decide which opportunity they needed and whether they were willing to invest their time to develop their teaching practice. In this case, multiple learning opportunities were offered, ranging from informal sessions to formal programs, from short one-hour sessions to a long four-week program, or from group support to one-on-one coaching. Specifically, at the institutional level represented by the Teaching and Learning Center, multiple opportunities were provided, such as the Online Teaching Preparation Program (for novice online instructors, it offers to support them in navigating online teaching successfully), Instructional Design Program (it helps instructors to design or redesign their courses through developing measurable learning outcomes, planning learning activities, and creating assessments), Online Teaching Award (it recognizes teaching excellence of full-time academic staff that developed and taught two or more online or blended courses), and Teaching and Learning Grant (it supports evidence-based projects that integrate research evidence into teaching and learning practice, generates new knowledge about teaching and learning in the institution, and disseminates the findings of the projects to benefit others in the institution). These opportunities were not only specified for UDL adoption; rather, they were offered generally to increase online teaching capacity at the university. The participants, Nancy, Heather, and Susan had used some of the above opportunities throughout their online teaching experiences over the years.

In addition, at the faculty level, several opportunities for faculty members and sessional instructors were offered (e.g., workshops, coaching, and café conversation). For example, there were regular formal workshops, an hour in length, to discuss various topics related to teaching and learning in postsecondary education. Technology coaching was a customized support to assist instructors in navigating the learning management system (LMS) and designing their course shells. According to Lisa, “Our coaches meet one-on-one. One of the things I really like about our coaches is when people make appointments, they must identify what they want to work on.” Susan was one of the people who used the provided technology coaching to explore the affordances of the learning management system and design her course shells. Heather said, “We can’t assume that even though instructors are passionate about UDL, and they want to try and use that in their course . . . they can figure out how to leverage all of the affordances within the LMS.” Café conversation was a less formal session, in which instructors met several times throughout the academic year to discuss and share their practices. As reported by Lisa, the aim of these conversations was to research and reflect on their practices. Online instructors Nancy, Heather, and Susan did mention that they attended several educational development opportunities at the faculty or institutional level.

Community of Practice (CoP)

For this online graduate program, a CoP approach was used to support UDL adoption. The importance of creating and maintaining a CoP to develop teaching capacity was evident during the interviews. Regular meetings, commitments, collaboration, trust, and common interests were the main features of the community. To express their feelings toward having such a community, the instructors made such statements as “We do have a sense of community,” “I did not feel isolated,” “It was a really incredible experience,” and “We really supported each other in designing our courses.”

The academic coordinator and the instructors, who formed the instructional design team, agreed to collaborate and support each other in the development of the program design and facilitation at the early stages of the program, as reported in the Program Curriculum Review. The team met prior to teaching the program to discuss program goals and design, and how to model UDL in online learning, as explained by Nancy and Heather. During the design phase, the team shared their course designs, exchanged resources, and provided formative feedback. Heather stated, “We were bringing forward our draft syllabus, and sharing them with each other for feedback, or looking at resources—the conversation was always around: Are we really modelling? Are we leveraging the UDL framework in our work?” Nancy offered a similar description: “We had this deep trust in what we were doing ... we developed some of the things we were doing, and passed them back and forth, and we received feedback, and it was feedback in a very collaborative sense. ... I think that when you’re open to critical friends, it grows you as an educator.” Then, after each course ended, the instructors and academic coordinator met to reflect on what worked, what did not, and what changes could be made in the future. As a result, the instructor had an opportunity to learn with and from each other’s experience “in terms of content, technological and pedagogical issues that emerged as part of teaching in this program,” as stated in The Program Curriculum Review.

Using the CoP approach influenced sessional instructors’ sense of belonging and satisfaction, as reported by Heather and Nancy. Heather expressed her feelings as follows:

I felt more a member of the faculty, even though I wasn’t. ... I did a lot of meetings before I actually signed my sessional contract, supporting the other teachers who were designing. ... I was willing to invest my time and do that because I felt like I was a valued member of the team, even though I wasn’t getting any financial benefit from doing it.

Such an approach requires effective leadership to create enabling conditions that build and maintain a sense of community of practice, as explained by the instructors. The three participating instructors spoke of Lisa’s strong leadership, as she supported them to enhance their online teaching practice, encouraged them to collaborate with each other, and provided feedback.

Challenges

The participants identified four challenges that may affect UDL integration in higher education. First, the lack of knowledge regarding UDL was reported as the main challenge by three participants (i.e., Julia, Nancy, and Lisa). For instance, Julia argued, “I think the biggest [challenge] is knowledge, and people having a clear definition of what it means and how they can support their learners.”

Second, Karen and David noted that changing the mindset and tradition around teaching and learning approaches is challenging in higher education, as UDL requires a flexible and

inclusive design. Karen spoke of the tradition of teaching and learning in the higher education system, such as “one size fits all.” According to her, a lot of academics “who are teaching in other disciplines have had no training on how to be a good teacher or have had no training on how people learn best.” Changing the mindsets about learner variability and learning styles is needed; however, “mindsets aren’t changed if people are not required to change their mindset.”

Third, the lack of time to increase teaching capacity and redesign courses was another reported challenge by David, Nancy, Julia, and Sarah. David noted that instructors are very busy with their teaching, research and publications, and administrative work, which may create a challenge for them to find time to learn and practice new teaching approaches such as UDL. Therefore, Nancy and Julia highlighted that sufficient time needs to be given for people to first acquire knowledge and then gradually implement UDL.

Fourth, Sarah claimed that insufficient empirical research on the effectiveness of UDL incorporation in the higher education context is often overlooked. Having access to empirical research findings on UDL implementation and outcomes on student learning, engagement, and satisfaction would help motivate instructors to adopt it and redesign their courses; otherwise, it may be challenging, as most higher education institutions are research intense.

Discussion

Our findings demonstrate that leadership plays a key role in developing online teaching capacity for UDL adoption. Effective leadership is reflected in a clear vision and strategic plans, and appropriate customized supports, thus enabling conditions and opportunities for learning, recognition, and rewards. Through meaningful communication and collaboration between and among multiple levels of leadership within a university, efficient infrastructure and sufficient support are offered that meet the needs of individuals. UDL implementation in higher education needs to be a “faculty-driven” process along with institutional support for wide-campus adoption (Bowman, 2016). Having buy-in from instructors through open conversation is a critical component in UDL incorporation because they need to see the values of UDL and understand the method of practice to change from their traditional ways (Bowman, 2016; Goforth-Melroy, 2014). Thus, pedagogical support and technical coaching are required throughout the UDL incorporation process.

The findings demonstrated that having a CoP scaffolds the process of UDL incorporation. Similar to what was found in previous research (Schaler & Fusco, 2003), developing online teaching capacity is more than a series of workshops: it requires a continuance of support to put knowledge into practice with ongoing feedback, and that occurs within a supportive community. Having a community influenced sessional instructors’ sense of belonging, motivation to continually develop their teaching practice, and satisfaction. It is important to assign a facilitator for each CoP to provide support and guide discussion and activities to reach desired outcomes (Cheng & Lee, 2014). In this study, the academic coordinator, Lisa, was the facilitator of the CoP.

Affording a variety of educational development opportunities is required to build teaching capacity to redesign learning experiences based on UDL (Lock et al., 2019). Pedagogical knowledge regarding online learning pedagogy and the UDL framework, guidelines, and technological skills are necessary for UDL integration. UDL incorporation occurs through an iterative process, in which instructors make small changes and observe their effectiveness, as then they are more likely to invest their time and change their entire teaching practices (Bowman, 2016).

Future Research Directions

Drawing on the experience of this research, two recommendations for future research are offered. First, a larger similar study with a more varied sample of courses or programs (online, blended, face-to-face) from different disciplines is recommended. Second, another area for future research in UDL is institutional support. Such questions need to be investigated: What types of infrastructures and supports are required to foster UDL infusion across faculties and programs? What are the barriers and how are they addressed about the implementation of UDL? A mixed methods study could be carried out using a survey along with interviews to gather such information.

Conclusion

UDL adoption in the design and delivery of online learning aims to reach all individual needs and interests. The challenge for higher education institutions is fostering UDL adoption across faculties and programs. UDL adoption is more than an individual initiative; it requires adequate support and sufficient collaboration among and through multiple levels within the academic institution. The results of this study make a significant contribution to the literature on UDL and the development of online teaching capacity. This study explored the phenomenon from a holistic perspective that involved instructors, academic leaders, and educational development providers. Thus, the findings' respond to Westine et al.'s (2019) recommendation to investigate the faculty adoption and provide "concrete examples of best practices" (p. 37).

UDL infusion requires thoughtful considerations of what to do before, during, and after the process. The preparation phase is critical in setting the stage for UDL incorporation. A clear vision and strategic plans regarding UDL integration are needed and effectively communicated across programs. Then, a recognition and award system can be established to encourage instructors to redesign their courses and modify their teaching approach.

Ongoing technological and pedagogical support is recommended for individuals throughout the incorporation process. Instructors need to understand UDL theory and then apply its principles gradually within a supportive learning community. Using reflective practice aims to identify areas of strength to be amplified and areas of weaknesses to be eliminated. Creating and sustaining a CoP as an educational development approach is suggested to facilitate the process of UDL implementation. Academic leaders play a significant role starting from the creation of the strategic plan and vision down to the implementation in practice, through ensuring adequate resources with an array of supports are in place to not only facilitate its incorporation but also its sustainability.

Declarations

Permission to conduct this research with human subject was granted by University of Calgary, Canada.

The author declared that data collection and initial analysis for this study occurred while a student at the University of Calgary, Canada, but subsequent analysis and article development occurred while in a current position at the University of Jeddah, Saudi Arabia.

The author declares no conflicts of interest or external funding.

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Appendix A

Sample of the Interview Questions

Online UDL-Based Program

- Tell me about the preparation, implementation, and outcomes of the UDL-based program regarding the UDL incorporation.
- What support and resources were used to increase the online teaching capacity to use UDL?
- What structures and scaffolds are needed to support UDL implementation in online learning?
- How do you assess the program from the UDL perspective?
- Did you collaborate with other instructors and leaders in the program to increase your teaching capacity in UDL implementation? Explain.
- What are the roles of academic leaders, development providers, and instructors in UDL implementation within online learning environment?
- What issues or challenges did you face in designing or implementing the program?

Recommendation

- Based on your experience, what did work well in the online program, what did not work?
- What kind of support did you receive/offer, and what kind of support you wished you received/ offered (e.g., institution level, program level, individual level)?
- What recommendations do you have for the university and academic leaders to foster UDL implementation?

Wrap Up

Do you have anything else to add regarding the design and implementation of UDL for the online program?