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Understanding Universal Design for Learning Implementation: A Hermeneutic Phenomenological Study of the Experiences of Higher Education Faculty and Instructional Designers

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UNDERSTANDING UNIVERSAL DESIGN FOR LEARNING IMPLEMENTATION: A HERMENEUTIC PHENOMENOLOGICAL STUDY OF THE EXPERIENCES OF HIGHER EDUCATION FACULTY AND INSTRUCTIONAL DESIGNERS

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ABSTRACT

UNDERSTANDING UNIVERSAL DESIGN FOR LEARNING IMPLEMENTATION: A HERMENEUTIC PHENOMENOLOGICAL STUDY OF THE EXPERIENCES OF HIGHER EDUCATION FACULTY AND INSTRUCTIONAL DESIGNERS

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Faculty face a rising challenge in supporting diverse student populations on campuses (Bastedo et al., 2013). Inclusive pedagogy, facilitated by UDL, helps alleviate learning barriers for diverse student groups (Basham & Blackorby, 2021). However, the ambiguous operational definition of UDL poses practical challenges in implementation and assessment (Diedrich, 2021), especially when it is described variably as a practice, framework, or intervention in the literature (Basham & Blackorby, 2021). This hermeneutic phenomenological study explores the meaning faculty and instructional designers ascribe to the experience of implementing UDL in higher education.

The main question is: what is the meaning that faculty and instructional designers ascribe to the experience of implementing UDL in higher education? Research sub-questions guiding this study include: (1) What are the lived experiences of faculty and instructional designers when implementing UDL in higher education? (2) What meaning do faculty and instructional designers that have implemented UDL in higher education ascribe to UDL? (3) What process do faculty and instructional designers use when planning to implement UDL in higher education? The research design involved two semi-structured interviews and a think-aloud activity to

observe faculty and instructional designers implementing UDL in response to a prompt. Purposive sampling was used when five faculty and five instructional designers were recruited with UDL experience in higher education. The analysis involved a whole-parts-whole process (Vagle, 2018) of the semi-structured interviews. The think-aloud activity was analyzed using a standardized coding manual based on UDL principles from CAST (2018) and concepts from Sheridan et al. (2019).

Findings from the study included themes related to the lived experience, meaning, and process of implementing UDL. The study highlighted diverse UDL interpretations like accessibility, inclusive design, and equity, and key implementation factors, such as influence from instructional designers and a plus one approach (Tobin & Behling, 2018) for faculty development. Faculty and designers in this study shared insights on implementing UDL in higher education. Recommendations included practical professional development with classroom examples and technology for flexible classrooms. Institutional expansion calls for administrator buy-in, awareness-raising policies, and framing UDL as an inclusivity tool. Engaging faculty involves providing a variety of training opportunities, instructional designer consultations, and fostering personal meaning-making and reflection on course design. UDL implementation, ultimately, is a continuous journey towards accessible, inclusive, and impactful learning for students.

This dissertation is dedicated to my husband, Jonathan Kirsch and our dog Luna, who both helped me through my graduate program and dissertation adventure and to my parents, Paul and Debra Geery, for encouraging a love of reading and scholarship throughout my life. I love you.

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NOMENCLATURE

Co-Constitution	To recap or restate what a participant is saying and asking if that is correct right after being originally stated by the participant (Dibley et al., 2022). This can help confirm different parts of the participant's story or comments for the researcher.
Hermeneutic Circle	The process of understanding that moves from parts of an experience to the whole of experience and back and forth to reach the meaning of phenomena (Heidegger, 1927/1962).
Hermeneutic Phenomenology	The study of experience and meanings (Friesen et al., 2012).
Implementation	"The process of putting to use or integrating new practices within a setting" (Nilsen, 2015, p. 54). For this study, focused on the process of using or integrating the UDL framework guidelines and checkpoints within higher education.
Lived Experience	"A representation and understanding of a researcher or research subject's human experiences, choices, and options and how those factors influence one's perception of knowledge" (Boylorn, 2008, p. 489). Relates to how people live through (what they do and how they do it) and respond to experiencing a phenomenon (Boylorn, 2008).
Reflexivity	Self-awareness to open up to different perspectives and ways of thinking about an experience or phenomenon and to remain open to the participant's perspectives and experiences that may differ from researcher pre-understandings (Dibley et al., 2022). Combining the researcher's pre-understandings with what is shared by participants to aid in a new understanding (Dibley et al., 2022).
Think-Aloud Activity	Has the aim to provide insights into problem solving processes that use working memory (Charters, 2003; Leighton, 2017; Reinhart, 2022). An example includes lesson planning out loud which can support participants in exploring their thinking about a phenomenon (Lauterbach, 2018).
Universal Design for Learning (UDL)	UDL has been characterized in various ways, including as an articulated framework to be applied, as well as an attitude, movement, or philosophy for teachers to continuously improve their teaching (Howery, 2021). For the purposes of this research, UDL is a framework that can be practically implemented using the guidelines and checkpoints within the framework.

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CHAPTER 1

INTRODUCTION

Postsecondary institutions serve a diverse range of students with varying needs and challenges related to education. The universal design for learning (UDL) framework can be used by educators to provide inclusive pedagogy (Carlson & Dobson, 2020; Chen et al., 2018; Lowenthal et al., 2020) that meets the educational needs of students and reduces educational barriers. Inclusive in this case is referring to the goal of including everyone in the learning process, including those that "have historically been excluded (as because of their race, gender, sexuality, or ability)," according to the Merriam-Webster Dictionary. While UDL can help meet the needs of diverse students and reduce learning barriers, it can be challenging to apply UDL, particularly in higher education where faculty are often not required to master discipline specific or general pedagogical knowledge in order to teach (Hromalik et al., 2020).

Significance of the Study

This study can begin to describe the lived experience of faculty and instructional designers implementing UDL in higher education. Common experiences and meanings were collected and could be used to improve UDL training and implementation efforts of faculty and instructional designers in higher education. Faculty interested in implementing UDL can review the findings to gain an understanding of what UDL implementation means from a variety of perspectives in higher education. Instructional designers can gain knowledge of what UDL implementation means in practice and how they can train and support faculty in UDL implementation. This research can begin the work of operationally defining UDL and sharing the experience of applying UDL in higher education to better comprehend the experience of UDL implementation. By having a better understanding of the phenomenon of UDL implementation in

higher education from the faculty and instructional designer's perspective, stakeholders at academic institutions can not only enhance and hone operational definitions, which can help engender a shared vocabulary and discourse to better share ideas, but also craft policies that can further UDL adoption.

Theoretical Framework

The theoretical framework for the study was hermeneutic phenomenology. Phenomenological research has the primary goal of reaching an understanding of the meaning of phenomena (Vagle, 2018). For phenomenological studies, the theoretical framework is the particular philosophical branch utilized for the research (Peoples, 2021). Husserl originated the philosophical idea of studying essences of consciousness, which became known as transcendental phenomenology (Friesen et al., 2012). On the other hand, researchers from the hermeneutic or interpretive phenomenology branch consider humans to exist as beings in a world that is constantly being interpreted, or Dasein according to Heidegger (1927/1962); although they acknowledge the significance of researchers setting aside prior assumptions and understanding, they believe it is crucial to consider all relevant contexts to gain a deeper interpretive understanding of the phenomenon being studied (Vagle, 2018). Hermeneutic phenomenology is the study of experience and meanings (Friesen et al., 2012). Hermeneutic phenomenology is well suited to explore teachers' understanding or meanings that teachers hold about pedagogical strategies (Boadu, 2021), such as implementing UDL.

Hermeneutic phenomenology researchers comprehend the meaning of phenomena by examining relationships with objects in the world in context (Vagle, 2018). Phenomenology is a way of thinking about things that exist in the world and how people understand and experience them; how people see and interpret phenomena in their own way, and how their interpretations

change over time and how they are connected and related to the world (Vagle, 2018). It is a reflective, active participation in meaning (van Manen, 2001). Hermeneutic phenomenologists interpret the meaning of lived experiences in the context of that experience (Friesen et al., 2012). For educators, phenomenology can provide an understanding of phenomena relevant to pedagogical practice and could be considered the bridge between practice and theory (Friesen et al., 2012). The conceptual framework that will be used to undergird the study is the UDL framework since UDL implementation in higher education is the phenomenon being explored.

Problem Statement

There is a growing challenge for faculty to provide support for increasingly diverse student bodies on college and university campuses (Bastedo et al., 2013; Hromalik et al., 2020). UDL has been advocated for globally throughout Algeria, Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Finland, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Saudi Arabia, Singapore, Slovenia, Spain, and the United States (Basham & Blackorby, 2021). Implementing inclusive pedagogy through UDL can reduce learning barriers for diverse students (Basham & Blackorby, 2021). From a practical standpoint, UDL's vague operational definition presents difficulties in both executing and assessing its effectiveness (Diedrich, 2021), particularly when UDL is denoted as a practice, framework, or intervention in the literature (Basham & Blackorby, 2021).

The lack of a consistent operationalized definition of UDL, which ranges from attitudes to a philosophy to a framework and other conceptualizations, could be further explored and defined, not because any particular narrowly defined terms are needed but because better defining the fundamental aspects of what UDL entails allows for a more coherent discourse and sharing of ideas leading to a better understanding of UDL. For example, having a more

consistent operationalized definition could allow researchers to determine the effectiveness of the UDL framework more uniformly across different environments and contexts. This could have a major impact on UDL implementation moving forward. More research is needed from a hermeneutic phenomenological perspective exploring the experience of UDL implementation in higher education to understand what the experience of UDL implementation can mean for faculty and instructional designers in postsecondary education. This research study explores the phenomenon of UDL implementation in higher education to better understand conceptions faculty and instructional designers hold about the experience of implementing UDL. With this understanding, instructional designers and faculty can improve UDL implementation efforts in higher education, which will help improve student success through increased engagement with course content and demonstrated improvements in learning (Cunningham et al., 2017).

There have been several empirical studies regarding UDL implementation in higher education, but there have been very few (Black et al., 2015; Fovet, 2020 & 2021; Takemae et al., 2018) regarding UDL implementation from a phenomenological approach. Black et al. (2015) interviewed students to describe their understanding of UDL and universal design for instruction using a phenomenological approach. They found that students felt communication and feedback from the instructor to be important, had a desire to succeed, and had concerns about barriers to accommodations (Black et al., 2015). Fovet (2020 & 2021) used auto-ethnography and a phenomenological perspective to share the author's lived experience of adopting UDL as a disability service provider and being a UDL consultant and advocate. According to Fovet (2020), disability service providers have an ambiguous role in UDL implementation. There is a need to improve collaboration and communication across disciplines when it comes to UDL in higher education as well as a need for additional discipline specific research and UDL in laboratories,

trades, and studio arts literature (Fovet, 2020 & 2021). Finally, Takemae et al. (2018) also used a phenomenological approach to investigate experiences of teacher candidates towards UDL in a special education course. None of these focus on faculty lived experiences or the meaning they hold for UDL.

While these studies begin to address the question of UDL implementation from a phenomenological perspective, none were focused on faculty or instructional designer experiences since Black et al. (2015) reviewed student's experiences, Fovet (2020 & 2021) completed an auto-ethnography, and Takemae et al. (2018) studied teacher candidate experiences (graduate students in education). While student experiences can be helpful, none of these studies focus on faculty and instructional designer lived experiences or the meaning they hold for the experience of UDL implementation in higher education. Additional research is needed from a hermeneutic phenomenological perspective that will provide a rich understanding of the lived experience of faculty and instructional designers in UDL implementation in higher education (see Figure 1 for links between the theoretical framework, conceptual framework, and research focuses). Findings can be used to improve UDL training and implementation efforts of faculty and instructional designers.

Purpose of the Study

The purpose of this hermeneutic phenomenological study was to explore the meaning that faculty and instructional designers ascribe to the experience of implementing UDL in higher education. In other words, this study explored the experience and process that faculty and instructional designers use to integrate the UDL framework guidelines and checkpoints in higher education. This included applying UDL principles, guidelines, or checkpoints in a course or helping others use UDL principles, guidelines, or checkpoints. The overarching research

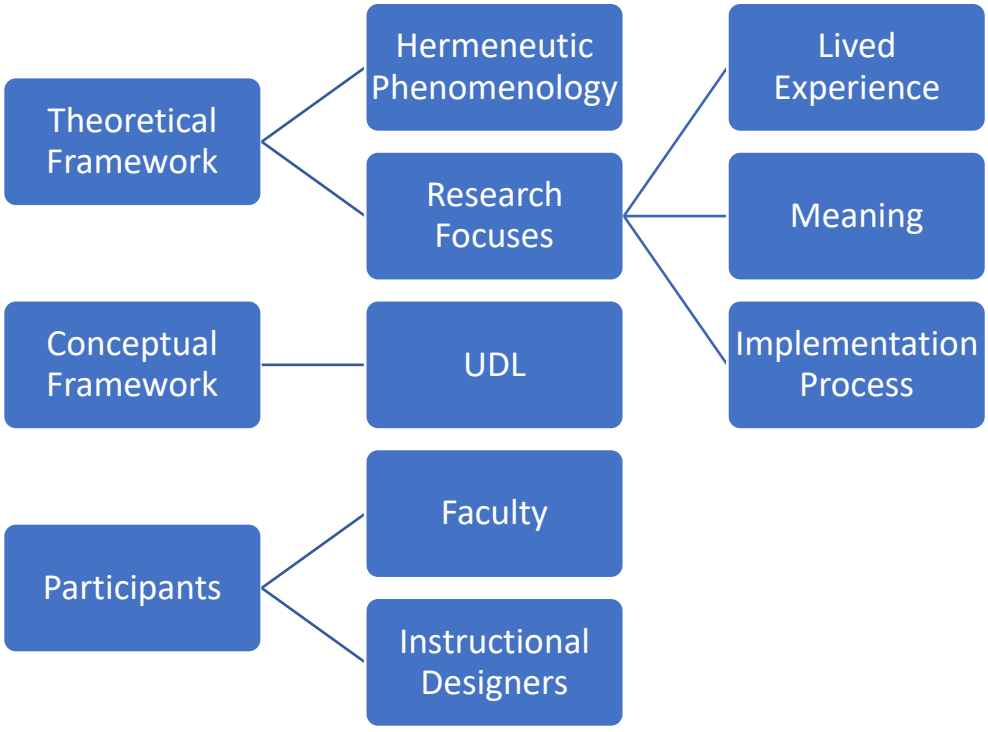
question for this study is: what is the meaning that faculty and instructional designers ascribe to the experience of implementing UDL in higher education?

The research sub-questions include:

1. What are the lived experiences of faculty and instructional designers when implementing UDL in higher education?
2. What meaning do faculty and instructional designers that have implemented UDL in higher education ascribe to UDL?
3. What process do faculty and instructional designers use when planning to implement UDL in higher education?

Figure 1

Linkages Between Research Questions and Larger Theoretical Concepts



CHAPTER 2

LITERATURE REVIEW

Conceptualization of UDL

Universal design for learning (UDL) is a framework that includes multiple means of engagement, representation, and expression for learning. According to the Center for Applied Special Technology (CAST), "Universal design for learning (UDL) is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn" (CAST, 2023, para. 1). While UDL can support students with disabilities, it is designed to help improve learning for all students, including those in higher education. The principles, guidelines, and a brief description of each is available in Table 1. This literature review explores research about UDL implementation in higher education.

Table 1

Universal Design for Learning Principles, Guidelines, and Descriptions

Principle	Guideline	Description
Multiple Means of Representation	Options for Perception	Offering ways to customize displays and alternatives for auditory and visual information
	Options for Language and Symbols	Clarifying vocabulary and symbols, promote understanding across languages, and use multimedia
	Options for Comprehension	Activate prior knowledge, highlight relationships and important concepts, and maximize transfer

Multiple Means of Action & Expression	Options for Physical Action	Provide access to assistive technologies and vary response methods
	Options for Expression and Communication	Use a variety of media and tools for communication and scaffold content to provide practice opportunities
	Options for Executive Functions	Guide goal setting and strategy development
Multiple Means of Engagement	Options for Recruiting Interest	Allow for learner autonomy, optimize relevance and authenticity, and minimize distractions
	Options for Sustaining Effort and Persistence	Vary demands to increase challenge, provide mastery-oriented feedback, and foster collaboration
	Options for Self-Regulation	Facilitate personal coping strategies and develop learner self-reflection

Note. This table is adapted from the universal design for learning framework (CAST, 2018).

Several conceptual studies related to UDL provide additional perspectives useful to this review. McGuire (2014) compared different models of universal design (UD), such as universal design in education (UDE), universal design for instruction (UDI), universal design for learning (UDL), and universal instructional design (UID) (See Table 2). These models are based on or adapted from the seven principles of UD.

Table 2

Comparison of Universal Design Frameworks for Higher Education

Framework and Source	Principles or Guidelines
Universal design for learning (UDL) by Meyer & Rose (1998)	Multiple means of representation: options for perception, language and symbols, comprehension. Multiple means of action and expression: options for physical action, expression and communication, executive function. Multiple means of engagement: options for recruiting interest, sustaining effort and persistence, and self-regulation.
Universal design in education (UDE) by Bowe (2000)	Utilized the seven principles of universal design: equitable use, flexibility in use, simple and intuitive, perceptible information, tolerance for error, low physical effort, and size and space for approach and use.
Universal design for instruction (UDI) by Scott et al. (2001)	Adapted the seven principles of universal design: equitable use, flexibility, simple and intuitive, perceptible information, tolerance for error, low physical effort, and size and space for approach and use; and added two additional principles: community of learners and instructional climate.
Universal instructional design (UID) by Higbee (2003)	Based on universal design: create a climate that fosters trust and respect, determine the essential components of the course, provide clear expectations and feedback, explore ways to incorporate natural supports for learning, provide multimodal instructional methods, provide a

	variety of ways for demonstrating knowledge, use technology to enhance learning opportunities, and encourage faculty-student contact.
Universal instructional design (UID) by Palmer & Caputo (2003) at the University of Guelph	Based on universal design: be accessible and fair to all parties, be straightforward and consistent, provide flexibility in use, participation and presentation, be explicitly presented and readily perceived, provide a supportive learning environment, minimize unnecessary physical effort or requirements, ensure a learning space that accommodates both students and instructional methods.
Universal design of instruction (UDI) by Burgstahler (2007)	Utilized the seven principles of universal design: equitable use, flexibility in use, simple and intuitive, perceptible information, tolerance for error, low physical effort, and size and space for approach and use.

Note. Adapted from McGuire (2014).

Overview of the Literature

There are several literature reviews related to UDL implementation in higher education. A comparison of eleven literature reviews is available in Table 3. The literature reviews shared positive results of UDL implementation including increased engagement and access, addressing learner variability, positive student perceptions, improving the learning process, and decreasing learning barriers (Al Azawei et al., 2016; Brandt & Szarkowski, 2022; Capp, 2017; Crevecoeur et al., 2014; Cumming & Rose, 2021; Ewe & Galvin, 2023; Fornauf & Erickson, 2020; Ok et al., 2016; Rao et al., 2014; Seok et al., 2018). Brandt and Szarkowski (2022), Crevecoeur et al. (2014), Ewe & Galvin (2023), and Ok et al. (2016) reviewed K-12 studies on UDL implementation, which was shown to increase access, participation, and engagement and decrease or eliminate learning barriers.

Toutain (2019) completed a literature review on the barriers to accommodations for students with disabilities and recommended UDL to decrease the need for accommodations. The three universal design (UD) models of UDL, universal instructional design (UID), and universal design of instruction (UDI) improved student learning and engagement (Rao et al., 2014). Only one study was included for each of UDI and UID (which also included UDL); the other 11 studies focused solely on UDL. There is an inconsistent use of UD terminology in these studies, creating a challenge of researching the efficacy of implementing UD models (Rao et al., 2014). Broadly, while the literature has shown positive perceptions and results of UDL implementation, more research is needed in a variety of areas of UDL implementation.

Table 3

Literature Reviews Related to Universal Design for Learning (UDL)

Author and Publication Date	Focus of the Review	Findings
Al Azawei et al., 2016	12 peer-reviewed, empirical articles published between 2012 and 2015 on UDL in K-12 and higher education.	Students did significantly better after UDL implementation and the learning gap between students with and without disabilities was reduced. Students had positive perceptions, more flexibility, decreased stress, and enhanced success and social presence.
Brandt & Szarkowski, 2022	3 K-12 studies about UDL implementation and deaf education.	UDL is well established in U.S. policy and education, but more research is needed in

		the field of deaf education and UDL implementation.
Capp, 2017	18 peer-reviewed, empirical articles with pre and post-testing published between 2013 and 2016.	UDL is an effective teaching methodology to improve the learning process for all students.
Crevecoeur et al., 2014	5 K-12 single subject and group comparison studies of UDL implementation.	UDL decreased or eliminated learning barriers. UDL was used to increase access and participation for variable learners. Studies did not share which checkpoints were utilized.
Cumming & Rose, 2021	52 peer-reviewed articles focused on UDL implementation in higher education.	The efficacy of UDL in higher education was supported by high student satisfaction and added value of UDL implementation, increased engagement, and teacher belief that UDL improved their teaching. There is a need for faculty training and access to UDL peer experts.
Ewe & Galvin, 2023	8 peer-reviewed articles published between 2018 and 2023 on UDL implementation in K-12 across Europe.	Articles explored student and/or teacher perceptions of the learning process, such as engagement, motivation, and attitudes. More research is needed on learning outcomes when UDL is applied.

Fornauf & Erickson, 2020	38 peer-reviewed articles published between 2002 and 2018 in postsecondary education.	UDL was implemented in response to a problem (student attrition, access to disabilities related services, or racial tensions). UDL enabled diverse students to access learning, improved student wellness and empowerment, decreased learning barriers, and fostered an inclusive environment. Students' perceptions were positive and improved engagement. UDL implementation is a process of continual refinement as the higher education landscape changes.
Ok et al., 2016	13 K-12 studies about UDL implementation.	UDL can improve engagement, access for students with disabilities, and student academic and social outcomes. Efficacy and effect sizes varies across studies, but generally UDL based interventions are effective for addressing learner variability and improve access for diverse learners.
Rao et al., 2014	13 K-12 and postsecondary peer-reviewed, empirical studies on UDL (12 studies), universal instructional design	These three UD models improved student learning and engagement and resulted in positive student perceptions.

	(UID), and universal design of instruction (UDI) implementation.	
Seok et al., 2018	17 empirical studies on UDL implementation for postsecondary students with and without disabilities.	Implementations were effective for all students sampled with or without disabilities. These studies demonstrate the value of UDL implementation.
Toutain, 2019	23 empirical studies on students with disabilities in higher education and barriers to accommodation.	Barriers to accommodations include lack of knowledge, non-functional or unhelpful accommodations, and attitudes including personal beliefs, faculty attitudes and reactions, and social stigma. UDL implementation is recommended to decrease the need for accommodations and moving towards a social model of disability as a component of campus diversity instead of a medical condition.

The Need to Implement UDL

UDL can address the needs of learners with disabilities and meet the requirements of the Americans with Disabilities Act (Varonis, 2015). UDL can reduce the need for students to disclose their diagnosis for accommodations, which would reduce demands on student support services and become more neurodiversity-inclusive universities (Hamilton & Petty, 2023).

Compliance with accessibility requirements is important, but it is not enough (Lowenthal et al., 2020). UDL provides flexibility and alternative ways for students to interact with each other and faculty and demonstrate what they've learned (Rogers-Shaw et al., 2018). UDL facilitates an epistemological shift in education to a student-centered approach in that it is uniquely focused on meeting students where they are as individuals as opposed to only providing flexibility in response to a limited spectrum of student disabilities, strengths, or learning needs. UDL is also an approach that addresses social justice concerns and exclusionary educational practices by eliminating assumptions of a student's background and focusing on content relevance for the learner, value to the learner, and authenticity to improve practice through flexibility, reducing barriers, and cultural and developmental sensitivity (Rogers-Shaw et al., 2018). "UDL … allow[s] course design and educational practice to directly address issues of justice and inclusion" (Rogers-Shaw et al., 2018, p. 28). UDL creates more chances for academic achievement and promotes the design of inclusive learning environments that meet the needs of a diverse student population (Rogers-Shaw et al., 2018).

There is a need for UDL to provide inclusive pedagogy (Carlson & Dobson, 2020; Chen et al., 2018; Lowenthal et al., 2020). Although UDL was not the focus of the study, a student survey found that students desired UDL techniques including multiple means of communication with the faculty member, multiple formats of course content, and the need for more timely feedback (Chen et al., 2018). Applying inclusive design choices with the UDL framework is a helpful approach for many learners, but being empathic and flexible with students during a course is also important (Lowenthal et al., 2020). In addition to the broad need for UDL described in these articles, UDL can also be utilized for culturally responsive pedagogy.

UDL and culturally responsive pedagogy overlap in multiple areas (Kieran & Anderson, 2019; Moore, 2020). This includes reducing threats and distractions in the learning environment and the need to foster a safe learning environment where students can be successful (Kieran & Anderson, 2019). Both guide instructors to view student diversity as a benefit rather than a deficit, and when used proactively, UDL and culturally responsive pedagogy can help improve student success in terms of academic achievement (Kieran & Anderson, 2019). Embracing diversity through UDL adoption by faculty can lead to a more enriching educational experience and culturally responsive teaching acknowledges that student groups come from varied cultural backgrounds that should be valued (Pacansky-Brock et al., 2020). By fostering strong relationships between instructors and students and incorporating empathy and collaboration, a learning environment of mutual trust can be created through culturally responsive pedagogy. This also promotes a humanized approach to education (Pacansky-Brock et al., 2020).

This relates to UDL improving student persistence and increasing students' feeling like they belong at the institution and promoting student autonomy over their learning process (Espada-Chavarria et al., 2023). Several studies have posited that UDL can help improve student persistence and retention (Bradshaw, 2020; Espada-Chavarria et al., 2023; Garrad & Nolan, 2023; Olivier & Potvin, 2021; Tobin, 2015). After implementing UDL in a course, attrition decreased from nearly 16% to just over 7% and supported increased student engagement (Garrad & Nolan, 2023).

Inclusive education is an ongoing pursuit towards providing equal opportunities for education and resources by recognizing and valuing diversity in the curriculum, teaching techniques, and assessment methods as well as giving a platform for marginalized groups to have a say in decisions that address any issues of exclusion (Waitoller & Thorius, 2016). Waitoller

and Thorius (2016) state that disability is socially constructed through cultural beliefs and lead to categorizing individuals as other. While disability is one reason people can be marginalized or othered, there are other reasons people can be marginalized including race, gender, age, sexual orientation, socioeconomic status, religion, mental health, and more. Racism and ableism [and additional ways of othering individuals] perpetuate a hierarchical difference based on individualism and ignore the educational and environmental context when labeling students (Waitoller & Thorius, 2016). Reducing direct racism and ableism is crucial to address equity issues and examine normalcy and stereotype-embracing constructions that label certain student groups as problematic (Waitoller & Thorius, 2016). Culturally responsive pedagogy would enhance UDL by minimizing barriers to access with critical reflexivity (Waitoller & Thorius, 2016). UDL should be expanded to offer resources, roles, and responsibilities that empower historically marginalized learners within cooperative learning environments, while also supporting their identities with a critical perspective (Waitoller & Thorius, 2016). Both UDL and culturally responsive pedagogy tie in well with current and future diversity, equity, and inclusion efforts in postsecondary education, which will be discussed further in the next section.

UDL Implementation

Several studies describe UDL implementation on a broader scale, beyond an individual course. UDL has been advocated for in several countries, including the U.S. (Basham & Blackorby, 2021). A study comparing UDL implementation in higher education in the U.S. and the U.K. shared the importance of senior leadership buy-in for a campus-wide UDL initiative to be successful (Martin, 2021). Martin (2021) recommends professional development in UDL as being vital to UDL implementation. Dalton et al. (2019) shared examples of UDL implementation in the U.S. and South Africa. The authors suggest prioritizing the practical needs

of students, making accessibility and inclusiveness a priority across the campus, establishing a systemic foundation with the use of UDL, utilizing technology to enhance inclusiveness instead of creating obstacles, and collaborating with others to exchange ideas and overcome challenges (Dalton et al., 2019). Over one third of Australian universities referred to UDL or inclusive teaching in policies (Hitch et al., 2015). Despite this, there was not much professional development available regarding inclusive teaching and it is not widely embedded into policy (Hitch et al., 2015).

It is challenging to improve course accessibility when it is unclear whose job it is to ensure accessibility (Linder et al., 2015). Education of faculty on UDL and creating accessible materials tends to occur in one-on-one sessions rather than broader workshops or trainings. Broad, institutional support is needed for UDL to gain traction in higher education. Institutional policy is often reactive, rather than proactive like the UDL framework intends. The lack of people, money, and time can also make UDL implementation on an institutional scale a challenging endeavor (Linder et al., 2015). Successful partnerships can improve the chances of success for UDL implementation when the center for excellence in learning and teaching, the office of disabilities services, and information technology work together (Linder et al., 2015). Another office to consider partnering with is the writing center. A writing center director at one institution implemented UDL in writing center services (Kleinfeld, 2018). They aligned UDL principles in hiring, tutoring, designing spaces, and marketing services to make the writing center more accessible. UDL implementation should be considered from an ecological basis since multiple stakeholders will affect the success of the UDL initiative (Fovet, 2021). Fovet (2021) believes that UDL should be a shared goal with shared ownership across the institution.

On the other hand, UDL is loosely defined from an operational sense making it challenging to implement and measure the effectiveness of implementation (Diedrich, 2021), especially when UDL is referred to as an intervention, practice, or framework in the literature (Basham & Blackorby, 2021). In one study, researchers interviewed 19 UDL experts in UDL origination and research about an operational definition of UDL and found that there are a variety of ways to define and implement UDL (Hollingshead et al., 2022). There were common elements that the experts described as being part of UDL, including variability in designing for academic diversity (Hollingshead et al., 2022). UDL is about design, addressing variability, providing access to learning, and reaching a broader range of students beyond the average student (Hollingshead et al., 2022). The flexibility of UDL implementation is confusing in practice, making it challenging to define UDL operationally (Hollingshead et al., 2022). Applying the UDL framework can vary as each teacher or faculty member can choose to adopt it differently, using differing levels of complexity or implementation (Basham & Blackorby, 2021; Ok et al., 2016; Rao & Cook, 2021).

UDL has been characterized in various ways, including as an articulated framework to be applied, as well as an attitude, movement, or philosophy for teachers to continuously improve their teaching (Howery, 2021). “At a conceptual level, UDL is a lens by which to consider inclusive education efforts; at a practical level, UDL is an instructional design framework that can be applied when designing instruction that includes flexible and engaging options” (Rao & Cook, 2021, p. 67). Regardless of how UDL is operationalized, the UDL framework is complex, and each faculty member will implement UDL in a way that makes the most sense for their course and objectives.

Issues in UDL implementation

It is now time to discuss faculty UDL implementation efforts. At one institution, faculty were interviewed about their level of comfort with UDL and most of the 46 faculty participants stated that they wanted to learn more about UDL and were not currently applying UDL (LaRocco & Wilken, 2013). This highlights the importance of UDL professional development. Black et al. (2014) surveyed faculty about UDL techniques and if they were being utilized and found that faculty were using a variety of instructional methods but were unfamiliar with UDL. Cash et al. (2021) found a correlation between faculty attitudes and inclusive teaching practices; women tended to initiate inclusive teaching practices more than men. To meet the demands of technology growth and support diverse student learners with accessible means, higher education institutions should foster a supportive environment that recognizes the importance of implementing inclusive pedagogical techniques and provide relevant training (Cash et al., 2021). Faculty members describe several challenges to UDL implementation including lack of time and budget, absence of administrative support, and misconceptions about UDL (Fovet et al., 2014).

An action research study occurred over four semesters of one faculty member's implementation of UDL (Smith, 2012). The changes over each semester were described, ranging from developing course materials with multiple representations, offering opportunities for student choice and engagement, providing targeted feedback and quicker responses on student paper drafts, to adding short videos to discuss gaps in prior knowledge. This helped center students as active agents in their learning by implementing aspects of UDL over time.

The final study to be discussed related to faculty UDL implementation provides the idea of different UDL implementation levels (Moore et al., 2018). The different levels of UDL implementation were described as individual implementation, facilitated through a professional

learning community, initiated at the department level, and initiated across the university (Moore et al., 2018). UDL initiatives often begin with one individual as a grassroots implementation, which can lead to higher levels of implementation as time goes on and as more faculty learn about UDL (Moore et al., 2018). UDL implementation occurs gradually over time, through multiple iterations, and networking with others about UDL is vital to moving up to higher levels of UDL implementation (Moore et al., 2018). Moving to the higher levels of UDL implementation usually requires partnership between campus groups, faculty professional development, and administrative support (Moore et al., 2018). "Intentionality is central to UDL implementation" (Moore et al., 2018, p. 47). These studies demonstrate how faculty have implemented UDL in higher education.

UDL Measurement

It is important to be able to reflect on the process of UDL implementation while also measuring the outcomes of UDL implementation (Edyburn, 2010). Unfortunately, due to the ambiguity and complexity of the UDL framework and implementation, the different ways of operationalizing UDL, and because measures may not exist for UDL outcomes, it is challenging to measure UDL implementations in a consistent manner (Evmenova et al., 2022). Previous studies have assessed UDL implementations with student attitudes, faculty perceptions, review of lesson plans, or observation instruments (Evmenova et al., 2022). Evmenova et al. (2022) argues that valid measurement instruments of UDL implementation are needed, such as measuring different levels of UDL implementation. A UDL scan tool was developed by Basham et al. (2016) focused on UDL techniques used for online learning content. Similarly, Basham et al. (2020) developed a UDL observation measurement tool for observing teachers in the classroom and evaluating in-person UDL implementation. It uses different levels of UDL

implementation for different aspects of UDL: no evidence of UDL, incomplete evidence of UDL, UDL is occurring, and dynamic, interactive UDL (Basham et al., 2020). These tools can be used for future studies when evaluating UDL implementation efforts.

UDL is a process of intentionally designing instruction and courses to reduce learning barriers (Ewe & Galvin, 2023; Smith et al., 2019). Reporting criteria are needed for sharing UDL implementation efforts in the literature (Smith et al., 2019). Rao et al. (2020) developed UDL reporting criteria and validated it with prior UDL research. Minimal reporting criteria are shared that should be included in studies related to UDL implementation. These include information about learner variability and environment or setting, proactive and intentional design including the barriers being addressed and how UDL is applied, and UDL implementation description and outcomes or findings, along with their implications (Rao et al., 2020). The one area that many previous studies did not have was detail on how UDL implementation aligned to specific checkpoints or UDL guidelines (Rao et al., 2020). Next, studies will be reviewed that evaluated UDL implementation with student and faculty perceptions.

Student Responses to UDL Implementation

Student responses to UDL implementation have generally been positive (Black et al., 2015; Davies et al., 2013; Schelly et al., 2011; Smith, 2012). Black et al. (2015) found that students with and without disabilities considered UDL principles to be helpful in improving their learning. Schelly et al. (2011) surveyed students before and after UDL implementation and found a significant increase in UDL strategies being used by faculty including multiple formats of content and providing prompt feedback and supplemented course materials with visual aids. Davies et al. (2013) measured UDL implementation effectiveness with a student survey before and after UDL training and implementation with a control group of faculty members who did not

implement UDL. The UDL techniques which showed the greatest benefit after implementation were using multiple formats of course materials, relating concepts to course objectives, providing an agenda or outline each class session, summarizing content each class session, highlighting key points from videos, and using accessible and well-organized content (Davies et al., 2013). There were positive changes for UDL strategies for all classes, including the control group with more engagement at the end of the semester than at the beginning of the semester and feedback was more helpful, which could have improved across the semester due to increased familiarity between faculty and students (Davies et al., 2013).

Another student survey showed a relationship between UDL implementation and increased student engagement (Smith, 2012). Generally, Kennette and Wilson (2019) found that students perceived UDL techniques as positive and useful for their learning. In a large lecture class, students found instructional tools implemented with UDL in mind to be helpful in learning (Dean et al., 2017). In addition to the traditional lecture and textbook methods, PowerPoint, lecture notes, clickers, and MindTap were utilized. These alternative instructional materials improved student learning and student satisfaction (Dean et al., 2017). This study demonstrates that UDL implementation can have positive impacts in large lecture courses as well as smaller courses.

Student perceptions are helpful in determining the effectiveness of UDL implementation in terms of engagement, but only offer self-ratings of student learning (Ewe & Galvin, 2023). Student learning outcomes and achievement should also be measured as part of the evaluation of UDL implementation efforts (Ewe & Galvin, 2023). A recent meta-analysis found that student achievement was greater in UDL-based courses rather than non-UDL courses (King-Sears et al.,

2023). Faculty perceptions and responses to UDL implementation is another area that should be considered when evaluating UDL implementation efforts.

Faculty Responses to UDL Implementation

Several studies explored faculty responses to UDL implementation efforts. Kennette and Wilson (2019) surveyed faculty about their perceptions of UDL implementation. They found that faculty used some UDL techniques some of the time. Faculty also perceived the UDL techniques used as being most beneficial for students (Kennette & Wilson, 2019). Hills et al. (2022) also explored faculty perceptions of UDL implementation with interviews and a survey. They found that UDL implementation challenges included a lack of time, institutional support, resources, and knowledge of UDL. During interviews, faculty shared two areas that could increase UDL implementation: increasing knowledge of UDL and UDL champions to promote UDL on campus. While bottom-up approaches can be successful, it is helpful for a top-down approach for broader UDL implementation initiatives in higher education (Hills et al., 2022). Bottom-up approaches include providing diverse learning opportunities that model UDL best practices, simplifying implementation, and connecting early UDL adopters across disciplines to encourage sharing. Approaches that must be initiated by administration include acknowledging and rewarding UDL activities, investing in strategies to mitigate barriers related to faculty workload and time, identifying potential leaders and empowering them to make change, and formalizing UDL in institutional practices (Hills et al., 2022). Since there is a knowledge barrier to UDL implementation, there is a need for UDL training or professional development.

Professional Development on UDL

Several studies discuss the need for professional development or training in the UDL framework. According to Westine et al. (2019), there is a need for professional development in

UDL for online faculty. They found that 28% of faculty were unfamiliar with all aspects of UDL, while familiarity with specific UDL guidelines ranged from 37% to 60% of respondents. Use of the guidelines ranged between 39% and 70% for faculty that implemented at least one aspect of UDL (Westine et al., 2019). Faculty may not understand what different guidelines mean in practice. Westine et al. (2019) argue that UDL professional development is needed for faculty. In a follow-up study, Oyarzun et al. (2021) researched UDL implementation in conjunction with diffusion of innovation theory (Rogers, 2003). Seven faculty were interviewed about UDL adoption and challenges and benefits to implementing UDL. Faculty shared the need for UDL professional development training, though they also shared the challenge of time needed to learn about UDL (Oyarzun et al., 2021).

Guidelines for Faculty Training

The need for professional development in UDL relates directly to guidelines or recommendations by the literature that instructional designers can use when designing needed professional development opportunities for faculty. Some faculty obtain an understanding of UDL through participating in conferences, workshops, taking coursework, reading texts, or from their own experiences (Westine et al., 2019). Faculty chose to implement UDL since they felt UDL promoted good teaching practices and would improve learner engagement. The faculty participants wanted more administrative support, incentives, and better examples of UDL implementation in different disciplines to help overcome the barriers to UDL implementation (Oyarzun et al., 2021). Oyarzun et al. (2021) recommends peer support, faculty learning communities, and UDL training with context-specific examples to expand UDL adoption in higher education.

There is a lack of literature regarding UDL training for faculty in higher education (Hromalik et al., 2020). Hromalik et al. (2020) describes a UDL academy including objectives, timeframe, content, activities, and results from a questionnaire as well as changes to the academy for the second iteration. Faculty members were aided by instructional designers in revamping their courses according to UDL guidelines during the UDL academy (Hromalik et al., 2020). After attending the UDL academy, the faculty members incorporated UDL into one of their courses and presented it to their peers to promote UDL awareness (Hromalik et al., 2020). Olivier and Potvin (2021) created three half-day training sessions for faculty adapted from Hromalik's and colleagues (2020) UDL academy but spread the three sessions over a semester to allow time for faculty to consider implementation and reflect on their courses for each principle.

Bastedo et al. (2013) presented a UDL initiative that involved professional development programs, instructional designer consultations, and communications throughout the university. The initiative was comprised of two professional development programs. The first was a mandatory 10-week course for faculty members who were creating hybrid or online courses, which included three in-person sessions, weekly readings, activities, assessments, and one-on-one consultations with an instructional designer (Bastedo et al., 2013). These efforts resulted in the creation of a syllabus, course schedule, and a module of content. The second program was a self-paced online course for faculty members teaching existing hybrid or online courses and included modules covering objectives, interactions, assessments, and UDL. Additionally, faculty members were offered 30-minute online learning seminars as additional professional development opportunities (Bastedo et al., 2013). This UDL initiative led to improved communication between the Center for Distributed Learning and Student Disability Services,

students receiving accessible online course content more readily, and roles were defined for making accessible course materials (Bastedo et al., 2013).

Schelly et al. (2011) investigated the impact of a UDL training program on the teaching of instructors. The study evaluated the effectiveness of the UDL training based on student perceptions. The instructors participated in a one-hour UDL training workshop and received tutorials on how to create accessible documents (Schelly et al., 2011). However, there is no further detail provided about the UDL training workshop. The students reported improvements in the use of UDL strategies by the instructors, including the provision of alternative electronic formats for content, online readings, key points in videos, more effective feedback, and an increase in the use of visual aids (Schelly et al., 2011).

An alternative UDL professional development option includes weekly emails with tips for strong instructional practices that promote accessibility and UDL and are practice-oriented; an archive of the weekly tips was kept for faculty to reference (Herring et al., 2017). A self-study group of seven faculty explored UDL over one year and met weekly to discuss their UDL implementations (Azam et al., 2021). One more group created self-paced UDL modules for faculty, which was found to be successful with 90% of participants feeling more comfortable in their knowledge of UDL (Izzo et al., 2008). These studies and several others focused on teacher preparation discuss recommendations for UDL training and professional development.

Fovet and Mole (2013) suggested that a successful implementation of UDL across a campus requires a shift towards a student-centered culture. Administrators should provide professional development opportunities for faculty in UDL, and the effective implementation of UDL should be considered in faculty promotions and tenure decisions (Fovet et al., 2014), though the different conceptualizations of UDL were not addressed as part of this

recommendation. In addition to faculty, it is important to involve key stakeholders from across the campus, such as the center for excellence in teaching and learning, diversity and inclusion office, administration, and other support services, such as the library, writing center, and tutoring services (Fovet & Mole, 2013). It may also be beneficial to start with faculty members who have students registered with disability services in their courses (Fovet & Mole, 2013). Furthermore, it is crucial to establish a recurring UDL training program for new faculty to maintain the momentum of a campus wide UDL initiative (Rodesiler & McGuire, 2015). Evaluating the learning outcomes through reflection and using feedback from students and teachers can greatly improve the impact of UDL training (van Kraayenoord et al., 2014). The implementation of UDL is an ongoing process, requiring more than just two semesters of learning, application, and reflection to achieve and maintain change (van Kraayenoord et al., 2014).

According to Hromalik et al. (2020) and Westine et al. (2019), within a community college setting and a large university setting, a comprehensive faculty training program is crucial for the effective implementation of UDL in the classroom. The authors emphasize the need to move beyond introducing the UDL framework and delve into the practical implementation of UDL in the classroom. While a short workshop can introduce the UDL framework and spark interest in further training, a more in-depth training program is necessary. To support faculty in their UDL implementation journey, it can be beneficial to have a knowledgeable colleague serve as a consultant or instructor for professional development opportunities (Hromalik et al., 2020). Grant-funded training opportunities are often provided to teachers or faculty members (Hromalik et al., 2020; van Kraayenoord et al., 2014; Richman et al., 2019; Rodesiler & McGuire, 2015; Smith Canter et al., 2017; Westine et al., 2019). This highlights the significance of offering monetary compensation, such as a stipend, to incentivize participation in these training

programs. Given the busy schedules of many instructors, providing an incentive through financial compensation can be an effective way to encourage faculty members to engage in more in-depth training (Rodesiler & McGuire, 2015).

Hromalik et al. (2020) indicated that a crucial aspect of UDL professional development is allocating ample time for group work on restructuring courses with UDL principles. Feedback from participants highlights the value of collaborating and discussing teaching ideas with colleagues during UDL training (Rodesiler & McGuire, 2015). The results of a study by Katz and Sugden (2013) indicate that when teachers are involved in scheduling collaboration time and securing a budget, they take more ownership of UDL implementation. Effective UDL professional development should include classroom examples of UDL, ongoing training sessions on specific topics, preparation time, and opportunities for teachers to share ideas through methods such as weekly video blogs (Smith Canter et al., 2017).

According to Scott et al. (2017), a number of instructional approaches can be used to teach UDL, including readings, tests, lectures, discussions, demonstrations, observations, projects, case studies, or evaluations of lesson plans. Incorporating a blend of these methods during UDL faculty training can enhance comprehension of the UDL principles. Modeling in particular can help ease the implementation of UDL for educators, reducing their fears (Evmenova, 2018). Evmenova (2018) and Westine et al. (2019) advocate for a step-by-step approach to implementing UDL, gradually adding new components each semester or year to address the challenge of time limitations. These guidelines and recommendations for faculty training in UDL can be utilized by instructional designers when training faculty.

Role of Instructional Designer in UDL Implementation

In postsecondary institutions, instructional designers may be housed in varied locations, from specific academic departments or schools to centralized centers for teaching and learning, which has implications for their role (Richardson et al., 2019; Ritzhaupt & Kumar, 2015), as well as their authority and level of empowerment (Drysdale, 2021). They may work within departments of information technology, centers for teaching and learning, academic affairs, libraries, online learning times, or continuing education departments (Drysdale, 2021). Frequently, instructional designers work in course improvement and development, supporting faculty, staff, and students (Ritzhaupt & Kumar, 2015). Primarily, instructional designers in higher education support and collaborate with faculty (Drysdale, 2021; Magruder et al., 2019; Ritzhaupt & Kumar, 2015). The relationship between faculty and instructional designers is an essential aspect of instructional design in higher education (Magruder et al., 2019). This is often a cooperative mentoring or coaching relationship (Olesova & Campbell, 2019). Communication and collaboration skills are both important soft skills for instructional designers working in higher education and supporting faculty (Magruder et al., 2019; Ritzhaupt & Kumar, 2015; Sugar & Luterbach, 2016). A successful, collaborative relationship between instructional designers and faculty requires building trust, being an active listener, being open-minded and flexible, and understanding cultural differences (Richardson et al., 2019). Instructional designers help faculty solve instructional challenges or problems. Instructional designers may also work with new faculty onboarding training, orientation for new students, creating tutorials or workshops to help train faculty, and recommending effective instructional strategies (Sugar & Luterbach, 2016).

Instructional designers provide professional learning opportunities for faculty to support planning, implementation, and evaluation of courses (Xie et al., 2021). This can include offering

webinars, workshops, courses, and consultations for faculty. A tangential, but important role for some instructional designers in postsecondary education is to ensure accessibility compliance. In offering support to faculty, instructional designers can help enhance student motivation and engagement through tools and strategies for active learning, suggesting inclusive pedagogical practices (like UDL or culturally responsive pedagogy), and modeling technology integration. The COVID-19 pandemic opened further avenues for instructional designers to support higher education faculty, including the need for more multimodal courses, which aligns to UDL principles (Xie et al., 2021). UDL is one of the best practices or teaching theories that instructional designers can help faculty apply (Magruder et al., 2019).

Instructional designers working in higher education play an important role in UDL implementation and have extensive experience working with faculty in designing instructional materials and selecting content and teaching strategies. Instructional designers may have other titles in postsecondary institutions, such as educational technologist. Their experiences can provide valuable insight into the practical challenges and opportunities associated with UDL implementation in higher education and in supporting faculty with course design. Instructional designers work closely with faculty in the instructional design process of planning a new course. Several studies have discussed instructional designer use of UDL in higher education (Gronseth & Hutchins, 2020; Moore, 2020; Rogers & Gronseth, 2021; Rogers-Shaw, 2018; Singleton et al., 2019; Xie et al., 2021).

UDL can be a valuable framework for instructional designers, such as addressing social justice and inclusion issues when designing courses (Rogers-Shaw, 2018). This includes ensuring that instructors comprehend the details involved with access (Moore, 2020). Moore (2020) argues that instructional designers should go beyond assisting faculty with specific course

design aspects to assisting faculty in thinking about themselves as learning facilitators and being intentionally inclusive with course design. Additionally, instructional designers need to ask faculty questions and give concrete examples of UDL implementation to help faculty create learning environments conducive to students meeting course objectives. There is a need for ongoing learning, implementation, and deliberation when applying the UDL framework in higher education. UDL can be recommended by instructional designers for more intentional course design using inclusive teaching strategies (Moore, 2020).

In another study, instructional designers were surveyed and participated in a focus group about UDL and active learning; over 80% of instructional designers felt fairly or completely confident in designing accessible content and courses and they learned about accessible practices from colleagues, workshops, videos, or reading about accessibility (Rogers & Gronseth, 2021). Instructional designers felt that accessibility was an important part of UDL and defined UDL as designing to the margins with courses that are accessible and culturally responsive. In other words, UDL checkpoints and techniques help faculty design courses that are accessible to students with a variety of learning needs and culturally responsive. Respondents applied UDL by centering students in the learning process and providing multiple formats of content and discussed the importance of offering UDL training for faculty (Rogers & Gronseth, 2021). Gronseth and Hutchins (2020) described how UDL could be used for designing formal workplace training to improve learner engagement and sustaining effort. They suggest that UDL can be used to create training that is flexible in meeting the needs of workers (Gronseth & Hutchins, 2020).

In a final study, Singleton and colleagues (2019) interviewed instructional designers, along with analyzing documents analysis regarding UDL implementation in the online course

development process. The importance of faculty and instructional designer partnerships was described, including the use of varied language with faculty to increase buy-in for accessibility, such as using the phrase student success rather than accessibility or UDL. Instructional designers also feared overwhelming new faculty, there were inconsistencies in how instructional designers approached UDL implementation, and both instructional designers and faculty have limited time, resources, and knowledge related to addressing accessibility. Barriers to adopting UDL included a lack of administrative enforcement, mandates, and how it relates to promotion and tenure.

Instructional designers shared that faculty had never been asked to address UDL and accessibility previously and that faculty are resistant to accessibility or UDL, though a couple instructional designers recommended accommodations rather than UDL since online courses change so frequently. Adjunct faculty often do not receive compensation or instructional designer support in designing courses, making it challenging to implement UDL (Singleton et al., 2019). Singleton et al. (2019) recommends several ways to improve UDL adoption by faculty: delivering a consistent approach to UDL implementation, recommend prescriptive UDL strategies for online courses, and focus on specific UDL techniques rather than accessibility. It was also recommended to appeal to faculty through the instructional designer and faculty relationship to do the right thing for student success by implementing UDL. Focusing on a few strategies, such as splitting up longer videos into shorter videos or adding knowledge check questions and focusing on inclusive design choices can result in faculty UDL implementation (Singleton et al., 2019).

Conclusion

This review of the literature provides an overview of UDL implementation in higher education. UDL and culturally responsive pedagogy are discussed as complementary in

supporting academic achievement and diminishing barriers to learning. UDL implementation is examined broadly on a campus-wide scale or in different countries. Likewise, faculty implementation is discussed, along with ways of measuring UDL implementation efforts, such as recording and analyzing student and faculty perceptions. There is a need for UDL training, which instructional designers can provide, or early UDL-adopters at institutions can initiate with proper instructional designer and administrative support. Finally, instructional designer perceptions about UDL implementation are shared.

Despite the literature currently available, there is a need for additional research on UDL implementation in higher education. The lack of a consistent operationalized definition of UDL, which ranges from attitudes to a philosophy to a framework and other conceptualizations, could be further explored and defined. This could have a major impact on UDL implementation moving forward. Additionally, further UDL implementation research in higher education could shed light on unique problem areas or barriers which certain individual academic disciplines may face when attempting to integrate UDL techniques or a more systematic UDL framework in the teaching of their subject area.

CHAPTER 3

METHODS

Research Questions

The focus of this hermeneutic phenomenological study was on the meaning of the experience of implementing universal design for learning (UDL) in higher education. The overarching research question for this study was: what is the meaning that faculty and instructional designers ascribe to the experience of implementing UDL in higher education?

The research sub questions for this study follow:

1. What are the lived experiences of faculty and instructional designers when implementing UDL in higher education?
2. What meaning do faculty and instructional designers that have implemented UDL in higher education ascribe to UDL?
3. What process do faculty and instructional designers use when planning to implement UDL in higher education?

Research Design

The research design was comprised of two semi-structured interviews and a think-aloud activity used to observe faculty and instructional designers as they implemented UDL when given a prompt. The think-aloud activity was meant to help the researcher observe the process of UDL implementation and the steps faculty and instructional designers take to implement UDL techniques. Think-aloud interviews can include activities such as lesson planning out loud; think-aloud activities can support participants in exploring their thinking about the phenomenon

(Lauterbach, 2018). The main aim of think-aloud interviews is to provide insights into problem solving processes that use working memory (Charters, 2003; Leighton, 2017; Reinhart, 2022).

Think-aloud interviews have been used in education research widely (Reinhart, 2022). According to Ericsson and Simon (1980), verbal reports (or think-aloud interviews) do not change the structure of thought processes, making this a viable method for studying thought processes while solving problems. They argue that "…verbal reports, elicited with care and interpreted with full understanding of the circumstances under which they were obtained, are a valuable and thoroughly reliable source of information about cognitive processes" (Ericsson & Simon, 1980, p. 247). To reduce bias in responses, researchers should avoid being intrusive and leading the participant in a certain direction (Chi, 1997). This was avoided by only speaking in order to prompt the participant to keep talking if they are silent for approximately five to 10 seconds (Leighton, 2017). This allowed the focus to be on participant reasoning rather than influence from the researcher (Reinhart, 2022).

In think-aloud interviews, it is important to begin with an ideal template or model of the task (Chi, 1997). For this study, the ideal template was the UDL framework that can be used to apply UDL. Leighton (2017) provides a recommendation of four aspects to include in the think-aloud prompt including an introduction to the study's objective and purpose of the think-aloud activity, an explanation of the think-aloud process, acknowledgement of procedure limitations and reiterating that participants are not being evaluated and including a brief practice activity. Chi (1997) also recommends that a researcher should provide a practice prompt for participants. These methods were used in creating the think-aloud prompts in this study (see Appendix C). Retrospective questioning immediately after completion of the think-aloud activity was used to help expand parts of the thought process (Charters, 2003; Leighton, 2017).

The use of hermeneutic phenomenology provided a rich and nuanced understanding of the experiences and perspectives of the participants regarding UDL implementation. Hermeneutic phenomenology has been identified as an effective approach for studying lived experiences and the meaning ascribed to them (Peoples, 2021). As noted by Friesen et al. (2012), hermeneutic phenomenology has the ability to bring "pedagogical research into harmony with everyday pedagogical practice" (p. 123). Hermeneutic phenomenological research is particularly useful in educational research because it allows for the exploration of the lived experiences of participants within their specific context.

Phenomenological research involves verbal accounts of lived experiences (Larsen & Adu, 2021). These verbal accounts are then interpreted to gain insights into the meaning of the experience (Larsen & Adu, 2021). One of the challenges to UDL implementation is the loosely defined operational definition of the UDL framework (Diedrich, 2021). Investigating a lived experience can create an understanding of the meaning of that experience (Larsen & Adu, 2021). Therefore, investigating the lived experience of UDL implementation in higher education can explore the nuances in the meaning of UDL implementation.

In hermeneutic phenomenology, context includes factors that add meaning to understanding an experience (Dibley et al., 2022). The goal of hermeneutic phenomenology is to provide a rich and detailed description of the lived experiences of individuals, and this is only possible through a thorough examination of the researcher's own experiences and beliefs. “Lived experience… is a representation and understanding of a researcher or research subject’s human experiences, choices, and options and how those factors influence one’s perception of knowledge” (Boylorn, 2008, p. 489). Research focused on lived experience and hermeneutic

phenomenology relates to how people live through (what they do and how they do it) and respond to experiencing a phenomenon (Boylorn, 2008) (such as UDL implementation).

Friesen et al. (2012) emphasized the importance of the researcher's self-reflection and self-awareness in hermeneutic phenomenological research, stating that this is crucial for a successful and meaningful study. Van Manen (2001) recommends hermeneutic reduction where the researcher reflects on their biases and pre-understandings regarding the research question to overcome subjective expectations or inclinations to avoid premature understandings of a phenomenon or experience. Pre-understanding is the researcher's situatedness and relationship with the world and how this allows the researcher to interpret a phenomenon (Dibley et al., 2022). During hermeneutic phenomenological studies, the focus should be on the participants' experiences and the phenomenon under investigation (Friesen et al., 2012).

Researcher Positionality

In hermeneutic phenomenological research, it is essential that the researcher is transparent about their subjective experiences, prior knowledge, and any biases they may bring to the study (Friesen et al., 2012). This level of self-awareness, transparency, and positionality allows for a deeper understanding of the researcher's perspectives and how these may influence their interpretation of the data. By stating the researcher's positionality and pre-understanding prior to completing the interviews, the investigator can participate in reflexivity or self-awareness to open up to different perspectives and ways of thinking about an experience or phenomenon (Dibley et al., 2022). This reflexivity should be used throughout the research process to ensure rigor (Dibley et al., 2022). For the purposes of this study, the researcher began her UDL journey while completing her master's degree in education specializing in educational technology. During her last couple of semesters, she learned about the UDL framework. Prior to

this, she had not heard about UDL. The idealism of UDL diminishing learning barriers and meeting the learning needs of all students drew the researcher's attention. After this, she explored UDL in her own work as a University Librarian. She began implementing UDL techniques in her library instruction sessions as well as the one-credit library courses she teaches. She received positive student feedback and used UDL recommendations to create multimodal training materials for student workers in the library.

After the successes of implementing UDL in the library over time, she began speaking to other faculty about the potential of UDL in higher education. She led a UDL faculty learning community and read *Reach Everyone, Teach Everyone* by Tobin and Behling. This caused the Center for Excellence in Teaching and Learning to hold a book club with the same title. Additionally, the researcher helped develop the new general education curriculum requirements to begin fall of 2024 to include UDL. Since many faculty had not previously heard about UDL, the researcher began to offer a UDL academy in the summer of 2021.

She has taught faculty about UDL and assisted faculty in implementing UDL in their own courses. The researcher conducted research in UDL implementation at her place of employment. She has led a UDL academy for faculty over the past three summers and interviewed faculty participants about their UDL implementation efforts. She also observed a class session for each participating faculty member to record how many different UDL checkpoints were utilized during the class session (Kirsch, 2023). Her interest in further exploring the experience of faculty and instructional designers implementing UDL and the meaning of UDL implementation in higher education stems from the desire to understand why some faculty choose to implement UDL and what affects that experience. Instructional designers often assist faculty members during the course design process, which is when it is most beneficial to use the UDL framework

to proactively create course materials and assignments that address various UDL guidelines and checkpoints. With this perspective, the researcher is biased towards seeing the benefits of UDL implementation. Further assumptions and biases were reflected on and explored in the researcher journal.

Based on prior experience with implementing UDL and training faculty in UDL implementation, the researcher had a preconception that the UDL framework is complex and can be challenging to implement given the limited time faculty and instructional designers often have in higher education and in making significant changes to courses in order to implement UDL. She expected that this would be witnessed during the interviews but attempted to put aside these expectations and experiences in order to focus on the participant's descriptions and experiences. While this prior knowledge informed the researcher's interpretation of the data, it did not affect the interviews, or the questions asked. The different experiences of participants were compared and contrasted, which modified the researcher's understanding of the phenomenon (Peoples, 2021). Recommendations from the literature (Dibley et al., 2022; Galleta, 2013; Peoples, 2021; Vagle, 2018) were utilized during the phenomenological interviews to avoid steering participant responses in one direction or another and leave room for participants to share their beliefs, experiences, and the meaning they hold for UDL and UDL implementation.

Pilot Study

Faculty and instructional designers were asked to complete a survey as part of a related pilot study prior to the current study (Kirsch & Luo, 2023). Faculty and instructional designers were recruited from professional email listservs, social media channels including Twitter and Facebook and the Association for Educational Communications and Technology Facebook channels, and in LinkedIn profiles for faculty and instructional designers working in higher

education that mentioned universal design for learning or UDL. A total of 151 people participated including 58 instructional designers and 93 faculty members from various disciplines (Kirsch & Luo, 2023).

Results demonstrated that faculty and instructional designers learned about UDL in a variety of ways, such as webinars and daylong trainings, conference sessions and workshops, or journal articles. Instructional designers tended to feel more comfortable with UDL and training or mentoring faculty in applying the UDL framework, in fact 82% of instructional designers surveyed had previously helped faculty learn about or apply the UDL framework (Kirsch & Luo, 2023). Reasons given for implementing UDL included accessibility, being a best practice or the right thing to do, diminishing learning barriers or meeting the needs of variable learners, and equity and inclusion. Additionally, faculty and instructional designers believed the most important UDL guidelines were comprehension, expression and communication, and perception (Kirsch & Luo, 2023). These presented interesting results, but a richer, more nuanced understanding of UDL implementation in higher education is needed from a hermeneutic phenomenological perspective to further explore this research area.

Participants

The sample size in phenomenological research can vary, but it is generally recommended to keep the sample between five and 25 participants, depending on the type of phenomenology being studied (Creswell & Poth, 2018). For hermeneutic or interpretive phenomenological studies, a smaller sample size of between five and 10 participants is typically recommended (Larsen & Adu, 2021).

Purposive sampling was used to recruit five faculty and five instructional designer participants that have implemented UDL or have assisted faculty in implementing UDL in higher

education. Faculty and instructional designers recently surveyed for the pilot study (Kirsch & Luo, 2023) were asked if they would be interested in participating in a future study exploring UDL implementation in higher education. A total of 40 individuals submitted their names and email address stating they would be willing to participate in further research exploring UDL implementation in higher education.

These 40 people were emailed with information about the study and a recruitment survey (https://briarcliff.libwizard.com/f/UDLinterviews) that determined their eligibility for participating in this study. The questions on the eligibility survey are also available in Appendix A. The initial group of 40 led to 7 faculty and 8 instructional designers that were interested in participating in the research. Ten participants were selected from this group from varied disciplines, types of institutions, and experience with UDL to ensure that a variety of perspectives would be present in the data. Participant demographics and information can be viewed in Table 4 and Table 5. Demographic information and role, experience, and institutional information are shared in separate tables to help protect participant identities. Pseudonyms are used in place of participant names. The 10 participants were entered into a raffle for two $50 Amazon gift cards as an incentive for participation in the study. One gift card was given to a faculty member participant and one gift card was given to an instructional designer participant.

Table 4

Participant Demographics

Gender	Age	Ethnicity
Female	40-49	Asian
Female	30-39	Caucasian
Female	40-49	Caucasian
Female	40-49	Caucasian
Female	50-59	Caucasian
Female	50-59	Caucasian
Female	50-59	Caucasian

Female	50-59	Caucasian
Male	30-39	Caucasian
Male	50-59	Caucasian

Table 5

Participant Role, Experience, and Institutional Information

Pseudonym	Role	UDL Familiarity	Courses/ Projects	Institution
Brandy	Faculty- Previously Psychology, now Research and Evaluation	3-4 years	2 or 3	Private- Technical University- urban, Northeast- 10,001-20,000 students
Charlie	Faculty- Librarian	3-4 years	2 or 3	Public- University- rural Southeast- 5,001-10,000 students
Elizabeth	Faculty- English	5+ years	5+	Public- Technical College- urban Southeast- 5,001-10,000 students
Madeline	Faculty- Sociology	3-4 years	4 or 5	Private- University- urban Midwest- under 1000 students
Suzie	Faculty- Nursing	5+ years	5+	Public- Medical University- urban Midwest- 1001-5000 students
Adrian	ID or EdTech	5+ years	5+	Private- College- suburban Midwest- under 1000 students
Echo	ID or EdTech	3-4 years	5+	Private- University- rural West- 40,001-50,000 students
Hannah	ID or EdTech	3-4 years	5+	Public- Community College- urban West- over 50,000 students
Michelle	ID or EdTech	3-4 years	5+	Public- University- urban Midwest- 10,001-20,000 students
Snoopy	ID or EdTech	5+ years	2 or 3	Private- College- suburban Southeast- 1,001-5,000 students

Note: The line in the middle of the tables divide the divides the faculty and ID participants.

Instruments

Two semi-structured interviews were conducted with each participant. During the initial interview, broad questions were asked and probed for clarification, and notes were taken

regarding meaningful parts of the story or response to return to later in the interview for more discussion (Galletta, 2013). Later in the interview and during the second interview, questions were asked in order to reflect on and further explore and clarify the meaning about implementing UDL (Galletta, 2013).

Initial Interview and Think-Aloud Activity

Initial semi-structured interview questions were used during the first interview, along with probing questions to ask for more detail or explanation of participants' responses. To help develop rapport with participants, the researcher asked several opening questions before going into the questions for the study. Interview questions are available in Appendix B. After the initial semi-structured interview, the think-aloud activity was conducted (prompts and questions can be viewed in Appendix C).

In addition to the interview and think-aloud activity transcripts, a researcher journal was kept, and notes were taken during the interviews and after interviews about experiences and initial reflections of each interview. This journal can help track personal biases and expectations and how those conceptions changed throughout the hermeneutic circle (Peoples, 2021). The researcher journal and transcripts from the first interview and think-aloud activity were used to further develop questions for the second interview.

Final Interview

During the second semi-structured interview, participants were asked questions to gain further insights and clarification on the phenomenon of UDL implementation in higher education. These interviews were used to explore and develop an understanding of the lived experience of implementing UDL in higher education and to describe the meaning of the experience (Lauterbach, 2018). A second semi-structured interview was held with participants

approximately one-week after the first interview and think-aloud activity to clarify and elaborate on statements made by the participants during the first interview and the think-aloud activity. Questions similar to those listed in Appendix B were used but depended upon the first interview and think-aloud interview responses.

Co-constitution refers to the bond between an individual and the world (Dibley et al., 2022). This concept is important to consider during semi-structured interviews and recap or restate what the participant is saying, and asking if that is correct right after the participant's original statement (Dibley et al., 2022). This could include questions like: are you telling me…? Or why do you feel that…? This can help confirm different parts of the participant's story or comments for the researcher. This confirmation from the participant makes the data more powerful and trustworthy (Dibley et al., 2022).

Pilot Test of Instruments

A pilot test of the interview instruments and think-aloud prompt was conducted to improve the clarity of the think-aloud prompt and interview questions and make sure they are at an appropriate level of difficulty (Pan et al., 2023). An educator familiar with UDL in higher education that previously taught at the researcher's workplace was asked to participate in the initial interview questions and think-aloud activity and provide feedback on the instruments. This educator met the eligibility criteria for this study, making them a viable representative of the study's participants. Questions were adjusted for clarity based on the pilot participant's feedback, such as breaking up the final think-aloud compound question into two separate questions and selecting a different practice prompt for the think-aloud activity.

The initial prompt of having participants describe their process of determining what they wanted for dinner was changed to: "You've been asked to give a presentation about something

current in your field of study. Walk me through the process of how you decide what topic to present on at a conference?" Finally, the think-aloud prompt was slightly reworded for additional clarity. Other interview questions were deemed to be organized in an appropriate sequence, clear, and understandable by the pilot participant.

Data Collection

This study was submitted for approval by the institutional review board. This ensured that the research was ethical and kept participants anonymous and reduced the chance of harm. The interviews were held virtually in Zoom. Participants were asked for a pseudonym to help protect their identity. During interviews, the researcher actively listened to the participants and was aware of any contradictions described by the participants about their experience implementing UDL in higher education. Reflexivity is required in active listening to remain open and self-aware of the participant's perspectives and experiences that may differ from pre-understandings (Dibley et al., 2022). Interviews were audio recorded to create automatic transcripts, which were downloaded and then deleted from the Zoom account. Transcripts were edited for accuracy. After the research and dissertation were completed, the interview audio recordings were deleted. Transcripts were kept on a password-protected laptop and a back-up was stored on an external hard drive, which was kept in a locked drawer when not in use.

After participants were selected based on the recruitment survey, participants were asked to schedule their first interview at a date and time at their convenience. The initial interview and think-aloud activity took place at the same time during the first Zoom session and took between one and two hours depending on how detailed participants were in their responses to questions. The final interview took place approximately one week after the first interview and think-aloud activity to give the researcher time to initially review and code them and list follow-up questions

needed for clarification and elaboration. The final interview took between 30 and 45 minutes to complete.

Data Analysis

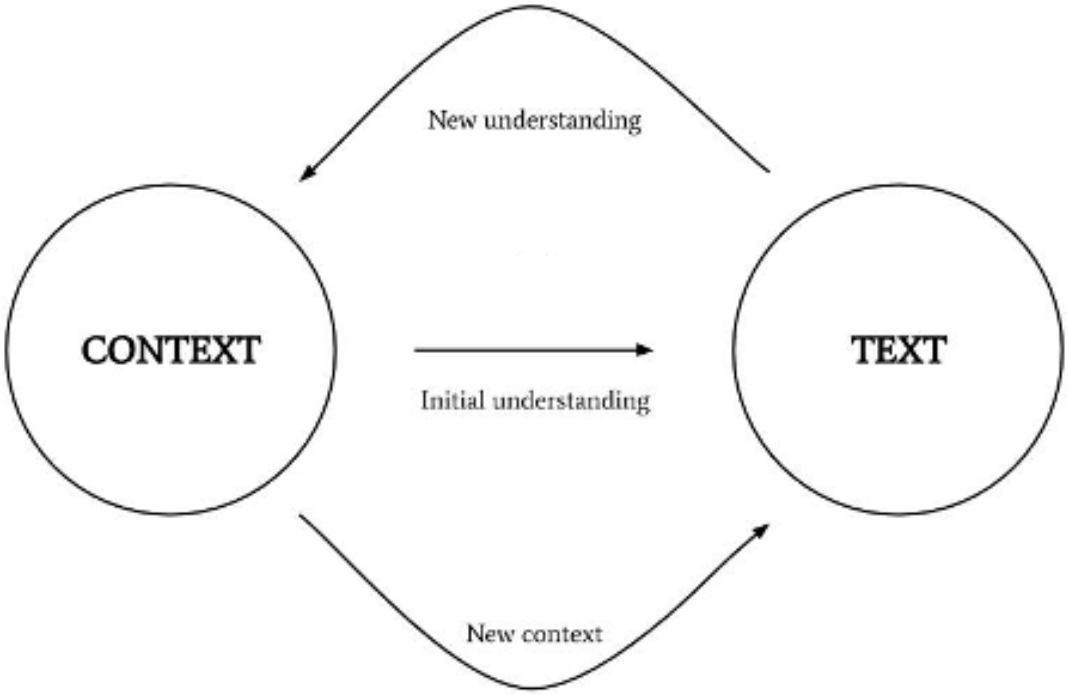
By researching both faculty and instructional designer experiences implementing UDL in higher education, a more in-depth understanding of the phenomena of implementing UDL could be achieved. There were three types of comparisons that could be made regarding the lived experiences of faculty and instructional designers in implementing UDL in postsecondary education. These comparisons included individual lived experiences of faculty members, individual lived experiences of instructional designers, and lived experiences shared between faculty and instructional designers. By making these comparisons, any similarities or differences in the experiences of implementing UDL in postsecondary education could be identified and discussed. Some faculty participants worked with instructional designers with their UDL implementation, and some instructional designers worked with faculty in implementing UDL and obtaining both of these possibly interrelated experiences lead to a deeper understanding of the lived experience of UDL implementation.

Analysis of the first and final semi-structured interviews occurred with a whole-parts-whole process recommended by Vagle (2018). First, the researcher conducted a holistic reading of the entire transcript, followed by a line-by-line reading with notetaking and marking of excerpts, noting potential follow-up questions for the second interview, and subsequent readings to code and articulate meanings and themes (Vagle, 2018). This is a similar process to what van Manen (2001) recommends with the holistic, selective, and detailed thematic analysis and the hermeneutic circle with interpretation being an ongoing task of relating the transcript data to the context of the interview and the phenomena under study. Heidegger (1927/1962) discussed the

hermeneutic circle as the process of understanding that moves from parts of an experience (codes and themes) to the whole of experience (full transcripts from the interviews) and back and forth to reach the meaning of phenomena (see Figure 2). This involves bridling or restraining researcher pre-understandings to allow the phenomenon to present itself through ongoing reflection and interpretation of the experience, which includes the researcher acknowledging their assumptions or positionality (Valentine et al., 2018).

Figure 2

Heidegger's Hermeneutic Circle



Note. From *Hermeneutic Circle*, by DukeLondon, 2021, Wikimedia Commons, (https://upload.wikimedia.org/wikipedia/commons/d/d5/Hermeneautic_Circle.png). CC BY-SA 4.0.

The hermeneutic circle or spiral involves a series of steps that are revisited throughout the data analysis (Suddick et al., 2020). These steps can be viewed in Figure 3, which were

considered when analyzing the data. Broadly, the steps include reading and coding the transcripts, categorizing and theming the codes, sharing findings and interpretations [such as with a critical friend], which involve the processes of building analytic rapport, checking for coherence, and attributing meaning (Boadu, 2021). The researcher engaged in reflexivity during the hermeneutic circle to consider how positionality informed interpretations of the data and combined this understanding with what was observed in the interview data (Dibley et al., 2022). This process helped the researcher arrive at meaningful understandings and insights, which is the goal of phenomenological research (van Manen, 2017). In conjunction with the hermeneutic circle, data for each transcript were coded first, phenomenologically, and then pattern coding was applied per Saldaña's (2021) recommendations. The researcher continued adding to the researcher journal about biases, preconceptions, assumptions, expectations, and any changes experienced with these preunderstandings throughout the data analysis process.

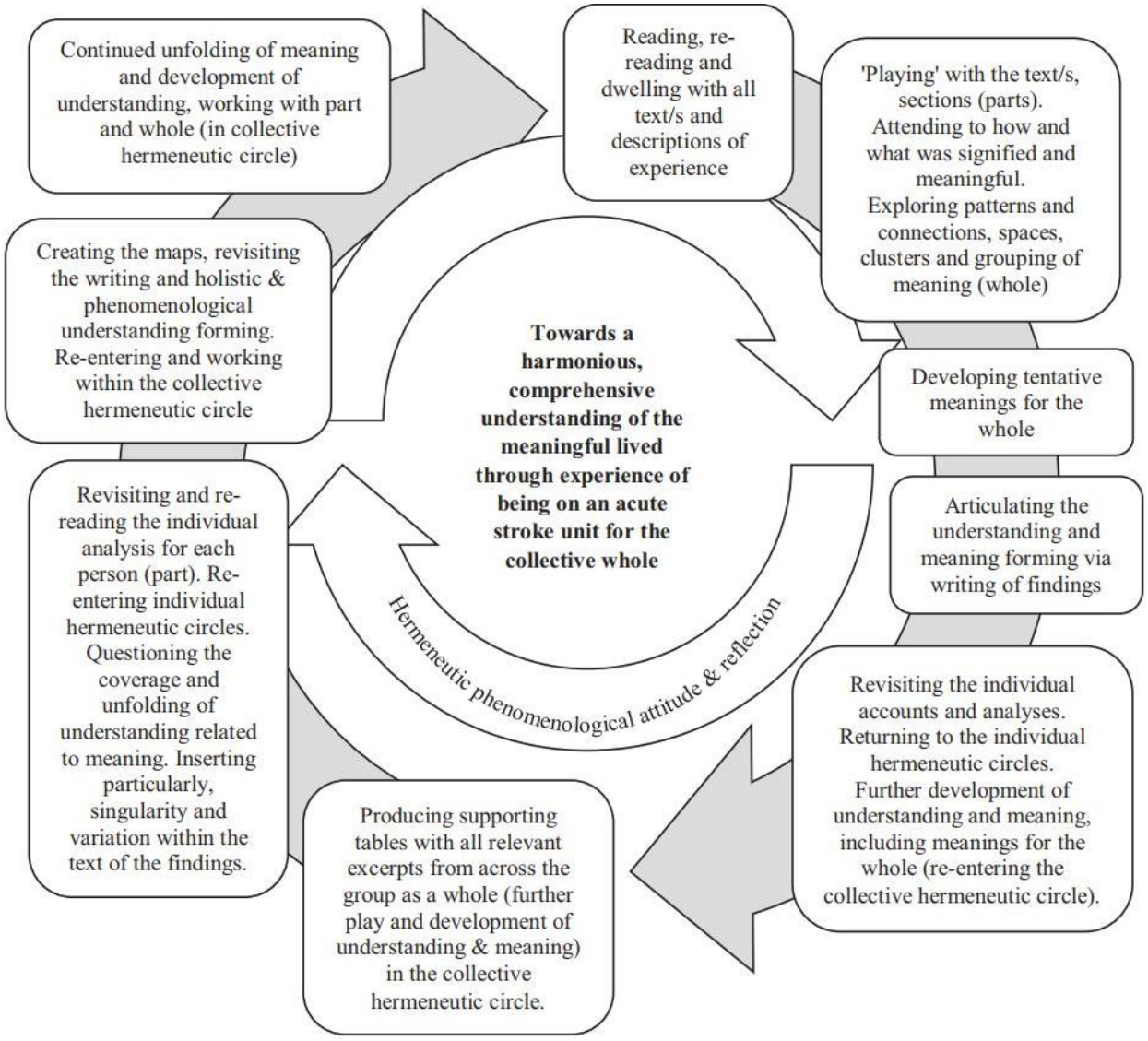
After the interviews were collected, they were coded phenomenologically. This involved analyzing the data to identify common themes and patterns from the participants' experiences and perspectives into two thematic areas: what a phenomenon is and what a phenomenon means (Saldaña, 2021). In this case, it involved what the lived experience of UDL implementation in higher education is and what meanings are ascribed to UDL by participants with the experience of implementing UDL in higher education. This was an important step in the research process because it allowed the researcher to gain a deeper understanding of the lived experience and meaning of UDL implementation for faculty and instructional designers in higher education, as well as detect any salient differences of UDL experiences among faculty versus instructional designers. Initial themes were created for each participant after initially coding the interviews, which were combined into groups of faculty and instructional designers, and finally the entire list

of codes was used to create themes and sub themes. The original transcripts were then reviewed, and excerpts were selected that illustrated the themes and sub themes.

Once the data was coded, the essential aspects of the phenomena could be described (Creswell & Poth, 2018; van Manen, 2001). This was done by sharing relevant excerpts for different participants from the interview and think-aloud activity transcripts for each of the themes that were identified. The creation of tables of themes provided a clear and concise summary of the key findings. The final result of the study was a composite summary of the implementation of UDL in higher education and the meaning that faculty and instructional designers ascribe to this experience. This composite description was based on the themes from the data and provides a comprehensive summary of the experiences and perspectives of participants (Peoples, 2021).

Figure 3

Data Analysis for a Hermeneutic and Phenomenological Understanding



Note. From "The Work of Hermeneutic Phenomenology," by K. M. Suddick, V. Cross, P. Vuoskoski, K. T. Galving, and G. Stew, 2020, *International Journal of Qualitative Methods, 19,* p. 10 (https://doi.org/101177/1609406920947600). CC BY-NC 4.0.

The think-aloud activity had a different method of data analysis. Coding for the think-aloud activity was based on the standardized coding manual (see Table 6). The process of

analyzing the think-aloud activity transcripts included the following steps recommended by Chi (1997):

1. The first step is to reduce or sample the protocols. This will be accomplished by removing fragments of thoughts that are unintelligible (such as a couple words or umm, uh, and other placeholder words).
2. The next step is to segment the protocols. Transcripts will be segmented by idea rather than by line or paragraph.
3. After segmentation, a coding scheme needs to be selected. The standardized coding manual will be used. Additional coding categories or themes will be created as needed based on the think-aloud transcripts.
4. The evidence in the coded protocols should be operationalized to create a mapping to a chosen structure. This has already been completed in the standardized coding manual, but additional categories, descriptions, and code numbers would have been added as needed.
5. The mapped structure can be depicted if desired. This can be viewed in Table 6.
6. The next step is to seek patterns in the mapped structure. These patterns may be based on individual participant responses or more broadly from multiple participants' responses.
7. Next, the patterns found in the mapped formalism need to be interpreted. Patterns will be interpreted in the discussion for the study and will be triangulated with other interview data and themes or categories.
8. These steps can be repeated as needed.

For this study, segments for the transcripts occur as new ideas rather than new paragraphs. The context of surrounding segments was taken into consideration when coding the segments (Chi, 1997).

Table 6

Standardized Coding Manual

Category	Description	Code
Multiple means of representation	Providing different formats of course materials or discussing representation in general	1
• Options for perception	Offering ways to customize displays and alternatives for auditory and visual information	1A
• Options for language and symbols	Clarifying vocabulary and symbols, promote understanding across languages, and use multimedia	1B
• Options for comprehension	Activate prior knowledge, highlight relationships and important concepts, and maximize transfer	1C
Multiple means of action & expression	Providing different options for course assignments or discussing action and expression in general	2
• Options for physical action	Provide access to assistive technologies and vary response methods	2A
• Options for expression and communication	Use a variety of media and tools for communication and scaffold content to provide practice opportunities	2B
• Options for executive functions	Guide goal setting and strategy development	2C
Multiple means of engagement	Providing different ways to engage with the course or discussing engagement in general	3
• Options for recruiting interest	Allow for learner autonomy, optimize relevance and authenticity, and minimize distractions	3A

• Options for sustaining effort and persistence	Vary demands to increase challenge, provide mastery-oriented feedback, and foster collaboration	3B
• Options for self-regulation	Facilitate personal coping strategies and develop learner self-reflection	3C
Motivations	Underlying purposes, aims, or motives shared	4
Feelings	Affective response to the prompt, process, or aspects of implementing UDL	5
Explain/Justify	Providing reasoning for choices	6
Choose	Selecting different UDL checkpoints or guidelines to implement	7
Value	Benefits of UDL or aspects of UDL	8
Meaning	UDL as an intervention/framework/ movement etc.	9
Causal/Relationships	Relationships between different guidelines or aspects of UDL or implementation methods utilized	10

Note. Created based on the UDL principles, guidelines, and checkpoints from CAST (2018) and concepts and assertions previously utilized by Sheridan et al. (2019).

Trustworthiness and Quality

Trustworthiness and quality in phenomenological studies is determined in similar ways to other qualitative studies. Several methods were utilized to assure data reliability. As discussed previously, an explanation of researcher bias based on the researcher journal was used to help ensure reliability by bridling researcher pre-understandings so participant perspectives and experiences could be reviewed with a more open mind. Reflexivity was used throughout the

research process by responding to the following questions, similar to those posed by Dibley et al. (2022) to realize how past experience and pre-understandings inform, but do not rule research findings.

- What interests me about this topic?
- What about my own past experiences helps or hinders this research and what should I do about it?
- What do I hear in this participant's story and how does this challenge my pre-understanding of UDL implementation?
- Am I open to other perspectives and avoid introducing bias by asking 'can you explain' rather than 'is that because'?
- Am I open to alternative explanations and meanings within the data or am I only seeing what I want or expect to see?

Engaging in these questions within the researcher journal helped to open the researcher up to other explanations, perspectives, and experiences of the participants. Using these reflexivity techniques as a robustness indicator improved the trustworthiness and rigor of the phenomenological study (Dibley et al., 2022). This allowed the researcher to consider pre-understandings in light of what was stated by participants, which could change and adjust the researcher's pre-understandings to a new understanding. Combining the researcher's pre-understandings with what was shared by participants to aid in a new understanding is known as reflexivity (Dibley et al., 2022). Additionally, the researcher spent two interview sessions with each participant for prolonged engagement and gained a better understanding of their context and perspective (Peoples, 2021). Triangulation was used to address reliability (Charters, 2003; Peoples, 2021) with the initial interviews, think-aloud activity, and follow-up interviews as well

as the researcher journal. Combining the semi-structured interviews of the hermeneutic phenomenological method with the think-aloud activity and researcher journal increased the reliability of findings through triangulation.

A second PhD student in instructional design and technology acted as a critical colleague or interpretive partner to share initial findings and gain a critical perspective on the data and the researcher's initial data analysis. This interpretive partner helped challenge pre-understandings and how the researcher interpreted the interview data (Dibley et al., 2022). Peer review was one method used to address reliability (Peoples, 2021). The same educator that met the eligibility requirements and participated in the pilot study acted as a neutral colleague to review the methods, findings, discussion, and conclusions to help with accountability. Additionally, rich descriptions were used to provide details of participants' contexts and experiences to help show their lived experience of implementing UDL in higher education. These methods helped assure reliability of the data in this study (Peoples, 2021).

Reflexivity and co-constitution both impacted the quality of the study (Dibley et al., 2022). Trustworthiness was also enhanced through being explicit about the study's procedures, design, researcher positionality, and methods of reflexivity and co-constitution (Dibley et al., 2022). Transparency of data collection and analysis and use of direct quotes to illustrate themes and support findings helped maintain an audit trail and credibility for hermeneutic phenomenological research (Dibley et al., 2022). Creating this audit trail allows other researchers to conduct a similar study, leading to increased dependability and reliability (Dibley et al., 2022).

In addition to the trustworthiness recommendations provided by Dibley et al. (2022) for hermeneutic phenomenological research, de Witt and Ploeg (2006, p. 224-226) describe several components to consider as "expressions of rigor" in hermeneutic phenomenology. These include:

- Balanced integration involves the philosophical explanation being intertwined with the participant's experience and voice in the interview transcripts.
- Openness relates to explicitly sharing the study process and decisions made during data collection and analysis to present an audit trail that can be followed by others.
- Concreteness situates the findings in the real world or understanding the experience of a phenomenon in the participant's world.
- Resonance involves the impact of findings on the reader and how the findings make sense or are recognized by the reader in their own world or experience.
- Actualization refers to the possible impact of findings and how they can be re-interpreted by others for new understandings. (p. 224-226).

The components described by de Witt and Ploeg (2006) and the recommendations by Dibley et al. (2022) are specifically meant to be utilized in hermeneutic phenomenology research as methods of trustworthiness. While these are different from positivist methods of trustworthiness including reliability and generalizability, they have been developed to demonstrate a study's trustworthiness for interpretive studies, similar to the current study.

Conclusion

This hermeneutic phenomenological qualitative study provides an understanding of faculty and instructional designer experiences of implementing UDL in higher education and the meaning ascribed to UDL. The phenomenological interviews helped answer the first two sub research questions about the lived experience of implementing UDL techniques and the meaning that faculty and instructional designers ascribe to UDL. The third sub research question regarding the process of planning a UDL implementation has been investigated with the think-aloud activity in addition to the semi-structured interviews.

Data was analyzed according to recommendations from the literature for both semi-structured interviews (Dibley et al., 2022; Galleta, 2013; Peoples, 2021; Vagle, 2018) and the think-aloud activity (Charters, 2003; Chi, 1997; Leighton, 2017). Several methods were used to ensure trustworthiness and data reliability including explicitly stating the researcher's preconceptions about the topic and prior experience and beliefs related to UDL implementation in higher education; triangulation of semi-structured interviews, the think-aloud activity, and the researcher journal; and a critical colleague improved data reliability, along with peer review by an educator familiar with UDL. Alignment between sub research questions, data collection, and data analysis methods can be reviewed in Table 7.

Table 7

Question and Data Collection and Analysis Methods Alignment

Sub Research Questions	Data Collection	Data Analysis
What are the lived experiences of faculty and instructional designers when implementing UDL in higher education?	• Researcher journal • Semi-structured interview using reflexivity and active listening	• Bridling researcher preunderstandings with reflexivity techniques • Hermeneutic circle with whole-parts-whole process to reflect on and interpret the data in order to create phenomenological codes and themes • Triangulation of collected data to create a table of themes and a composite description of UDL implementation in higher education

		• Critical colleague and interpretive partner helps challenge preunderstandings and how interview data is interpreted • Peer review by a neutral colleague (an educator familiar with UDL) to review methods, findings, and conclusions to encourage accountability
What meaning do faculty and instructional designers that have implemented UDL in higher education ascribe to UDL?	• Researcher journal • Semi-structured interview using reflexivity and active listening	• Bridling researcher preunderstandings with reflexivity techniques • Hermeneutic circle with whole-parts-whole process to reflect on and interpret the data in order to create phenomenological codes and themes • Triangulation of collected data to create a table of themes and a composite description of UDL implementation in higher education • Critical colleague and interpretive partner helps challenge preunderstandings and how interview data is interpreted • Peer review by a neutral colleague (an educator familiar with UDL) to review methods, findings, and conclusions to encourage accountability

What process do faculty and instructional designers use when planning to implement UDL in a course?	• Researcher journal • Think-aloud activity	• Bridling researcher preunderstandings • Reduce and segment transcripts by idea • Code findings based on the standardized coding manual and add additional categories as needed • Interpret patterns in the mapped data • Triangulation of collected data • Critical colleague and interpretive partner helps challenge preunderstandings and how think-aloud activity data is interpreted • Peer review by a neutral colleague (an educator familiar with UDL) to review methods, findings, and conclusions to encourage accountability

CHAPTER 4

FINDINGS

In order to help answer the overarching research question of the meaning that faculty and instructional designers ascribe to the experience of implementing UDL in higher education, three sub questions were explored in this study. Each sub question is answered with a corresponding table or tables of themes and number of mentions as well as a representative figure or figures of themes. Although typically in a phenomenological study the number of mentions for each theme would not be included, in order to align with conventions in the instructional design and technology field this information has been provided. The sub questions about faculty and instructional designer lived experiences, meanings ascribed to UDL, and the process of implementing UDL in higher education are answered with the following participant perspectives and experiences with relevant paraphrases and quotations for each theme and subtheme. Faculty and instructional designers perceived the implementation of UDL to be worthwhile but with challenges and a need to tie implementation firmly to outcomes.

The lived experience is embodied by the themes of professional empowerment, navigating constraints, emotional resonance with UDL, evaluating impact, and practical UDL implementation. The ascribed meanings of UDL that emerged were related to metaphorical insights for the process, accessible learning landscapes, blueprint for effective teaching, connectedness between UDL and pedagogical approaches, and inclusive practices for equitable learning. The process of implementing UDL was embodied by six steps of UDL discovery, preparing and launching the UDL process, decision-making in UDL integration, implementing UDL strategies, evolving synthesis of UDL-pedagogical change, and embedding UDL practice across the institution. These steps of the process were complemented by six descriptions of the

process including reflective pedagogical practices, negotiating pedagogical trade-offs, professional internalization of UDL, proactive pedagogical adaptation, systematic and deliberate UDL practices, and collaborative pedagogical insight. These will be described in detail for each research sub question.

RQ 1: Faculty and Instructional Designer Lived Experiences When Implementing UDL in Higher Education

The lived experiences of faculty and instructional designers when implementing UDL in higher education was illustrated with several themes. The overarching themes of professional empowerment, navigating constraints, emotional resonance with UDL, evaluating impact, and practical UDL implementation surfaced during analysis of the interview codes. Each of these themes is further categorized with subthemes that will be described and relevant excerpts from the interviews will be shared in the participant's words. The themes are shared in Table 8 along with the participants that described them and the number of times each theme was mentioned. Figures 4-8 display the subthemes for each theme for participants' lived experiences implementing UDL in higher education.

All instructional designer participants and three faculty spoke about professional empowerment for their lived experience of implementing UDL in higher education. Similarly, all but one instructional designer participant navigated constraints during their experience of implementing UDL in higher education. All participants spoke about evaluating impacts and practical UDL implementation. Most participants also experienced an emotional resonance with UDL. In summary, faculty and instructional designers demonstrated a high level of commonality in terms of the noteworthy aspects of their lived experience with UDL implementation.

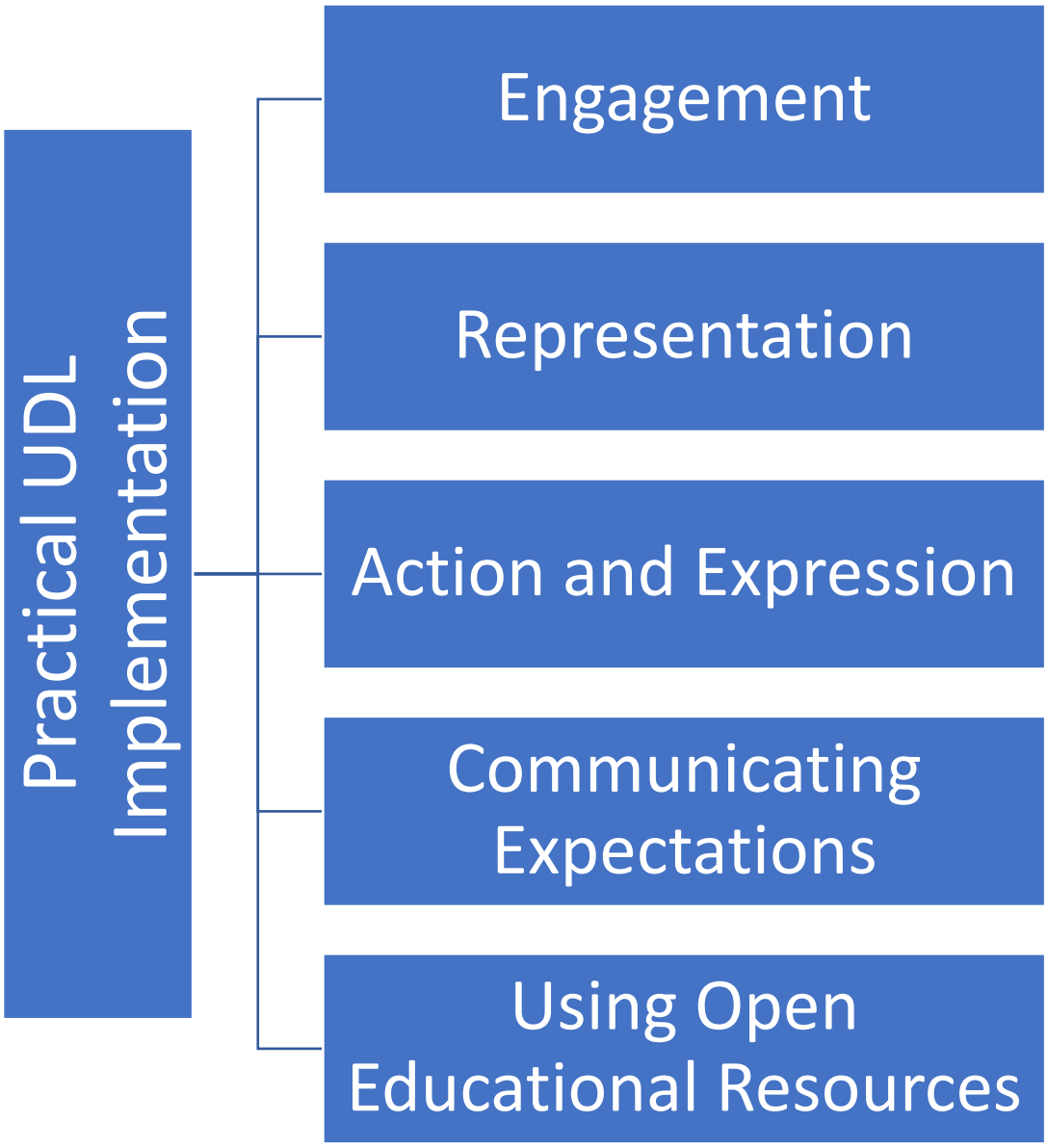
Table 8

Participants' Lived Experiences Implementing UDL in Higher Education

Pseudonym	Navigating Constraints	Professional Empowerment	Evaluating Impact	Emotional Resonance with UDL	Practical UDL Implementation
Brandy	X	X	X	X	X
Charlie	X	X	X		X
Elizabeth	X	X	X	X	X
Madeline	X		X	X	X
Suzie	X		X	X	X
Adrian	X	X	X	X	X
Echo		X	X		X
Hannah	X	X	X	X	X
Michelle	X	X	X	X	X
Snoopy	X	X	X	X	X
Mentions	34	100	146	151	244

Figure 4

Subthemes for the Lived Experience of Practical UDL Implementation Theme



Practical UDL Implementation

Participants spoke about the lived experience of practical UDL implementation, which naturally fell into themes for each of the three overarching UDL principles of providing multiple means of action and expression, representation, and engagement. In addition to these expected themes, participants described the importance of communicating expectations and using open

educational resources (OER). All of the participants shared their lived experiences of practical UDL implementation. This theme was mentioned 244 times by participants. The subthemes for implementing UDL techniques included action and expression (64 mentions), engagement (115 mentions), and representation (27 mentions), as well as the additional subthemes of communicating expectations (14 mentions) and using OER (8 mentions).

Some faculty evidenced the subtheme of action and expression by offering variety in their assignments in terms of format or choice, while others described the importance of supporting students in goals setting and project management under executive function. Several examples of action and expression techniques were discussed by participants. Michelle described this subtheme as how students show their competence with learning outcomes or concepts. She described an example she knew of with a faculty member at her institution sharing how their first generation, diverse students were terrified or intimidated with writing papers. Michelle said,

> He offered them multiple means of expression where they had choices of how they would deliver this content to show their competence with these concepts. They all moved to a much more thorough, detailed worksheet sort of layout, where it was shorter questions that they responded to.

So rather than use the paper format that was intimidating for the professor's students, he had them complete a worksheet. "His intent and thinking about remaking the assessment for multiple means of expression actually resulted in a stronger and more effective relationship so that he could connect better to students." Michelle also spoke about empowering students and "ensuring that I'm able to see what effectiveness is so I can inform my choices and ways that I can give people other opportunities for expression are crucial."

Suzie tended to focus on action and expression by "giving options to the students when possible within the assignments" and "with students working with different tools for completion of coursework." Adrian and Snoopy both spoke of allowing students to complete projects in multimodal or multiple formats and in a different way than typical papers. Hannah, Brandy, and Charlie discussed executive functions and supporting students in setting goals and project management.

The second UDL principle of representation was discussed by most participants in terms of accessibility efforts of captioning, alternative text, and transcripts, while other participants focused on clarifying language for students or supporting knowledge transfer with examples. Suzie focused on captioning and providing transcripts for videos and adding alternative text for images. She felt that "representation is the easiest to do, that you see immediate results." Brandy and Charlie also utilized captions and Echo utilized transcripts for videos. Snoopy likewise discussed using alternative text with images. Several participants spoke about language: Echo about using the CITI Lab language leveling tool and Google dictionary, Michelle using more concise and commonly used words and syntax structure, and Snoopy clarifying language. Transferring knowledge was another concept discussed by participants, including Echo with giving examples to reduce cognitive load and decision fatigue, Hannah also spoke about giving examples to help with transfer and comprehension.

The final UDL principle of engagement was addressed by all participants with self-regulation, guidance, and utilizing different approaches to help students comprehend difficult concepts. Other participants shared how they used humor to minimize threats, the autonomy students have over their learning, and methods for sustaining effort and persistence. Suzie talked about the challenges with self-regulation since "it's hard to change the behaviors of the

students," while Snoopy shared how he encouraged student self-regulation by "setting up a calendar on your phone using alarms." Adrian gave students guidance and parameters to "try some stuff- we might fail- effort and persistence make it safe to fail. We can always keep improving." Elizabeth talked about "reading a room, guesstimating the engagement level of a student" and then noticing when something is not working to "come up with a different approach in the moment on the spot." She also spoke about using humor to minimize threats and sharing interesting news to help with recruiting student interest. Charlie described how using UDL helped engage her students since they are "more excited about the classwork because it feels like they have more control." She felt that heightening the salience of goals and objectives made a big impact on her students. Michelle also felt that providing choice mattered for her students and "when people feel like they're in control of their learning, they tend to engage." Flexible deadlines were another method of giving students more autonomy, according to Brandy. Madeline and Echo spoke about sustaining effort and persistence by helping students understand the importance of a concept (Madeline) and fostering community with WhatsApp for students to engage with each other in and beyond the classroom (Echo).

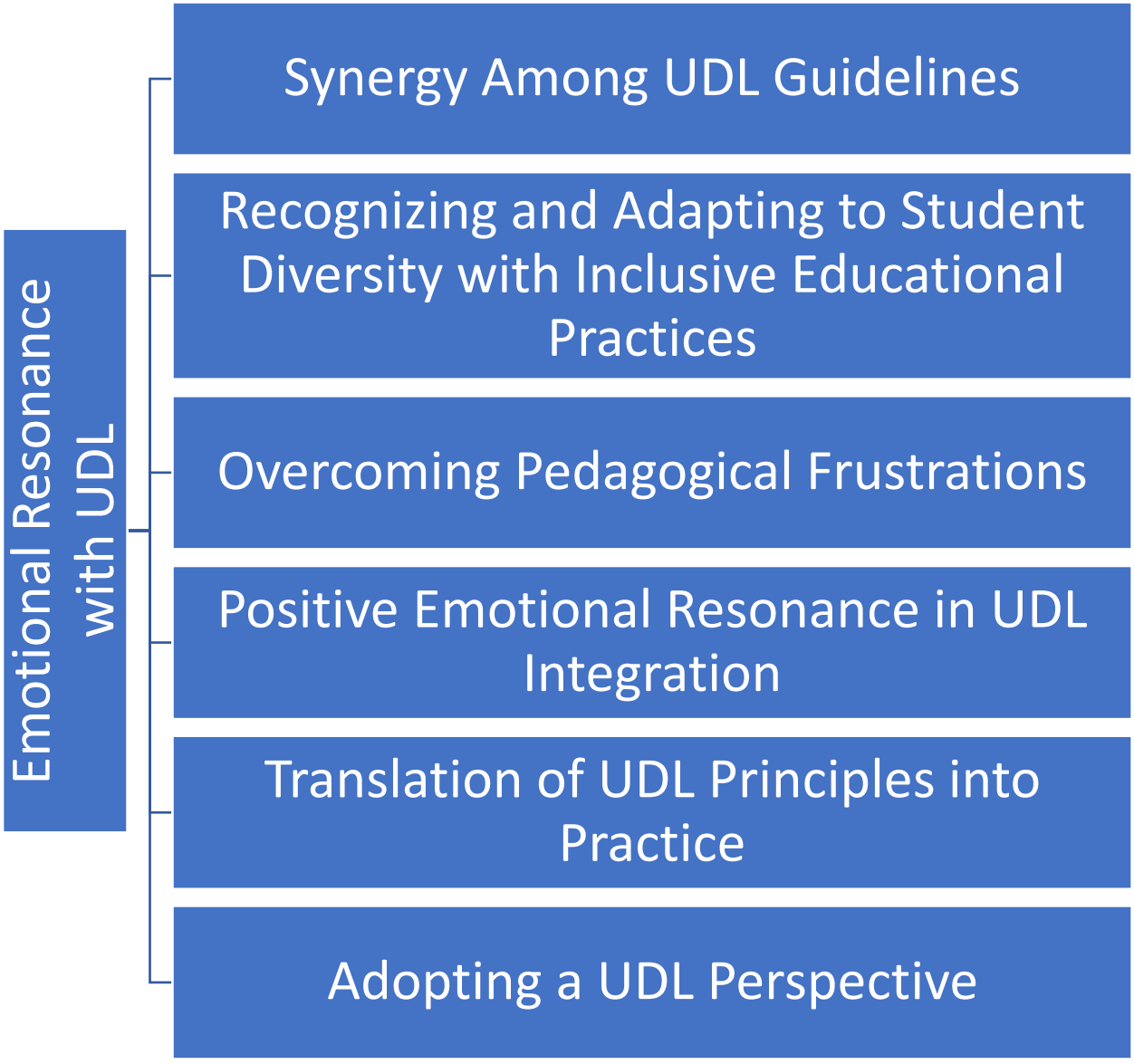
Another subtheme that arose related to the practical implementation of UDL was communicating expectations. Three participants described how they shared expectations with students verbally, through emails, and within rubrics. For example, Elizabeth helped first year students become comfortable with college expectations and Charlie sent weekly announcement emails to students about what is expected of them. Hannah shared expectations during her instructor introduction and Suzie shared expectations in assignment rubrics. Hannah also noted that "UDL doesn't ask us to change our expectations."

Using OER was the final subtheme related to practical UDL implementation. Several participants reimagined UDL and described how they felt OER fit into the framework. Adrian, Echo, and Snoopy all discussed how OER relates to UDL, though it is not specifically discussed in the UDL framework. Adrian was excited about open educational pedagogy (OEP) since he felt "OEP is the natural evolution of taking the ideas behind OER and then broadening them into the UDL space… Where you're talking about representation and how do we help the students see themselves in the curriculum of the course." Similarly, Echo wrote her own OER textbook that is available on Google for students to "download them and use them offline," which helps the international students download the text and use less of their 3G internet. Finally, Snoopy felt that OER helps remove financial barriers for students.

While the specific UDL techniques implemented by faculty and instructional designers varied, they all utilized components of the principles of the UDL framework. Similarly, the lived experience of practical UDL implementation led to emotional resonance with UDL experienced by participants. This emotional resonance with UDL was expressed by four faculty and four instructional designers.

Figure 5

Subthemes for the Emotional Resonance with UDL Theme



Emotional Resonance with UDL

All but one faculty and one instructional designer shared their affective responses and mindset during their lived experience of implementing UDL in higher education. Many felt that UDL supported diversity, equity, and inclusion (DEI) efforts and that UDL helped them address the reality that there is not an average student but rather that diversity is the norm, while others experienced feeling good or frustrated while implementing UDL. Others spoke about how they felt the guidelines related to each other and shared different interpretations of UDL and having a UDL mindset. The theme of emotional resonance with UDL involved the subthemes of synergy among UDL guidelines (6 mentions), recognizing and adapting to student diversity with inclusive educational practices (32 mentions), overcoming pedagogical frustrations (21 mentions), positive emotional resonance in UDL integration (30 mentions), translation of UDL principles into practice (10 mentions), and adopting a UDL perspective (7 mentions). All but one faculty member and one instructional designer discussed their emotional resonance with UDL and mentioned this theme 151 times. One subtheme was the synergy among UDL guidelines. Hannah shared that “a single strategy can support multiple guidelines.” She gave the example of gamification fitting with comprehension and guidance from the instructor or self-regulation and mastery-oriented feedback during a debriefing session. She also said, “I don't see how that is not possible and intersect with multiple guidelines.”

Another subtheme related to recognizing and adapting to student diversity with inclusive educational practices. Participants shared how UDL and other inclusive and effective pedagogies overlap in diversity, equity, and inclusion goals. Brandy expressed not knowing the difference between UDL, inclusive, equitable, or equity minded teaching and believes that the goals are similar “to make sure your course is designed in a way that is accessible to all learners regardless

of differences that they may have in a variety of ways, whether it be disability, race or ethnicity, gender, or preparedness for college." Similarly, Michelle stated that effective teaching pedagogies including "trauma informed teaching, accessible teaching, and culturally responsive teaching" have similar principles based on learning science and how people learn effectively. Hannah was interested in the rising to equity initiative planned by CAST and believed that UDL comes from "a lens of neurodiversity as the norm." She stated that "inclusive pedagogy I think are aligned with UDL." Hannah also shared that relevance, value, and authenticity relate to culturally responsive pedagogy. Snoopy felt that implementing UDL gives everyone a chance to reach the same destination, "maybe not all at the same time, but reach goals that we set for ourselves." Suzie believed that UDL gives "our students all the access to education and respect of the diversity that they come with whether it is their background, knowledge, skills or attitudes… or their circumstances."

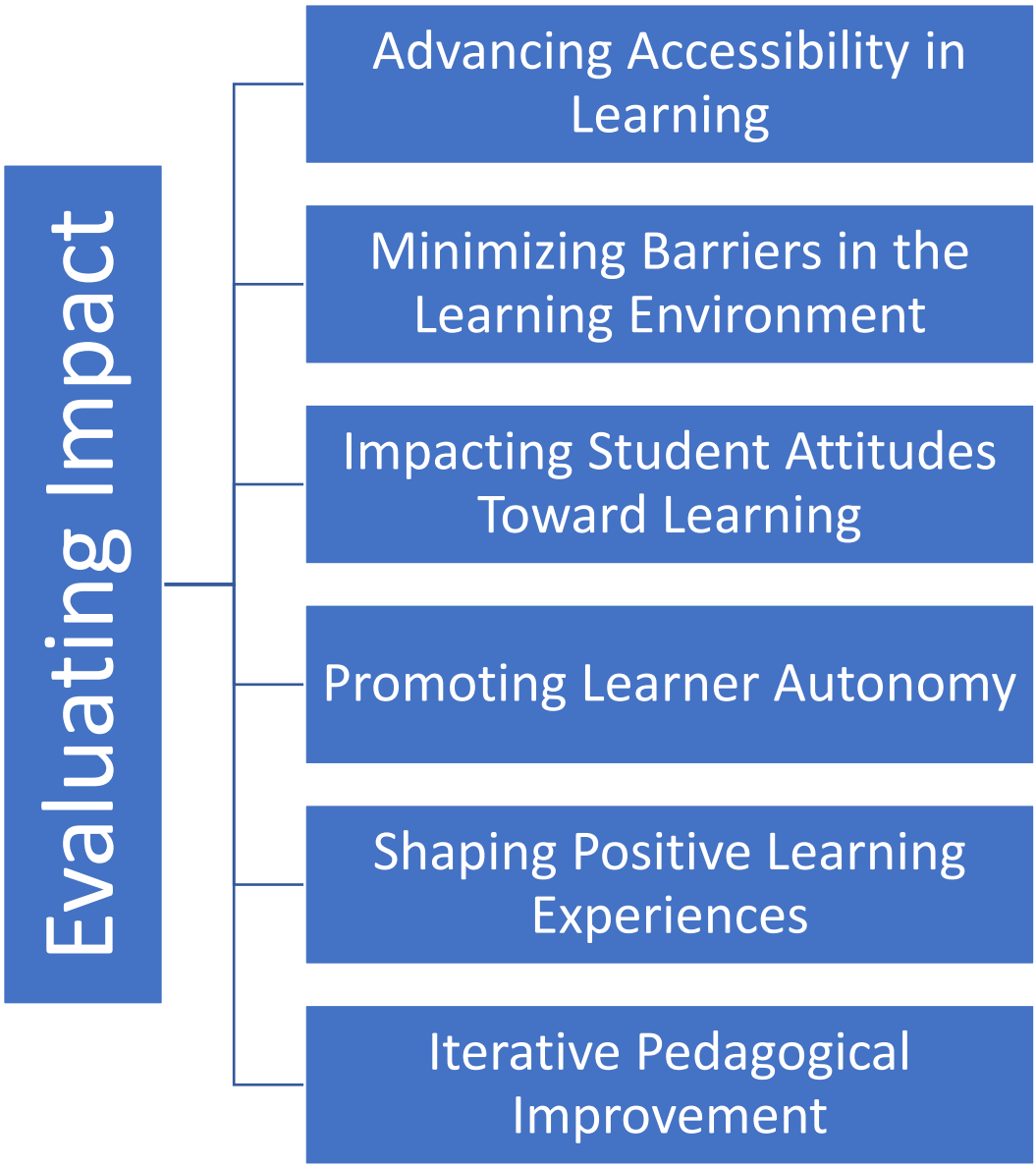
Participants described several affective responses during their lived experience of implementing UDL. The next subthemes related to emotional resonance with UDL were overcoming pedagogical frustrations and positive emotional resonance in UDL integration. Madeline mentioned feeling guilty that she did not have enough time to utilize the same UDL techniques in all of her classes. Michelle talked about seeing faculty feeling overwhelmed and overworked during faculty learning communities. Brandy felt committed to including the principles of UDL in her course design. Michelle believed that the payoff of using UDL is excellent and powerfully motivating, addictive, and incredible. She said, "I don't feel like I can design in a different way anymore. I'm getting to the point where it would feel wrong not to offer choice."

In addition to these affective responses, participants expressed how they translated UDL principles into practice and adopted a UDL perspective. Different people translated UDL into practice in contrasting ways and participants adopted a UDL perspective. Hannah stated that "there are so many varieties that we've been exposed to and how there are different ways that people practically interpret the limited information available in the framework… There's not really a definitive interpretation, but people want one." Madeline, Adrian, and Snoopy discussed mindsets. Madeline discussed how "implementing UDL is really just a shift in that mindset, encouragement to totally shift your thinking that there isn't one way to do college, that college should be accessible for everybody… UDL shifts responsibility from college to them, from us to them." She talked about "the mindset of imagining what could make it harder for a student to hear or see or digest the content with the way that it is set up and how can I change things so that… to make it easier for students." Adrian discussed mindset in terms of looking at UDL from an accessibility mindset and the need to avoid "falling into a deficit mindset."

These feelings or affective responses are important to consider when exploring the lived experience of a phenomenon. These feelings, whether they are positive or negative in nature, help participants interpret the experience of implementing UDL in practice, along with the synergy among different UDL guidelines and recognizing and adapting to student diversity. In addition to experiencing the practicality of UDL implementation and the emotional resonance with UDL, participants shared another aspect of the lived experience of implementing UDL: evaluating impact. These outcomes were described by all participants, though the specific impacts or outcomes expressed varied by individual.

Figure 6

Subthemes for the Evaluating Impact Theme



Evaluating Impact

Another aspect of the lived experience of practical UDL implementation involved evaluating impact. In evaluating the impact of a UDL implementation, participants shared several different outcomes or results of implementing UDL. These outcomes varied between practical advantages like minimizing barriers, advancing accessibility, or improving course

quality and student related responses in attitudes, autonomy, and their experience. All participants described several impacts they experienced or witnessed when implementing UDL. This theme was mentioned 146 times by participants. Evaluating impact was further categorized into subthemes of advancing accessibility in learning (24 mentions), minimizing barriers in the learning environment (25 mentions), impacting student attitudes toward learning (12 mentions), promoting learner autonomy (22 mentions), shaping positive learning experiences (16 mentions), and iterative pedagogical improvement (48 mentions). The outcome of advancing accessibility in learning was expressed as one of the first impacts participants evaluated or experienced. Charlie, Brandy, Madeline, Michelle, and Adrian discussed aspects of how UDL promoted accessibility and equity. Charlie discussed experiencing UDL in courses she took as a student and became passionate about accessibility and the importance of UDL and designing courses to be accessible from the ground up. Brandy talked about making sure course materials could be read by a screen reader and a variety of ways students could learn. Madeline used the accessibility checks and saw the implementation of UDL as providing individual equity. Michelle stated, “UDL really helps with bringing greater equity to learning because what I've been struck by as I've sort of moved into the culturally responsive teaching space, there's some kind of fundamental areas that can make from culturally responsive learning environments and they heavily overlap with what you see in UDL space.” Adrian talked about his first experience with UDL when a student found his PDF inaccessible on a screen reader and considering other ways he had been “creating inequitable environments for students.”

The next subtheme for evaluating impact involved minimizing barriers in the learning environment. This relates to the idea of recognizing and adapting to student diversity and that students experience barriers and obstacles that impede their learning when traditional educational

structures and pedagogies are utilized without any alternative. Charlie discussed how "UDL is creating an ergonomic educational system, some place where learning is not impeded by traditional barriers and traditional structures." Hannah described "actively trying to hear from my learners, where their barriers are and trying to respond to break down those barriers." Adrian shared that "we need to try to find ways to stop putting barriers in front of people to let people show us the great things that they can do without putting all these artificial barriers." Finally, Snoopy mentioned believing that "UDL involves trying to eliminate barriers…With UDL, we're looking to discover a barrier and then discover a way around, under, or over so that the barriers can be removed."

Other subthemes expressed by participants focus on the impact on students. The next three subthemes involved students' attitudes, autonomy, and the learning experience. Suzie reported receiving positive comments from students about her UDL approaches and Elizabeth found that UDL changed students' attitude about writing and that they are in charge of their writing. Brandy, Michelle, and Hannah felt that UDL gives students autonomy over their learning. Michelle touched on the idea of self-assessment empowering students as a critical aspect of UDL. Elizabeth believed that "UDL is the teacher and the students working together to improve the learning experience." Similarly, Brandy, Adrian, and Echo felt that UDL enhanced the student experience.

A final, overarching impact experienced by participants was iterative pedagogical improvement. Using UDL helped faculty evolve their teaching and made them more effective teachers. Brandy began implementing UDL because it was required, but as her teaching evolved, she evolved to become more empathetic to the student experience and student-centric and felt that UDL improved the quality of the course. Elizabeth stated, "UDL is the evolution of your

teaching, and it does not remain static, but it changes." Adrian witnessed that teachers who used UDL were well liked by students and effective in using active learning strategies in their courses with "very good success rates compared to peer institutions, very good job placement rates, good retention rates and graduation rates."

In addition to the broader themes of practical UDL implementation, emotional resonance with UDL, and evaluating impact, there are two additional themes related to the lived experience of implementing UDL in postsecondary education. These include professional empowerment and navigating constraints subthemes. Professional empowerment was a theme emphasized more by instructional designers, though three faculty also discussed this theme. Faculty and instructional designers spoke about several challenges they experienced while implementing UDL. This led to the final theme of navigating constraints.

Figure 7

Subthemes for the Professional Empowerment Theme

Professional Empowerment

Another theme for the lived experience which participants described was professional empowerment. This theme ranged from accessible teaching development to gaining faculty buy-

in to readiness and openness to pedagogical shifts to demonstrating UDL in action. All but two faculty members discussed professional empowerment they either received or supported others when implementing UDL in higher education. This theme was mentioned by participants 104 times during the interviews and relates to UDL discovery, the first step in the UDL implementation process, which is explored in the process themes. The subthemes for this theme included accessible teaching development (12 mentions), gaining faculty buy-in (27 mentions), readiness and openness to pedagogical shifts (6 mentions), and demonstrating UDL in action (8 mentions).

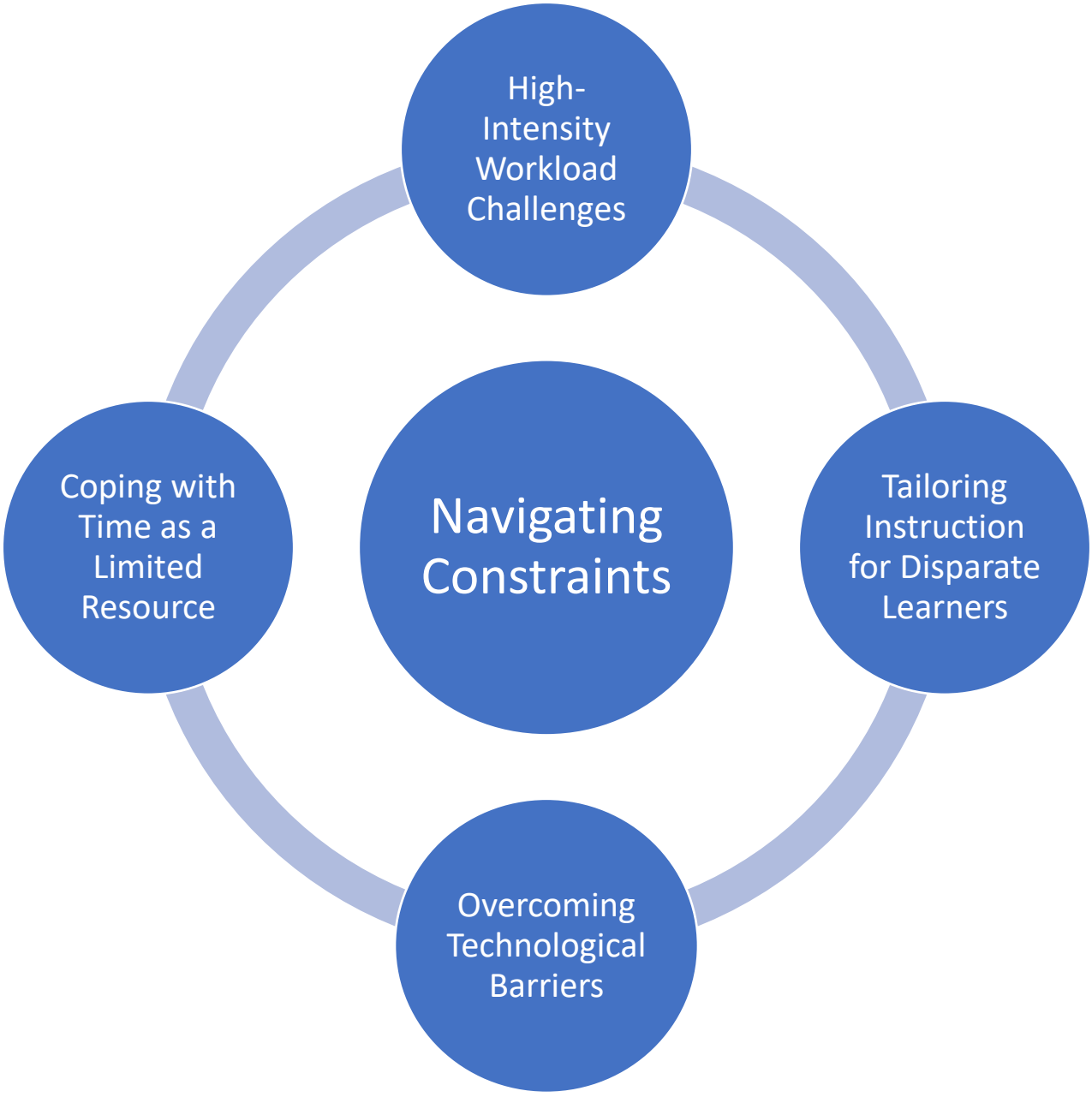
Two participants experienced and recommended accessible teaching development. Adrian came to UDL from accessibility and then broadened his understanding of UDL. Hannah felt that training in accessibility should be provided for faculty. The other related subtheme involved demonstrating UDL in action. Three participants spoke of how vital modeling UDL is as part of training and supporting faculty. Echo described the importance of modeling multiple modalities when meeting with faculty and Adrian modeled UDL as he taught faculty about UDL during a weeklong new faculty orientation. Snoopy also modeled UDL during every consultation he had with faculty and in workshops.

The final two subthemes were gaining faculty buy-in and readiness and openness to pedagogical shifts. The subtheme of gaining faculty buy-in was exemplified by Michelle and needing to "reach a sufficient number of faculty who do this, make it as visible as possible for their colleagues to see that this is effective." This relates to the subtheme of readiness and openness to pedagogical shifts. Adrian mentioned that faculty were receptive to UDL besides providing captions for videos and that newer faculty were more receptive to UDL than faculty that had been teaching awhile. Since UDL training is often optional in higher education, it is

important to consider faculty receptiveness and how faculty can be convinced to implement UDL.

Figure 8

Subthemes for the Navigating Constraints Theme



Navigating Constraints

The final theme for the lived experience of implementing UDL in higher education was navigating constraints. Participants expressed a variety of challenges ranging from a lack of time and UDL being a lot of work to implement to lacking technology or challenges related to students. All but one instructional designer described navigating constraints they or others encountered when implementing UDL. This theme was mentioned 34 times by participants. The subthemes for this theme included high-intensity workload challenges (3 mentions), tailoring instruction for disparate learners (3 mentions), overcoming technological barriers (6 mentions), and coping with time as a limited resource (13 mentions). Two additional challenges described by participants included overcoming bias and gaining support from administrators. Hannah described the challenge of overcoming her own bias towards text materials and using UDL "at every decision point trying to get outside of my own head, my own biases and trying to think from the perspective of other people." Hannah and Snoopy also shared about the challenge of gaining support from administrators.

Several participants expressed navigating the constraint of a high-intensity workload, which is closely related to the most prevalent constraint subtheme of coping with time as a limited resource. Adrian, Elizabeth, Madeline, and Charlie felt that implementing UDL is much more work on the front end before the class begins. Charlie expanded on this stating, "but when you actually have it all built and ready before the semester and you begin the class, it's easier for the teacher; it's easier for the students." Madeline gave the example, "It's a lot of work to transition courses and it involves a lot of learning. It's much faster to throw together PowerPoints if you're not worrying about accessibility."

The other closely related constraint described by all participants was coping with time as a limited resource. For example, Elizabeth talked about how implementing UDL takes a lot more time than just lecturing on a topic. Madeline discussed the lack of time to implement UDL techniques in all her courses at once. Hannah described the process of creating multimodal course materials, such as videos and the time needed to record it and edit captions.

Tailoring instruction for disparate learners and overcoming technological barriers were the two other subthemes for navigating constraints of implementing UDL described by participants. Brandy mentioned that UDL "makes you think everybody is going to enjoy the changes you've made to a course and that's not guaranteed. You can't please everyone all of the time." Elizabeth mentioned seeing resistance from students because they were sure "their way was the right way… and they knew everything before they came into class." She also discussed the inability to change the learning management system and working with a master course since she couldn't change large aspects of the course, such as the final exam. Snoopy shared a challenge that the classrooms were not up to date with technology, but that not all accommodations require electricity (or technology).

The lived experience of implementing UDL in higher education by faculty and instructional designers involved navigating constraints. Part of the lived experience is professional empowerment through training and support. Another facet of the lived experience is practical UDL implementation. This results in faculty and instructional designer emotional resonance with UDL as well as evaluating impact. Participants' lived experience has led to meanings ascribed to UDL that are anything but monolithic.

Navigating these constraints could be diminished or overcome with several suggestions from participants. The most prevalent suggestion mentioned seven times was providing relevant

examples of UDL for faculty to help make utilizing UDL practices easier. A UDL checklist was another preference of participants. Training, administrative support, and the need for additional research on UDL effectiveness were additional elements that more than one participant described as elements that would make UDL implementation easier in higher education.

RQ 2: Faculty and Instructional Designer Meanings Ascribed to UDL

Faculty and instructional designer participants attributed several meanings to UDL when they discussed their experiences implementing UDL in higher education. The most frequently mentioned meaning agreed upon by both faculty and instructional designers, was in UDL's ability to create inclusive practices for equitable teaching. The greatest number of participants (all faculty and three instructional designers) found meaning in UDL as a blueprint for effective teaching. Two faculty and one instructional designer shared metaphorical insights for the process of UDL to construct meaning or internalize what UDL represents.

It was thought-provoking to note that more faculty focused on the meaning of UDL connectedness to other pedagogical approaches and theories, while in contrast more instructional designers focused on the meaning in UDL's capability for creating accessible learning landscapes. It was interesting that more faculty discussed this meaning since one might expect instructional designers to be experienced in a variety of pedagogical approaches and theories and see the connectedness to the UDL framework. These concepts led to the five meanings of UDL. The themes are shared in Table 9 along with the participants that assigned each meaning and the number of times each theme was mentioned. Figure 9 gives a visual representation of the themes for assigned meanings to UDL.

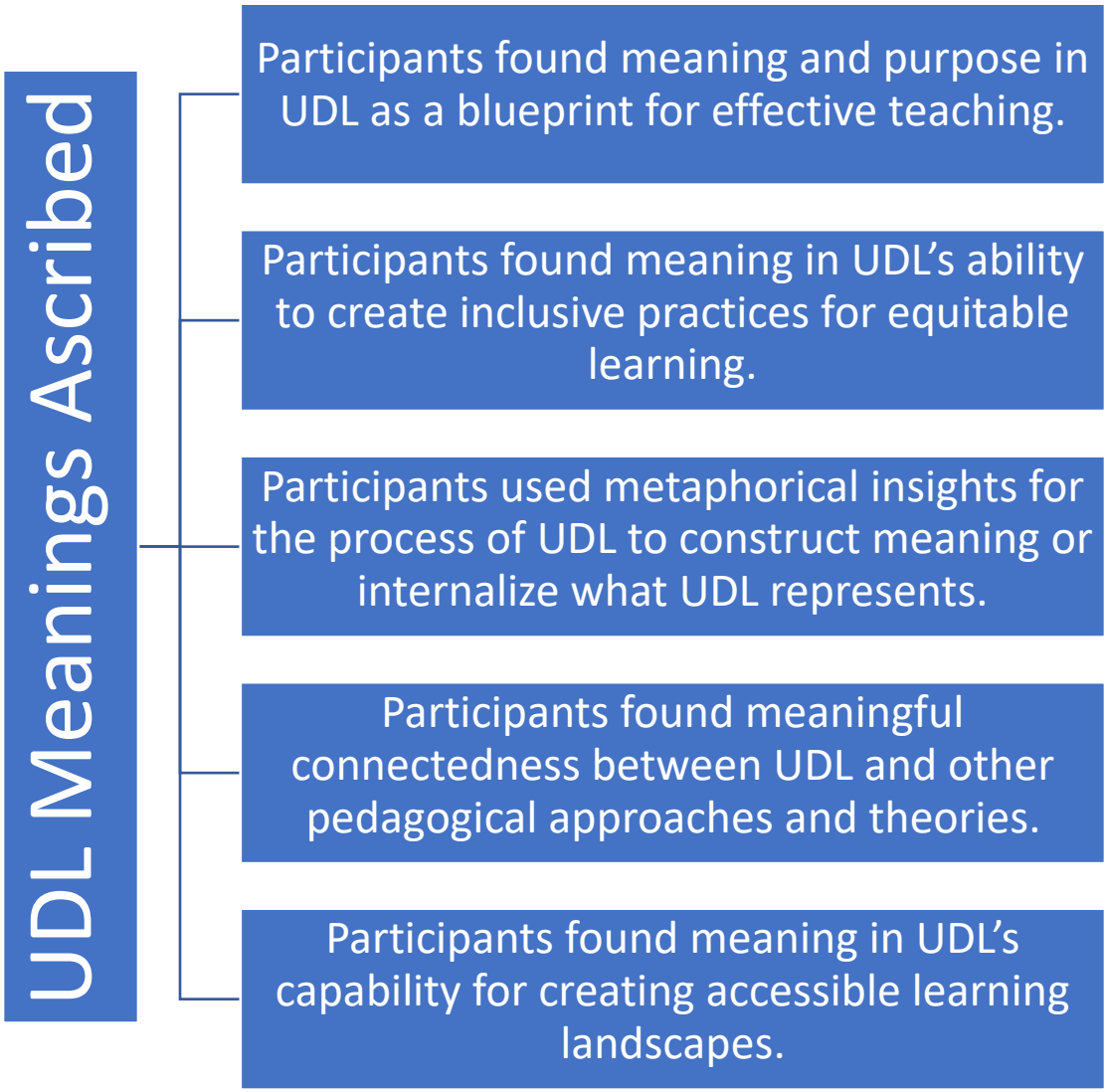
Table 9

Participants Assigning Meaning to UDL

Pseudonym	Participants used metaphorical insights for the process of UDL to construct meaning or internalize what UDL represents.	Participants found meaning in UDL's capability for creating accessible learning landscapes.	Participants found meaning and purpose in UDL as a blueprint for effective teaching.	Participants found a meaningful connectedness between UDL and other pedagogical approaches and theories.	Participants found meaning in UDL's ability to create inclusive practices for equitable learning.
Brandy		X	X	X	X
Charlie			X	X	X
Elizabeth	X		X	X	
Madeline	X		X		X
Suzie		X	X	X	X
Adrian		X	X		X
Echo					
Hannah		X	X		X
Michelle	X	X	X	X	X
Snoopy		X			
Mentions	3	6	8	8	14

Figure 9

Meaning Themes



Inclusive Practices for Equitable Learning

The meaning ascribed with the most frequent mentions was inclusive practices for equitable learning. Four faculty and three instructional designer participants found meaning in UDL's ability to create inclusive practices for equitable learning. This theme was mentioned 14 times by participants. Brandy stated that she did not know the difference between UDL, and inclusive or equitable teaching and equity minded teaching. She felt the goal of each of these is

similar to make courses “accessible to all learners regardless of differences that they may have in a variety of ways, whether it be disability, race or ethnicity, gender preparedness for college.” Adrian felt that “understanding UDL is placed in decreasing barriers and promoting equity.” Madeline stated, “UDL just means trying to do my best to make the class appropriate for every single individual that's in it.” Michelle discussed how “UDL really helps with bringing greater equity to learning.” The meaning of building equity closely relates to the lived experience subthemes of recognizing and adapting to student diversity with inclusive educational practices as well as the subtheme of advancing accessibility in learning and minimizing barriers in the learning environment. Similarly, the next subtheme of accessible learning landscapes is a narrower meaning for UDL that is related to inclusive practices for equitable learning.

Accessible Learning Landscapes

Accessibility is part of what makes a course equitable. This narrower meaning attributed to UDL was described by two faculty and four instructional designer participants with six mentions. Brandy described how different groups of people describe UDL differently, “I find most commonly that one group in one place is using a term like UDL and another group and another place as using something like inclusive teaching or making things accessible to students.” She felt that these are similar at a root level and UDL is “an opportunity to design your course to make it accessible to students from different backgrounds, different ways of thinking.” Michelle initially believed that UDL was making sure that everything is accessible, “I think a lot of people start there, believing that accessibility is the equivalent of UDL.” She expanded her understanding of UDL as she grew professionally. This meaning as compared to inclusive teaching or other interpretations of the meaning of UDL will be further investigated in the discussion.

Connectedness Between UDL and Pedagogical Approaches and Theories

Participants found a meaningful connectedness between UDL and other pedagogical approaches and theories. Four faculty and one instructional designer recognized this meaning along with the zone of proximal development, Quality Matters, critical disability theory, cognitivism, experiential learning, and backwards design. This theme was mentioned eight times by participants. Elizabeth talked about UDL being in line with instructional theory, like Vygotsky's (1978) ideas of the zone of proximal development. She believed, "UDL fits in with my personal and professional theories about how students learn. So, it gives me structure to implement those theories." Michelle described how UDL fits with critical disability theory, "Notions of how the world is laid out is fundamental to thinking about UDL itself. What UDL is essentially saying is if we can create a space that works for every different way that people's brains and bodies work and engage in learning, we create a more effective learning experience." Michelle also felt that UDL is "consistent with what we understand about what engages and motivates learners." Brandy spoke of how she believed UDL components fit into the Quality Matters rubric. Charlie spoke of using UDL with backwards design and organizing the course based on learning outcomes. Suzie felt that UDL "fit into pedagogies of cognitivism and experiential learning." This meaning ascribed to UDL relates to the subtheme of the lived experience of the translation of UDL principles into practice. The way faculty or instructional designers translate UDL principles into practices will also relate to how they ascribe meaning to UDL with the connectedness between UDL and pedagogical approaches and theories.

The researcher previously considered how UDL and culturally responsive pedagogy are related and seem to overlap in multiple ways, but she had not considered how UDL fits with learning theories or pedagogies. This has expanded the researcher's perspective on UDL and

how it relates to other pedagogies. While this makes sense to the researcher, it was not in the forefront of the researcher's preconceptions of the meaning of UDL. This interpretation of UDL also relates to the meaning of UDL being a blueprint for effective teaching.

Blueprint for Effective Teaching

When explaining what UDL meant, participants described it as a foundation of their teaching or the structure of their teaching. Five faculty and three instructional designer participants ascribed the meaning of UDL as a blueprint for effective teaching. This theme was mentioned eight times by participants. Suzie discussed UDL as being a framework with a set of clearly laid out principles, "It [UDL] does not specify what form you have to use. This framework, it gives us more direction and what we can do before the semester begins." Similarly, Elizabeth felt the framework is flexible and provides structure and "dovetails very neatly with a lot of instructional theory." Charlie also referred to the framework and structure UDL provides, "you want to make sure that you're focusing on the really big picture, but also the kinds of steps for getting there." Hannah contemplated UDL as a framework and how people interpret it in the following excerpt.

> The foundation of the framework is learning science, aligned with approaches that I already felt aligned to elements of the UDL framework that I feel synergetic with inclusive design practices or inclusive teaching practices. It works well with some of those other perspectives that I think are important… There are different ways that people practically interpret the limited information available in the framework. We're all in this process of trying to figure out what does this mean. How can it apply to what I'm trying to do in this course right now? There's not really a definitive interpretation, but people want one. We want the answer, which is again, why I think it's helpful that we adopt the

> UDL framework into a mindset of what are our goals, the steps that we worked through when we're trying to make any design decision, and who may experience an obstacle because of it.

Several participants ascribe UDL as being a foundation. Brandy said, “At the end of the day, the practices that fall under this framework are really just good teaching… That's just sort of the foundation for good teaching.” Michelle stated, “This was something that very foundationally informed my approach to instructional design.” Adrian also discussed UDL as a foundation, “I think UDL is going to form the foundation of teaching or already is but will continue to do so. This is kind of our duty to continue to push forward with these types of things.” This meaning can help inform how UDL is implemented and during the process of UDL implementation, whether UDL is viewed as the foundation of teaching or a practical framework to be applied. Similarly, the theme of accessible learning landscapes can also inform how UDL is implemented in higher education.

Metaphorical Insights for the Process

Participants used metaphorical insights for the process of UDL to construct meaning or internalize what UDL represents. Two faculty participants and one instructional designer discussed metaphors for their UDL implementation process with three mentions as a patchwork quilt, a Jenga tower, or a journey. Relevant excerpts related to these three metaphors follow.

> Madeline- It's kind of like a patchwork quilt, where I try to keep doing a little bit along the way to keep making them better. I wouldn't say anything's fully there. So, I expect that I'll keep continuing needing to make changes along the way… It's okay to do a little bit like there's no expectation that I'm going to finish my quilt of UDL at any point.

> Everything that I do is progress towards meeting UDL goals… It just has to be something that's an ongoing process.
>
> Elizabeth- Think of it like a Jenga tower. There're all kinds of parts to the Jenga tower, but there's little holes in the tower to the parts that they're already doing need to be recognized but the parts that are the little holes in the Jenga tower need to be addressed as well.
>
> Michelle- There is not an endpoint that you must achieve. This is a journey of slow implementation that's going to happen again and again as you encounter different learning environments that you're going to be working in thinking of it as a practice rather than an accomplishment.

These metaphorical insights can help faculty and instructional designers interpret UDL implementation as an ongoing process over time, like the lived experience subtheme of iterative pedagogical improvement and the process theme of evolving synthesis of UDL pedagogical change that will be described for research question three. The patchwork quilt, Jenga tower, and journey metaphors shared by participants were insightful about the meaning and process of UDL implementation. These metaphors are useful in describing the ongoing nature of UDL implementation and how some aspects of UDL may already be used by faculty before they learn about the UDL framework, but that there are more UDL techniques or guidelines that can and should be implemented. These are exciting additions to the researcher's preunderstanding of the meaning ascribed to UDL. The other themes were aspects of the meaning that the researcher held regarding UDL or were part of what the literature has previously stated regarding the meaning of UDL.

Additional Meanings Expressed by One Participant

There were two additional meanings expressed by two different instructional designer participants that should be shared since they represent additional meanings that others may also assign to UDL. Hannah described the meaning of UDL as more than one thing and mentioned this four times during her interviews. Hannah mentioned that UDL is associated with offering choice, assessment choices, accessibility, inclusive design, or differentiated instruction, "the problem I've seen is when it only gets kind of associated with one or the other… I pushed back when I heard the idea that UDL is only this one thing or only this other thing." This is similar to the varied meanings assigned by more than one participant, which suggests that UDL means multiple things and can be interpreted in multiple ways by different individuals. Michelle ascribed the meaning of UDL as a paradigm shift with two mentions during her interviews. She noted, "we have the possibility of turning this into a fundamental paradigm shift in how higher education was implemented during the pandemic… to more effective learning, and I believe that UDL is central to making that happen." This meaning of UDL implementation being a paradigm shift involves the perspective of implementing UDL on a broader scale across an institution or in postsecondary education more commonly. This will be explored with the process theme of embedding UDL practice across the institution for research question three.

Several participants spoke about how their understanding of UDL implementation in higher education changed over time or with their personal experiences. Madeline spoke of relying on her memory of what UDL was and what "would be the most fun" to do. Madeline shared "I'm not really going back to everything that is UDL and thinking about like what would be most effective for them [students] and I need to do that." Michelle said,

> I think, like many people, I spent a number of years saying, oh, I know what universal design for learning is; it's making sure everything is accessible so that everyone can use it, right? I think a lot of people start there believing that accessibility is the equivalent of UDL… As I started to get a much clearer understanding of what UDL was, and this sort of coincided with me moving from being a very new instructional designer, I started in instructional design in 2014, to really kind of growing professionally, and getting a much better feel for my field and the more I learned, the more fascinated I was, the more resonated with me… By 2020 this was something that was very, very much kind of foundationally informed my approach to instructional design, for sure.

Adrian came to UDL from accessibility and how he was "creating inequitable environments for students" but through collaborations with other instructional designers, broadened the perspective of UDL to "the idea of, you know, creating pedagogical practices that work for everyone" and "creating an environment that will work for all people regardless of their background."

Several participants chose to disclose diagnoses of ADHD or dyslexia, which made their learning challenging and may have caused UDL to resonate with them on a more personal basis. Michelle shared,

> The idea being that it [UDL] isn't always necessarily about a disability, and I waffle back and forth. I worry that this sounds like I don't really think of myself as having a disability per se when I think about ADHD. I think about it as I navigate the world, my brain navigates the world in a really different way than the way the world's constructed. So, I guess in some ways it's sort of like critical disability theory, you know, notions of how the world is laid out. That is fundamental to thinking about UDL itself. Right? That's

> what UDL essentially is saying is if we can create a space that works with every different way that people's brains and bodies work and engage and learn, we create a more effective learning experience and we bring people into a learning space in ways that are incredibly beneficial.

Snoopy spoke about why they chose to implement UDL,

> So probably because of my dyslexia… I use UDL both for a disability and for non-disability reasons. I use elements of UDL and so I know it works, or I feel very much that it works… What it means to me is whether it's my daughter who also has dyslexia or even my father, her grandfather, who has dyslexia that people with a stated, you know, diagnosed disability can participate in those learning activities.

Echo spoke of how her interpretation of UDL changed over time and became more relaxed with UDL and being less intentional and forgetting what was included in the UDL framework.

> So, when you brought up the chart that had the 3 columns and the different colors [UDL infographic]. As I was reading through some of there to answer questions, I was like, oh crap, I haven't been doing that. But I know that 6 years ago I was and when you know, you start new jobs and new technology and stuff comes down. Certain things that become a habit and you do them and other things maybe not so much or they fell by the wayside.

RQ 3: Faculty and Instructional Designer Process of Implementing UDL in Higher Education

When sharing their experiences with the process of implementing UDL, faculty and instructional designer participants expressed themes related to the steps in the process and descriptors of the process of implementing UDL in higher education. Six steps in the UDL

implementation process were constructed as themes, starting with UDL discovery, preparing and launching the UDL process, decision-making in UDL integration, implementing UDL strategies, evolving synthesis of UDL pedagogical change, and embedding UDL practice across the institution. Similarly, six themes arose that described the steps in the UDL implementation process. These themes are shared in Table 10 for the process step themes, the closely related think-aloud process themes in Table 11, and the characteristics themes are shared in Table 12, along with the participants that discussed each of them and the number of mentions for each theme. Figure 10 displays the steps in the process themes in a visual interpretation. Figure 11 displays the process characteristics themes.

Among the steps of the UDL implementation process, all participants spoke of the steps of UDL discovery and implementing UDL strategies. Two faculty and three instructional designers discussed the step of preparing and launching the UDL process. All but one instructional designer and two faculty spoke about the step of the evolving synthesis of UDL pedagogical change. The greatest area of contrast between instructional designers and faculty may be seen in embedding UDL practice across the institution, where the ratio of instructional designers versus faculty that discussed this theme's importance was three to one. However, this theme was less prominent overall across both faculty and instructional designers, having overall the lowest number of mentions. Finally, two instructional designers and one faculty member discussed the step of decision-making in UDL integration. While relatively fewer participants focused on decision-making in UDL integration though, those who did emphasized it heavily with 28 mentions. Despite a lack of any sharp contrasts in what instructional designers versus faculty focused on when it came to the process of UDL implementation, significant variations in

theme popularity (number of mentions) remained evident and showed that neither faculty nor instructional designers were monolithic in their preferences.

Several of the unexpected themes for the implementation process were negotiating pedagogical trade-offs, professional internalization of UDL, and systematic and deliberate UDL practices. Negotiating pedagogical trade-offs makes sense as a theme for the process since different students have different needs. The researcher had not thought of it in this light previously but has experienced it when playing captions on videos and some students find them distracting while others need the captions to understand the video. Similarly, while the researcher had not considered the process of implementing UDL as professional internalization of UDL, this is understandable since she adds captions to all videos, alternative text to images, and options for class assignments regularly. While it makes sense that UDL is about being flexible and offering options, it was surprising that a few participants described the implementation process as a systematic and deliberate UDL practice. After reviewing the interview transcripts and considering the researcher's own experiences with implementing UDL proactively, this aspect makes sense and expands researcher preconceptions.

Table 10

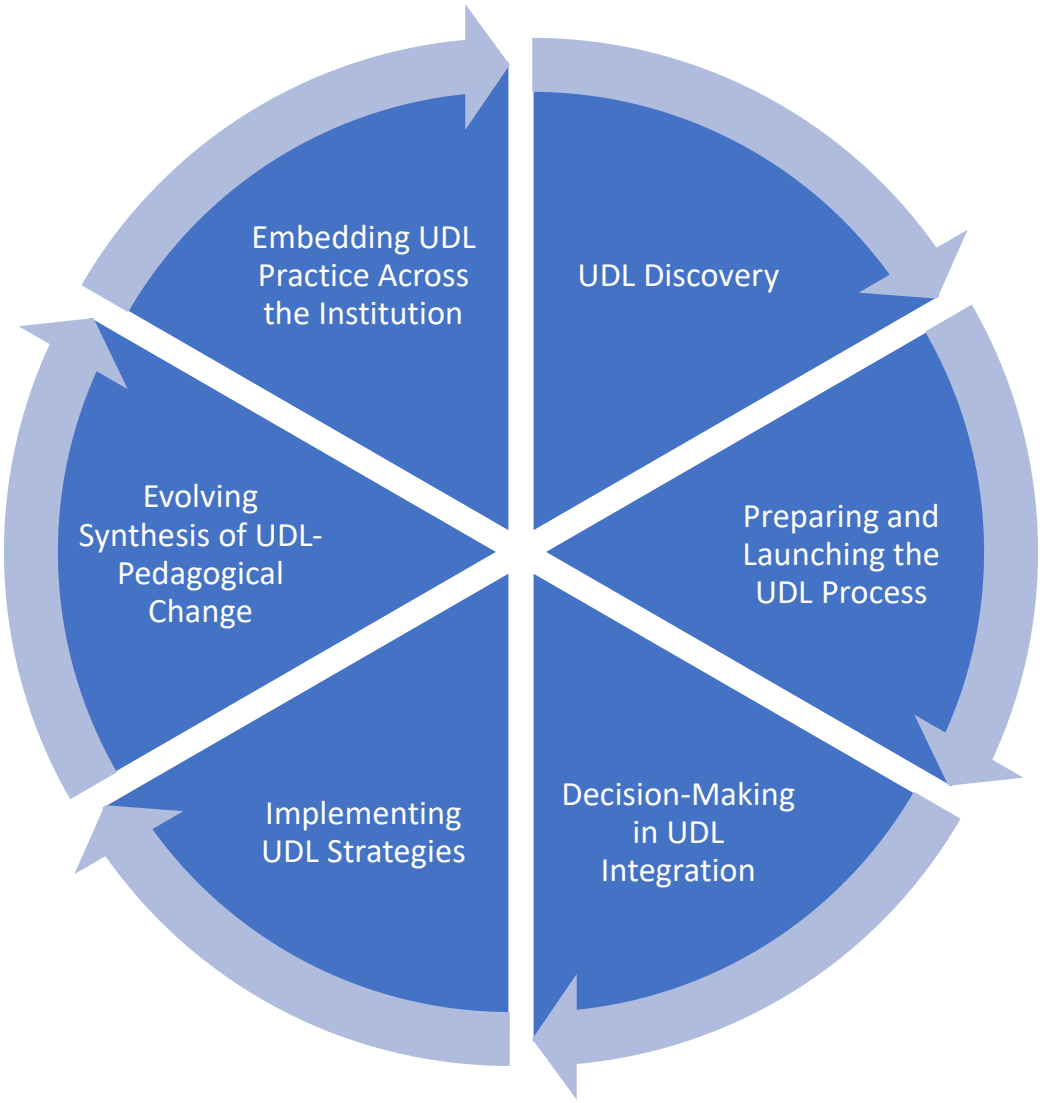
Participants' Themes for the Steps in the Process of Implementing UDL

Pseudonym	Embedding UDL Practice Across the Institution	UDL Discovery	Implementing UDL Strategies	Preparing and Launching the UDL Process	Decision-Making in UDL Integration	Evolving Synthesis of UDL Pedagogical Change
Brandy		X	X		X	
Charlie		X	X			
Elizabeth		X	X			X

Madeline		X	X	X		X
Suzie	X	X	X	X		X
Adrian	X	X	X	X		X
Echo		X	X	X		
Hannah	X	X	X	X	X	X
Michelle	X	X	X		X	X
Snoopy		X	X			X
Mentions	9	14	17	20	28	38

Figure 10

Steps in the Process Themes



UDL Discovery

The first theme or step was UDL discovery for the process of implementing UDL. All participants described their experience of discovering and learning about UDL during their implementation process with 14 mentions. Snoopy learned about UDL during his master's coursework. Snoopy also talked about introducing new faculty to UDL as a way to spread UDL across an institution over time and modeling UDL during consultations with faculty and

workshops for faculty. Charlie took some continuing education courses and learned about UDL. Elizabeth said that there was optional training in UDL for faculty at her institution. Brandy felt training in teaching and UDL should be required for higher education faculty. Echo also expressed the desire for additional training in UDL. Michelle talked about the challenge that faculty are taught expertise in their discipline, but not how to teach. Hannah described offering a UDL professional development workshop for faculty at her institution. Adrian offered faculty training in accessibility. He used UDL terminology with more established faculty when discussing course design.

Preparing and Launching the UDL Process

After UDL discovery, the next step in the process related to preparing and launching the UDL process. Two faculty and three instructional designer participants discussed preparing and launching their UDL implementation process with 20 mentions. Participants highlighted techniques which they used during the earliest part of the UDL implementation process. Some examples of this theme included Suzie beginning her UDL implementation with representation and Echo focused on heightening the salience of goals and objectives when she begins, along with focusing on mastery-oriented feedback. Madeline discussed how implementing more UDL techniques takes more work at the beginning of the course design process. The next step of the implementation process for participants involved decision-making in UDL integration.

Decision-Making in UDL Integration

One faculty and two instructional designer participants discussed the process of making decisions in their UDL integration during their interviews with 28 mentions. The decision about which guidelines to use necessitated deciding what to prioritize among the intimidating array of 31 guidelines. As a result, participants focused on relevancy, either from their students'

perspective or to their specific course and discipline. For example, Brandy talked about gravitating towards value and relevance and perception, which she viewed as being related to motivation. She also focused on using worksheets “to draw on students’ prior knowledge” which relates to relevancy because what a student finds interesting will be based on their prior knowledge and interests. Hannah described this theme by “identifying guidelines that are most relevant or applicable to your course and your discipline, makes it very possible for the faculty to make their own determination.” The theme of decision-making in UDL integration is connected to the subtheme of synergy among UDL guidelines.

Additionally, the think-aloud activity helped describe the UDL implementation process with practical, in the moment selection of specific guidelines within the UDL framework. The standardized coding manual (see Table 6) included themes for each of the nine UDL guidelines (1A-3C) and seven additional themes of motivations (4), feelings (5), explain/justify (6), choose (7), value (8), meaning (9), and causal/relationships (10). Participants’ process of implementing UDL based on the think-aloud activity can be viewed in Table 11 with the frequency or number of mentions.

Table 11

Participants’ Process of Implementing UDL Based on the Think-Aloud Activity

Codes	1A	1B	1C	2A	2B	2C	3A	3B	3C	4	5	6	7	8	9	10	Total
Brandy	8	0	13	0	10	1	10	3	8	3	11	12	3	6	2	1	91
Charlie	5	0	1	4	3	3	1	6	2	3	9	16	1	0	2	2	58
Elizabeth	3	2	11	5	10	3	13	13	8	1	8	19	0	0	0	0	96
Madeline	7	4	8	1	9	2	4	11	7	9	20	29	2	5	3	0	121
Suzie	0	1	1	3	8	5	2	4	2	1	5	7	0	1	0	0	40

Total Faculty Frequency	23	7	34	13	40	14	30	37	27	17	53	83	6	12	7	3	406
Adrian	2	1	3	1	7	3	12	10	7	14	17	17	1	2	2	0	99
Echo	4	3	5	1	0	2	6	6	3	7	9	22	0	4	0	0	72
Hannah	4	2	8	3	4	10	2	10	7	3	12	16	0	0	4	2	87
Michelle	6	2	12	0	15	6	17	17	8	2	1	10	1	2	0	0	99
Snoopy	15	0	3	2	1	1	6	2	2	19	8	29	1	13	4	1	107
Total ID Frequency	31	8	31	7	27	22	43	45	27	45	47	94	3	21	10	3	464
Total Frequency	54	15	65	20	67	36	73	82	54	62	100	177	9	33	17	6	870

In making decisions for UDL integration, the most prevalent UDL guidelines used by faculty participants were options for comprehension (1C with 34 mentions), expression and communication (2B with 40 mentions), and sustaining effort and persistence (3B with 37 mentions). The least prevalent UDL guidelines used by faculty participants were options for language and symbols (1B with 7 mentions), physical action (2A with 13 mentions), and executive functions (2C with 14 mentions). The most prevalent UDL guidelines used by instructional designer participants were options for perception and comprehension (1A and 1C each with 31 mentions), recruiting interest (3A with 43 mentions), and sustaining effort and persistence (3B with 45 mentions). Two of these guidelines were the most prevalent guidelines used by faculty participants too: comprehension and sustaining effort and persistence. The least prevalent UDL guidelines used by instructional designer participants were the same as those for faculty participants: options for language and symbols (1B with 8 mentions), physical action (2A with 7 mentions), and executive functions (2C with 22 mentions). The most prevalent guidelines used by all participants were expression and communication (2B with 67 mentions), recruiting

interest (3A with 73 mentions), and sustaining effort and persistence (3B with 82 mentions). Similar to both groups of faculty and instructional designer participants, the least prevalent guidelines for all participants were options for language and symbols (1B with 15 mentions), physical action (2A with 20 mentions), and executive functions (2C with 36 mentions).

During the think-aloud activity all participants discussed the themes of motivations (4 with 62 mentions), feelings (5 with 100 mentions), and explain/justify (6 with 177 mentions). The other four themes were not discussed as frequently by participants: choose (7 with 9 mentions), value (8 with 33 mentions), meaning (9 with 17 mentions), and causal/relationships (10 with 6 mentions). While thinking through a UDL implementation, participants gave a variety of reasons for their choices as the most prevalent theme of explain/justify with 177 mentions. Feelings or affective responses were the next most prevalent themes discussed by faculty (53 mentions), instructional designers (47 mentions), and in total (100 mentions). Instructional designer participants also focused on describing motivations or their underlying purposes, aims, or motives (45 mentions), while faculty only mentioned motivations 17 times. After decision-making in UDL integration, the next step in the process was implementing UDL strategies.

Implementing UDL Strategies

The next step in the process is the act of implementing UDL strategies from the practical everyday application to researching UDL and considering contextual elements, that involves training, reflection, and application. All participants discussed the process of implementing UDL strategies during their interviews, including during the think-aloud activity. The process of implementing UDL strategies refers to the act of applying the framework rather than practical UDL implementation, related to specific guidelines and checkpoints utilized (one of the themes of the lived experience). These two themes are closely related but differentiated in terms of the

specific techniques implemented versus the implementation process itself. This theme was mentioned 17 times by participants during the interviews. Suzie said, “the framework made sense to me in terms of a day-to-day practical application that we can include in the classroom.” Brandy discussed researching UDL and considering the context of her institution and student population when focusing on principles that fit that context and student population. Madeline shared how her implementation of UDL changed over time. She began by planning to work slowly and catch up with what is already there and then move forward and that everything would be UDL friendly. Now Madeline realized that she didn’t have to complete it all now and that “it’s okay to experiment with smaller things.” Elizabeth felt that implementation “should be more uniform or more deliberate.” For implementation, Elizabeth said, “It means training. It means practice. It means reflection.”

Michelle considered ways to help faculty implement UDL through faculty learning communities and providing training,

> To unlock the willingness at a large scale for faculty to engage with this… The implementation path is starting with the willing, praise them, highlight them, make their work and their effectiveness as public as we possibly can, and then bring everybody else on board until not taking that approach would be considered weird.

Hannah believed that system wide implementation needs faculty or staff champions, but also part of the strategic plan “to infiltrate accountability practice.” Similarly, Adrian discussed how faculty autonomy affects how UDL can be implemented across an institution. These two examples are similar to the process theme of embedding UDL practice across the institution.

Evolving Synthesis of UDL Pedagogical Change

After implementing UDL strategies, the next step was the evolving synthesis of UDL pedagogical change and utilizing the plus one strategy over time. Three faculty and four instructional designers described their UDL implementation process as involving an evolving synthesis of UDL pedagogical change with 34 mentions. The plus one approach is one recommended by Tobin and Behling (2018). Madeline put the plus one approach into practice by applying one UDL technique across all her classes, often in response to a problem she noticed in her classes. Hannah and Michelle both mentioned Tobin and Behling in their interviews and how they approach talking to faculty about implementing UDL slowly over time, so they do not become overwhelmed. Suzie also mentioned the plus one strategy and implementing UDL as an ongoing process. She said, "it's hard to implement every principal and strategy in place in one semester." Adrian talked about the need to support faculty in improving their teaching over time and slowly improving to get better and keep moving forward. Adrian also shared the importance of giving faculty some wins and small victories in making their courses better that gives them the "impetus for continually designing and rebuilding and going piece by piece until [they've] implemented it more broadly, which I think goes back to the UDL scaffolding piece."

Embedding UDL Practice Across the Institution

After implementing UDL strategies with evolving synthesis of UDL pedagogical change, faculty and instructional designers expressed the last step in the UDL process as embedding UDL practice across the institution and the importance of involving both faculty and administration. One faculty and three instructional design participants discussed this theme with nine mentions. Suzie shared that gaining institutional buy-in is challenging. Michelle felt that "policy is going to make a difference in what administrators do, what institutions choose to

support or not support, and especially faculty unions." Hannah helped integrate UDL into her institutional quality standards and provided workshops for faculty. Adrian contemplated how UDL could become a regular job expectation in higher education. He discussed the different levels of oversight in higher education and the need to make sure Deans are on board with UDL, as well as faculty. Adrian believed that making UDL an institutional effort and "the idea is that UDL is not an option. It's kind of an expectation that you're going to aim to do these sorts of things, while also understanding that faculty are under a large load." Embedding UDL practice across the institution was the final step of the process of implementing UDL in higher education. In addition to these process themes, six additional themes were related to descriptors participants gave for the UDL implementation process.

Table 12

Participants' Themes for the Characteristics of the Process of Implementing UDL

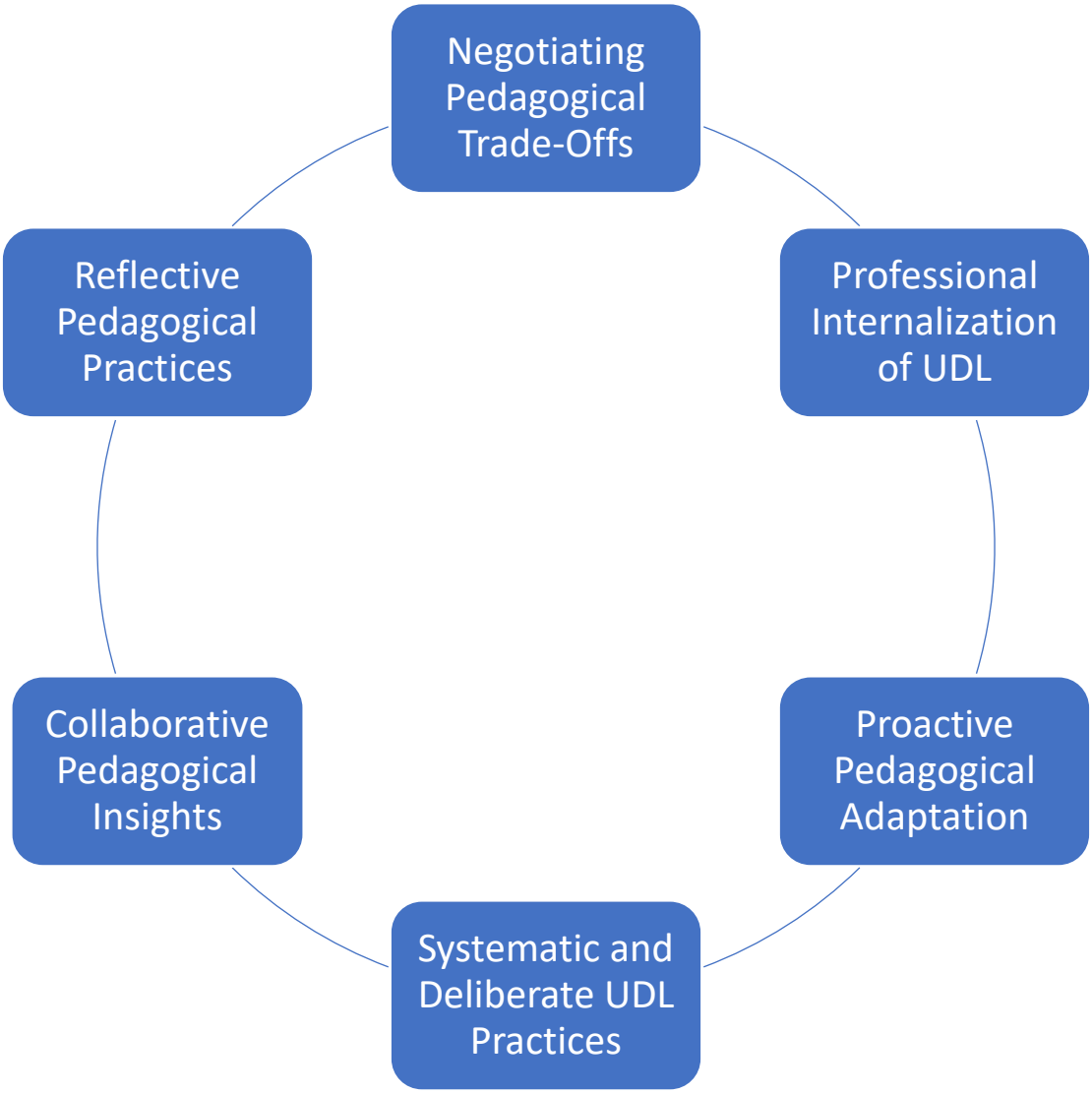
Pseudonym	Proactive Pedagogical Adaptation	Systematic and Deliberate UDL Practices	Collaborative Pedagogical Insight	Professional Internalization of UDL	Negotiating Pedagogical Trade-Offs	Reflective Pedagogical Practices
Brandy	X		X		X	
Charlie	X		X		X	
Elizabeth				X		X
Madeline			X		X	X
Suzie	X	X	X			X
Adrian			X		X	
Echo		X	X	X		
Hannah	X	X			X	X

Michelle		X				X
Snoopy				X		X
Mentions	5	5	9	9	12	26

Reflective pedagogical practice was the most frequently mentioned characteristic of the process of implementing UDL spanning both faculty and instructional designers. However, there were notable differences in some themes which faculty stressed more heavily in contrast to what instructional designers emphasized. Faculty participants focused more on the proactive pedagogical adaptation and collaborative pedagogical insight characteristics whereas instructional designer participants focused more on the systematic and deliberate UDL practices characteristic of the process. Professional internalization of UDL was emphasized least among participants overall (only one faculty and two instructional designers), showing a degree of similar perspective across both of the two groups for this characteristic.

Figure 11

Process Characteristics Themes



Reflective Pedagogical Practices

Reflective pedagogical practices proved to be the most prevalent theme, with more than two to five times as many mentions as any of the other descriptor themes. Participants reflected or reasoned on why they adopted or used UDL. Three faculty and three instructional designer participants mentioned reflecting or reasoning during their implementation process with 26 mentions. Suzie reflected on how implementing UDL helps back up her design approach and

helps a problem or challenge with student learning. Michelle discussed “how extraordinarily effective this [UDL] is for students, for learners both in the story I told you about my own kid, but also I've seen it in me.” She stated that witnessing how choice and relevance give people control over their learning was the reason she is powerfully motivated by taking a UDL approach. Hannah shared why she adopts a UDL mindset and that the reasons for implementing UDL are multifaceted with different rationales and multiple benefits for learners. Snoopy also described seeing UDL work in his students, his faculty, and himself. He gave the reason for the principles he uses, “because those are the ones that helped me in my learning accommodations that I was making for dyslexia.” Generally, these faculty and instructional designers reflected on their pedagogical practices in their UDL implementation process.

Negotiating Pedagogical Trade-Offs

The second most dominant description theme involved negotiating pedagogical trade-offs in the UDL implementation process. Three faculty and two instructional designer participants discussed balancing and compromising as being part of their UDL implementation process with 12 mentions. Brandy discussed how courses change over time with changes in the students’ context and the need “to find a balance that stays true to the principles… The creative challenge of finding a compromise where you're still adopting the principle. I don't want to choose between these two students. Their needs are equally important.” Hannah felt there needed to be a balance in providing concrete starting points for faculty beginning the implementation process, but also offering flexibility for faculty to make their own connections. Madeline talked about making one change in all of her classes for a semester since it felt more balanced between needing structure and needing to be fair. Charlie compromised between different student preferences by offering different formats for assignment submission to build in flexibility for learners. In addition to

reflective pedagogical practices and negotiating pedagogical trade-offs, participants described the process as including professional internalization of UDL.

Professional Internalization of UDL

Professional internalization of UDL was the next description theme for the process of implementing UDL, where participants talked about internalizing and implementing UDL without conscious or deliberate effort. One faculty and two instructional designer participants discussed the process of UDL implementation as becoming automatic with nine mentions. Echo illustrated this theme by explaining how implementing multiple modalities became ingrained for her. Similarly, Snoopy shared, "UDL techniques become automatic over time." Elizabeth felt that she uses UDL "without even thinking about it so much anymore… You've got existing schema and universal design becomes part of that so that you're not even thinking about it anymore." In addition to UDL becoming professionally internalized, it appears that the process of implementing UDL involves collaborative pedagogical insight.

Collaborative Pedagogical Insight

Collaborative pedagogical insight was another theme related to describing the process of implementing UDL. There were different ways participants described gaining others' perspectives and insights including through collaboration with others and receiving feedback from students. Two faculty and two instructional designer participants discussed collaborating with others during the process of UDL implementation with five mentions. Brandy witnessed the Disability Services Offices relying on help to teach faculty about accommodating students with disabilities from instructional designers. Echo shared that she worked with the ADA office and provided enough alternative text for images that does not give away a test answer. Adrian worked "with faculty developers who brought in the broader UDL context, creating good

equitable learning environments." Charlie collaborated with her instructional designer who discussed UDL and built course shells for people to try out different aspects of UDL.

Four faculty and no instructional designer participants talked about receiving feedback from students during their implementation process with four mentions. For example, Suzie stated, "Student feedback has been the most valuable aspect to check back on if what I implemented is actually useful for them." Charlie shared that "student feedback is what guides and improves your course." Collaboration with others and gaining their pedagogical insight was another description for the UDL implementation process.

Systematic and Deliberate UDL Practices

Systematic and deliberate UDL practices was another theme for the process of UDL implementation. One faculty and three instructional designer participants discussed being systematic and deliberate during their UDL implementation process with five mentions. Hannah described how UDL is embedded in the institutional quality standards, but that there is not "willingness in our system yet to associate it with faculty evaluation for that kind of accountability." She felt that for UDL to be fully implemented across the institution systematically, there should be accountability procedures in place and that UDL should be part of the course blueprint for all courses. Others believed that being deliberate with UDL implementation led to consistency: Suzie felt that UDL "added to our college's consistency across the courses" and Echo felt that consistency should be built across all courses from general education to their program with UDL.

Proactive Pedagogical Adaptation

The final description theme for the process of UDL implementation was proactive pedagogical adaptation. Three faculty and one instructional designer participants described being

proactive during their implementation process with five mentions. Suzie talked about the UDL framework providing more direction in thinking ahead during the design process before the semester begins. Charlie described being proactive during her implementation process, “when you actually have it all built and ready before the semester begins… I'm not worried about making an exception for this one student because I already really put a lot of effort beforehand.” Brandy discussed keeping track of challenges that arose during the semester to address them proactively before teaching the following semester. This description of the process as well as the steps of the implementation process itself aligned with what participants shared during the think-aloud activity.

Composite Summary

The meaning attributed to the experience of implementing UDL in higher education has been answered through investigating the lived experience of implementing UDL, the meaning assigned to UDL, and the UDL implementation process in higher education. The following composite summary is an overview summary taking all participants’ experiences into account.

Lived Experience of Implementing UDL in Higher Education

The lived experience of implementing UDL in higher education involves professional empowerment, from both the instructional designer perspective of supporting and training faculty in UDL and from the faculty perspective of needing assistance in implementing UDL. Professional empowerment in implementing UDL often begins with an accessibility need and focusing on advancing accessibility in learning with the guideline of perception through offering multiple formats under the principle of representation. Instructional designers and faculty who implement UDL techniques feel the need to gain faculty buy-in to implement UDL strategies. This involves readiness and openness to pedagogical shifts and how open they are to working

with the UDL framework. One additional facet of training and supporting faculty is demonstrating UDL in action to faculty so they can experience UDL from the learner's perspective.

There are also a number of constraints that faculty and instructional designers negotiate when implementing UDL in higher education that need to be overcome. The challenges with the experience of implementing UDL include high-intensity workload challenges, and students sometimes have challenges of being overwhelmed with too many options. Additional challenges include overcoming technological barriers, and the most prevalent challenge of coping with time as a limited resource. Part of the lived experience is being able to overcome these challenges.

Additionally, the lived experience involves evaluating impact of the UDL implementation. After implementing UDL, faculty and instructional designers advance accessibility in learning, which relates to minimizing barriers in the learning environment for learners. Three outcomes expressed by participants recall of their experiences are related to students including impacting student attitudes toward learning, promoting learner autonomy, and shaping positive student experiences. A final outcome experienced when implementing UDL is iterative pedagogical improvement.

Faculty and instructional designers have emotional resonance with UDL. The lived experience involves the synergy among UDL guidelines. Additionally, recognizing and adapting to student diversity and UDL supports diversity, equity, and inclusion efforts on college campuses. Overcoming pedagogical frustrations surrounding UDL implementation includes coping with time as a limited resource and wanting to use all UDL techniques in all classes for the semester or feeling overwhelmed and overworked. Additionally, there is positive emotional resonance in UDL integration, such as feeling powerfully motivated to implement UDL

strategies, feeling that it is hard to get enough of UDL techniques, and feeling like course design couldn't happen in any other way. The translation of UDL principles into practice is another factor of emotional resonance with UDL and the importance of mindset when implementing UDL.

Finally, the lived experience involves practically implementing UDL techniques, which varies from one technique at a time to as many as possible in a course. A number of UDL techniques are implemented including each of the three overarching principles of universal design for learning: engagement, representation, and action and expression. Additionally, implementing UDL techniques can focus on communicating expectations and using OER.

Meaning Ascribed to UDL

The meaning ascribed to UDL in higher education involves several aspects. Initially, UDL implementation is sometimes felt to be synonymous with creating accessible learning landscapes, which is closely related to the meaning ascribed of inclusive practices for equitable learning. Equity is an important aspect of the meaning and the need to provide inclusive practices for equitable learning. UDL can be considered a practical framework or on a more holistic basis as a blueprint for effective teaching. Three metaphorical insights that exemplify the UDL implementation process include a patchwork quilt, a journey, and a Jenga tower. There is also a connectedness between UDL and pedagogical approaches and theories, such as culturally responsive pedagogy or inclusive pedagogy.

Process of Implementing UDL in Higher Education

With the process of implementing UDL, there are a number of steps with initially learning about UDL and preparing and launching the UDL implementation process. The next step often involves decision-making in UDL integration. Then these selected guidelines are

applied to the course with an evolving synthesis of UDL pedagogical change, like the plus one approach recommended by Tobin and Behling (2018). The final step in the UDL implementation process in higher education is embedding UDL practice across the institution and moving beyond one individual faculty member.

There are also several key descriptions present throughout the UDL implementation process. UDL becomes professionally internalized, and some faculty and instructional designers do it without thinking about it. There is a need to negotiate pedagogical trade-offs and be flexible in the classroom and in teaching. It's a proactive, systematic and deliberate process that occurs before and during the course. Collaborative pedagogical insight is another facet of the UDL implementation process, such as speaking with instructional designers, disability services offices, or colleagues. Finally, the process of UDL implementation involves reflective pedagogical practices about the implementation to make improvements for future semesters.

CHAPTER 5

DISCUSSION

This hermeneutic phenomenological study aimed to investigate how faculty and instructional designers interpret and engage with the implementation of UDL in higher education. Specifically, it delves into the experiences and process employed by faculty and instructional designers in integrating the UDL framework guidelines and checkpoints. This study responded to the main research question of what is the meaning that faculty and instructional designers ascribe to the experience of implementing UDL in higher education by responding to the sub-questions involving the lived experience, the meaning ascribed to UDL, and the process of UDL implementation. The findings are discussed in light of the research purpose, questions, and how they align to what is discussed in the literature.

Lived Experience of UDL Implementation in Higher Education

The lived experience of implementing UDL in higher education was expressed by participants through the constructed themes of professional empowerment, navigating constraints, emotional resonance with UDL, evaluating impact, and practical UDL implementation. Participants discussed the need for UDL training in higher education, which aligns with what is recommended in the literature (Rogers & Gronseth, 2021). Participants spoke of how they trained and supported faculty in implementing UDL with new faculty orientations, trainings, workshops, faculty learning communities, and consultations. This aligns with the literature about offering training for faculty (Bastedo et al., 2013; Evmenova, 2018; Hromalik et al., 2020; Sugar & Luterbach, 2016), such as faculty onboarding training, tutorials, and workshops.

Part of the lived experience of offering faculty training and support in UDL involves faculty readiness and openness to pedagogical shifts and gaining faculty buy-in to attend training and then implement UDL strategies. This can relate to the lack of authority of instructional designers discussed by Drysdale (2021). While instructional designers can recommend faculty utilize the UDL framework and share how it will benefit students, they do not have the authority to require or mandate that faculty use UDL. Demonstrating UDL during faculty consultations or workshops on pedagogy was another technique used by instructional designer participants, which is also recommended in the literature (Evmenova, 2018). Some participants expressed the benefits of UDL during the COVID-19 pandemic and began offering professional development about UDL, which is aligned with the literature stating that the pandemic opened more avenues for faculty to be supported in offering multimodal courses (Xie et al., 2021).

Participants experienced several constraints when implementing UDL. Implementing UDL involves a high-intensity workload and coping with time as a limited resource. Time was the most prevalent challenge expressed by participants during UDL implementation. This parallels the literature (Fovet et al., 2014; Hills et al., 2022; Linder et al., 2015). Another constraint expressed by participants touched on the lack of educational knowledge of administration, which also aligns with the literature (Fovet et al., 2014; Hills et al., 2022; Martin, 2021; Moore et al., 2018; Singleton et al., 2019). Two participants spoke about challenges related to tailoring instruction for disparate learners including student resistance to changes made to the course when applying UDL. Similarly, others needed to overcome technological barriers within the learning management system or in the classroom environment. This is intriguing because there is less evidence in the literature regarding how student resistance and technology barriers can cause challenges when implementing UDL in higher education.

Participants expressed the experience of implementing UDL in higher education through several affective responses. Some felt that one technique, such as gamification, can relate to synergy among UDL guidelines. Similarly, Ewe and Galvin (2023) describe how the guidelines and checkpoints are interconnected and can be used together to support students. Participants believed that UDL relates to inclusive educational practices with aspects of accessibility, inclusive pedagogy, and bringing greater equity to learning. This is similar to the literature stating the need for UDL in providing inclusive pedagogy (Carlson & Dobson, 2020; Chen et al., 2018; Lowenthal et al., 2020; Rogers-Shaw, 2018). Broadly, most participants felt that UDL helps support diverse groups of learners and recognizing and adapting to student diversity. Similarly, some believed that there is not a definitive translation of UDL principles into practice. Other affective responses to UDL implementation included positive emotional resonance in UDL integration and overcoming pedagogical frustrations. Some felt guilty for not implementing all of the framework all at once, while others felt passionate about specific aspects of UDL and felt incredible after seeing how UDL impacts students. Participants also felt that adopting a UDL mindset was important with moving away from a deficit mindset to a UDL mindset.

The lived experience also involves the practical implementation of specific UDL techniques including the three principles of action and expression, engagement, and representation. For some, OER was also integral to UDL implementation. When it came to UDL implementation of action and expression, participants illustrated a strong willingness to give students more power over their learning and help them gain a more personalized stake in their education. On the other hand, the guideline of executive function was inherently difficult to implement because it requires intrinsic change on the part of the student. Similarly, self-regulation can be challenging with changing students' time management behaviors. Participants

identified a need to pivot during class when students have decreased engagement or do not comprehend a concept. Promoting student autonomy and control over their learning helps engage students and improves their interest in the course content and activities. Similarly, providing clear learning objectives can help sustain student effort and persistence.

In implementing the UDL guideline of representation, participants were not only able to self-reflect about how they could better communicate with their students, they also actively utilized technology tools to make that implementation a successful reality. Representation appears to be the most straightforward and approachable UDL principle since it is easy to see the results and know whether it has been accomplished. Representation was primarily expressed through perception and providing multiple formats of course materials, such as video, audio, and text-based materials and providing captions, alternative text, and other accessibility measures. This was expressed by all participants and was related to providing multiple formats of materials prevalent in OER. While OER is not specifically addressed in the UDL framework, participants expressed how aspects of using or creating OER fell under different components of the UDL framework.

Their lived experiences concluded with evaluating the impact from the UDL implementation. Implementing UDL advances accessibility in learning and involves iterative pedagogical improvement. It also minimizes barriers in the learning environment, promotes learner autonomy, and results in positive student attitudes and learning experiences. Promoting accessibility and equity is closely related to perception and representation. Eliminating barriers and learners overcoming obstacles to their learning conforms to what is found the literature (Smith et al., 2019). The positive student attitudes and experience impacts expressed by participants is similar to several articles in the literature sharing positive student responses to

UDL implementation and improving student learning (Black et al., 2015; Davies et al., 2013; Kennette & Wilson, 2019; Schelly et al., 2011; Smith, 2012). Likewise, Rogers-Shaw et al. (2018) describes how UDL can facilitate a shift towards being student-centered and Lowenthal et al. (2020) agreed that being empathic and flexible with students is important. Higher student achievement scores are correlated with UDL-implemented courses (King-Sears et al., 2023).

There are several key takeaways from this study related to the lived experience of implementing UDL in higher education. Pedagogical challenges require adaptive approaches for effective teaching and learning. Affective responses or feelings about UDL undergo significant cognitive and emotional transformation throughout the experience of implementing UDL. Similarly, implementing UDL techniques leads to significant positive outcomes or impacts in the teaching and learning experience. Several key meanings were attributed to UDL by participants.

Meaning Expressed for UDL in Higher Education

The meanings of UDL that emerged in this study were metaphorical insights for the process, accessible learning landscapes, blueprint for effective teaching, connectedness between UDL and pedagogical approaches and theories, inclusive practices for equitable learning, UDL as more than one thing, and as paradigm shift. Three metaphors for the UDL implementation process were shared by participants including a patchwork quilt, a Jenga tower, and a journey. There seems to be a dichotomy in the meaning ascribed to UDL in higher education. On one hand, many people discover the UDL framework from an accessibility standpoint either related to having a disability themselves, such as dyslexia or ADHD, or from trying to improve the accessibility of courses, like how the researcher initially learned about UDL. Some people still focus more on the accessibility component of UDL, but others push back against that idea and see UDL as creating equitable learning or breaking down barriers. UDL is more than

accessibility and Lowenthal et al. (2020) agree that compliance with accessibility is not enough. It's also more than offering choice or inclusive design. UDL is a mindset and a complex framework that means multiple things at once and different people focus on different aspects when assigning meaning to UDL. Several participants endorsed the connectedness between UDL and learning theories or pedagogies including culturally responsive pedagogy, which is in agreement with several studies (Moore, 2020; Kieran & Anderson, 2019; Waitoller & Thorius, 2016).

During the first interview, participants were told that UDL would be defined as a framework for this study and the practical perspective of implementing specific UDL guidelines and checkpoints (see Appendix B). While the researcher believes that this is still an accurate operational definition of UDL, this study demonstrated the nuances of what meanings are ascribed to UDL by the participants. This is similar to what has been described by others in the literature on UDL. UDL is loosely defined operationally (Diedrich, 2021) as designing with variability in mind to provide access to learning and cater to a diverse student population (Hollingshead et al., 2022). Something that surprised the researcher regarding the attributed meanings of UDL was the lack of some expected themes. This includes meanings described in the literature including a philosophy (Howery, 2021) or an intervention (Basham & Blackorby, 2021; Ok et al., 2016). UDL can be seen as both a practical framework for designing learning environments and a guiding philosophy or movement with an ongoing commitment to educational equity or inclusion and improving teaching (Howery, 2021; Rao & Cook, 2021). Despite the meaning of UDL as a philosophy not being explicitly discussed by participants in this study, it was alluded to when participants discussed having a UDL mindset. Faculty

members can adopt the UDL framework in varying ways, employing different levels of complexity or implementation (Basham & Blackorby, 2021; Ok et al., 2016; Rao & Cook, 2021).

These meanings are helpful to consider when researching UDL implementation in higher education since they can establish the researcher's perspective and ground the resulting research itself. The researcher's own interpretation of the meaning of UDL has broadened beyond being just a framework that supports equity to being a foundation of teaching that fits with different learning theories and removes learning barriers. This multitude of meanings expressed by different individuals with different lived experiences of implementing UDL over time is likely one of the main reasons that research into the effectiveness of UDL in higher education is challenging since UDL means different things to different people. UDL serves as a foundational framework for making courses accessible, aligning with learning theories, and building equity.

UDL Implementation Process in Higher Education

The process of implementing UDL in higher education involves a series of steps and descriptions shared by participants. First, an individual experiences UDL discovery, usually through professional development since most faculty do not learn about UDL during their programs of study. This is similar to the literature highlighting the need for professional development in UDL (Oyarzun et al., 2021; Westine et al., 2019). Preparing and launching the UDL process involves faculty prioritizing where to begin. For some participants this early stage may have represented the most labor-intensive aspect of their entire UDL experience, or at least presented the steepest learning curve since it involves selecting specific guidelines or checkpoints and then applying them in courses.

The think-aloud activity helped participants explore their process of selecting specific UDL guidelines. Comprehension and sustaining effort and persistence were the most prevalent

guidelines used by both faculty and instructional designers. The least prevalent guidelines were also the same for faculty and instructional designers: options for language and symbols, physical action, and executive functions. These guidelines could be difficult to comprehend or implement. For example, executive function is challenging because it relates to student behavioral changes like goal setting or planning and developing strategies, which requires the student to have inner motivation to change. The think-aloud activity responses were triangulated with the codes and themes of the semi-structured interviews demonstrating different aspects of the process of implementing UDL in higher education. Although the UDL framework itself makes no attempt to rate or rank which guidelines are harder or easier to implement, the findings show possible patterns of what aspects of UDL may be more challenging to implement.

For many individuals in the study, decision-making in UDL integration began with representation and providing multiple formats of course materials that meet accessibility requirements. For others, it began with the goals and objectives or outcomes of the course through backwards design. This involves taking the institutional context and specific student populations into account when considering which principles should be applied in a course. The process is an evolving synthesis of UDL pedagogical change in a course using a plus one approach as Tobin and Behling (2018) recommend rather than an intervention that can be completed after one or two semesters. This is why UDL is not just accessibility because accessibility can be accomplished or completed and is usually not viewed as an ongoing process. The literature agrees that implementing UDL is an ongoing process (van Kraayenoord et al., 2014) or a step-by-step approach over time (Evmenova, 2018; Westine et al., 2019).

The UDL implementation process varies for each individual and changes over time, making it challenging to specify which guidelines should be utilized and applied in specific

classrooms or at specific institutions. UDL efforts can be so successful at recruiting student interest that students go above and beyond course expectations. Trying to recommend specific UDL techniques or checkpoints that should be implemented can stifle or prevent unexpected positive outcomes. This can make it challenging for faculty to implement the framework when they first learn about UDL since they want guidance and specific techniques that they should implement. While instructional designers can make initial recommendations, it is vital for faculty to critically think about their specific course, context, and student population when choosing guidelines to implement in their courses.

Several participants discussed embedding UDL practice across the institution as a final step in the process. In addition to instructional designers providing faculty training or orientation introducing UDL, there are several other recommended ways to expand UDL across campus. One way is by gaining buy-in throughout the institution, which is also discussed by Moore et al. (2018) and Fovet (2021). Policy is also important for institutional support of UDL, which is also described in the literature (Hitch et al., 2015; Linder, et al., 2015). Institutional strategic plans and quality standards should integrate UDL for it to be implemented system wide.

When implementing UDL, participants shared descriptions of their implementation process. For example, some participants gain collaborative pedagogical insight through the disability services office, or from consultations with an instructional designer. UDL implementations can be more successful when partnering with disability services offices, centers for excellence in learning and teaching (Linder et al., 2015), or instructional designers (Moore et al., 2018). Student feedback was part of the process and valuable for reflecting on the usefulness of UDL for students and how to further improve a course. Collaborative pedagogical insight was

only described by faculty participants, which makes sense since instructional designers usually do not teach courses or have as much direct contact with students.

Several other descriptive themes of the process include negotiating pedagogical trade-offs, professional internalization of UDL, proactive pedagogical adaptation, reflective pedagogical practices, and systematic and deliberate UDL practices. Participants talked about being flexible for learners during the process of implementing UDL. The UDL framework is designed to be flexible, giving educators the freedom to choose their approach; it doesn't prescribe a specific method, encouraging teachers to concentrate on specific checkpoints based on the needs or difficulties that students encounter in the learning environment or within a particular academic discipline (Ewe & Galvin, 2023). Balance is important in implementing UDL across different classes and building flexibility into courses. Applying UDL over time becomes ingrained or automatic for some individuals.

Implementing proactively before the semester begins is part of the UDL implementation process. Reflecting on problems and being aware of the multifaceted reasons for implementing UDL were additional descriptions of the UDL implementation process. Approaching the UDL implementation process systematically and deliberately at the system level is another description. Being deliberate or intentional with the process of implementing UDL is also described in the literature (Moore et al., 2018; Moore, 2020; Smith et al., 2019). In general, the process of implementing UDL did not differ between faculty and instructional designer participants.

There are a number of key takeaways for the process of implementing UDL in higher education. The process involves learning about UDL, initiating the pedagogical journey, selecting guidelines, and applying UDL techniques. Pedagogical changes are ongoing, with a need for reflective reasoning, proactive decision-making, and systematic, deliberate practices in

the process of UDL implementation. Expanding UDL practices across institutions fosters collaborative efforts and gaining diverse perspectives. Finally, balancing and compromising are crucial elements in pedagogical choices and inclusive teaching. These key takeaways and alignment with the literature should be considered along with the implications for practice.

Implications for Practice

There are several implications for practice that can be gleaned from this study regarding UDL implementation in higher education by faculty and instructional designers. Additionally, the role for faculty and instructional designers will be described and differentiated in relation to implementing UDL in higher education. While implications are divided by instructional designer and faculty, some implications traverse both groups since the implications relate to what would support faculty in implementing UDL.

Instructional Designer Implications

Instructional designer participants sometimes taught courses for students or designed courses they taught themselves or that faculty used as a template. Two instructional designer participants worked with faculty on multiple campuses and advocate for UDL to faculty. All of the instructional designer participants supported faculty in professional development workshops, courses, faculty learning communities, or consultations and introduced UDL and/or modeled UDL to faculty. One instructional designer participant led the group that developed quality standards and incorporated some UDL elements in their institutional quality standards.

UDL means different things to different people. Therefore, when instructional designers discuss UDL with faculty, it would be beneficial to discuss this multitude of meanings from ensuring accessibility to providing inclusive design to promoting equity. This study focused on UDL as a practical framework that can be implemented based on the guidelines and checkpoints.

The literature also refers to UDL as an intervention or practice in addition to a framework (Basham & Blackorby, 2021). The way instructional designers introduce UDL to faculty and the meaning ascribed to UDL by instructional designers has important ramifications for how faculty will utilize or implement the framework. This relates to how UDL professional development or training is provided to faculty. Professional development is crucial to implementing UDL in higher education (Martin, 2021), especially more comprehensive training opportunities (Hromalik et al., 2020; Smith Canter et al., 2017; Westine et al., 2019).

Providing classroom examples of UDL implementation is an important part of professional development (Oyarzun et al., 2021; Smith Canter et al., 2017). Several participants also believed implementing UDL would be easier with relevant examples of UDL and non UDL courses with seven mentions. Two participants thought about having more conversations with faculty about implementing UDL and the positive effects of UDL. One participant recommended having faculty share examples of what they are already doing that fell under the UDL framework during training. Not only does this help faculty feel less overwhelmed by UDL, but it also gives faculty a baseline for what UDL can look like moving forward, which can then inform the conversation about how to implement additional aspects of UDL. Other participants discussed having a shared repository with examples of syllabi and course activities, and templates of ways to implement UDL techniques. Practical implementation of UDL in the classroom is the goal and training should move beyond introducing the framework to helping faculty begin to apply the framework in courses (Hromalik et al., 2020; Westine et al., 2019).

Release time and stipends are recommended for professional development to encourage more participation, which could help more faculty participate in training and then implement UDL strategies, which aligns with pre-existing research (Hromalik et al., 2020; van Kraayenoord

et al., 2014; Richman et al., 2019; Rodesiler & McGuire, 2015; Smith Canter et al., 2017; Westine et al., 2019). Instructional designers can use these ideas when designing professional development or holding consultations with faculty where UDL could be a viable framework.

Faculty Implications

All of the faculty participants spoke about implementing UDL in their courses, whether they were offered online or in person. One faculty member designed a course using UDL that her and her colleagues teach and also provided training for her colleagues in UDL so they would understand why she made specific design decisions. Another faculty member had recently moved from a faculty position to a faculty development position at a different institution. She believed that UDL training should be required for all faculty, which may be one of the reasons she moved into faculty development.

It is critical to note the multimodal reality of meaning for UDL evidenced in this study because faculty may be accustomed to pedagogies more heavily reliant on rigid definitions as opposed to more complexity and adaptability. The plus one approach by Tobin and Behling (2018) was mentioned by several participants and with the theme of the evolving synthesis of UDL pedagogical change. The plus one approach or viewing UDL implementation as an ongoing process can help faculty feel less overwhelmed as discussed by participants. Singleton and colleagues (2019) found that faculty felt overwhelmed with UDL as well. As a complex framework with 31 checkpoints that faculty can choose from to implement, it can be overwhelming when first learning about UDL. This relates to a prevalent recommendation for UDL training discussed previously. In general, these findings from the study aligned with the literature.

To apply the framework in courses, participants mentioned wanting additional training, a UDL checklist, video refreshers on different guidelines, and supportive technologies for high-flex classrooms. Other participants recommended expanding UDL across the institution through administrative support and awareness, policies, and gaining buy-in for UDL as an inclusivity approach. Several participants spoke of the need for more research into UDL effectiveness as a way to make the adoption of UDL practices easier. This relates back to the challenge of viewing UDL as an intervention (Diedrich, 2021) rather than a framework with an ongoing implementation process. There are some studies on UDL effectiveness (Capp, 2017; Espada-Chavarria et al., 2023; Ok et al., 2016; Seok et al., 2018), but they are not widespread and the ways UDL is implemented by different individuals vary greatly, making it impossible to broadly generalize UDL effectiveness as a framework.

The different methods of applying the framework make it unrealistic to create a UDL checklist or templates that share *all* of the possibilities for applying different aspects of UDL. That being said, a checklist could be used as a starting point for novice faculty and instructional designers first utilizing the UDL framework. Participants in this study may not have felt comfortable offering concrete ideas regarding how to measure UDL in large part because creating comprehensive ways to measure a learning approach like UDL with so many different adaptable components would likely require both extensive experience and a high level of mastery over UDL techniques overall.

The framework can be overwhelming for faculty to fully comprehend at first, especially for novices with little to no instruction in how to teach. Therefore, it would be helpful to adapt a checklist from the list of checkpoints and include the bulleted lists of examples available in the Version 2.0 full text document (CAST, 2011) to serve as a starting point for novice faculty.

Additionally, a template of a syllabus using UDL techniques could be shared with faculty. While a course template would be more time intensive to create, it could help make UDL adoption more widespread and examples of UDL content and assessment could be shared through a template more readily.

Based on the findings of this study and what the literature recommends, faculty can participate in a variety of professional development opportunities, training, or consultations with instructional designers to learn about the UDL framework and to begin implementing UDL in higher education. Faculty are encouraged to participate in learning about the UDL framework. They can consider ways that UDL guidelines and checkpoints can be implemented in their classroom to diminish learning barriers and lead to accessible, inclusive, and equitable learning opportunities for students. If faculty are just beginning their UDL implementation journey, they are encouraged to try one checkpoint right away to see the results in courses and the effects on student learning. As faculty become more familiar with the framework, they can reflect on their implementation process and interpret their experience of UDL implementation as well as develop the meaning they ascribe to UDL. Faculty and administrators should consider creating educational policies that highlight the importance of using UDL to foster a culture of inclusivity.

Limitations and Future Research Recommendations

There are several limitations to this study. The multiple understandings of UDL are a limitation since there is not one meaning or one way of implementing UDL experienced by all participants. This made interpreting the findings more holistically across all participants challenging. Additionally, these findings are not generalizable since that is not the purpose of phenomenological research. In hermeneutic phenomenology, the researcher interprets the data, which can introduce bias though this was reduced by sharing relevant excerpts in the

participants' own words. Relatedly, different researchers may interpret the same interview transcripts in different ways though this was mitigated in part with insights from the critical colleague. With phenomenological studies, there is always a risk of misinterpreting participants' experiences, which was mitigated in part with the reflexive, hermeneutic circle of reviewing the transcripts several times to ensure the alignment of interpretations with participants' statements.

The interpretive nature of phenomenological research may lead to differences in understanding based on cultural or contextual variations. There is little racial diversity since all participants were the same race but one, which limits considerations about the potential interplay of race in the lived experience of UDL implementation in higher education. While participants were from a variety of types of institutions in different states with different levels of experience, there were no participants with only one or two years of experience with implementing UDL. This means that the novice perspective is not represented in this study.

Future research would be beneficial to expand on what was explored in this study. Methodological variations of a study on a similar topic would be welcome. For example, a transcendental phenomenological study of faculty and instructional designer perspectives from different institutions could further explore the lived experience of implementing UDL in higher education, possibly through focus groups. Other mixed methods could explore a similar topic, such as surveys of faculty and instructional designers, followed up with interviews or focus groups. While this study further explores the lived experience and process of implementing UDL in higher education, further research is needed to see if the perspectives and experiences represented in this study are more widespread in other participant populations.

One more specific recommendation would be to complete a similar study with novice faculty and instructional designers with one or two years of experience in employing UDL in

higher education. On a related note, a more in-depth examination of the distinctive roles which faculty versus instructional designers play in UDL implementation would likely yield further insights. Similarly, it would be beneficial to gain perspectives from the student lived experience of those who have experienced both UDL and non-UDL implemented courses. Additionally, further research in metaphors for the process of applying UDL and the meanings assigned to UDL would be of interest in expanding the understanding of the lived experience of implementing UDL in higher education. Alternatively, research that focuses on UDL as a philosophy or mindset, an intervention, or a practice rather than a framework would expand understanding of UDL. A study more focused on what would make the experience of implementing UDL practices easier in higher education would also be useful.

Conclusion

As Michelle stated,

> We take that plus one approach, show faculty you can do this. You do not have to do it to perfection. There is not an endpoint that you must achieve. This is a journey of slow implementation that's going to happen again and again as you encounter different learning environments that you're going to be working in. Think of it as a practice rather than an accomplishment.

Although much of UDL research has focused on a particular initiative, course, or effort, this study brought together the different UDL components and perspectives with an array of participants to help solidify and make the lived experience and process of implementing UDL in higher education more concrete. Whether UDL implementation is considered to be a journey, a patchwork quilt, or a Jenga tower, it is a process that should continue to be explored by

instructional designers and faculty to make learning accessible, inclusive, equitable, and meaningful.

This study has explored the meaning assigned to the experience of implementing UDL in higher education by faculty and instructional designers through studying their lived experiences, the meaning ascribed to UDL itself, and their UDL implementation process. Broadly speaking, the findings from this study corroborate the literature regarding UDL. While this study found similarities to the literature, it adds nuances from a hermeneutic phenomenological perspective with the lived experience and meaning of implementing UDL in higher education, as well as the process of implementing UDL. The consistency of research subjects' experiences suggests that the lack of operational definition within UDL may not be the potential barrier it seems. Despite differences in how individuals use UDL in their courses, UDL still offers the same overall implementation journey, and perhaps this was why so much commonality revealed itself in participants' responses. Ultimately, participants viewed UDL as largely having delivered on its promise to improve the learning process and having a positive, inclusive impact on education.

REFERENCES

Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2016). Universal design for learning (UDL): A content analysis of peer-reviewed journal papers from 2012 to 2015. *Journal of the Scholarship of Teaching and Learning*, *16*(3), 39-56. https://doi.org/10.14434/josotl.v16i3.19295

Americans with Disabilities Act. 42 U.S.C. §§ 12101-12213 (1990).

Azam, S., Goodnough, K. C., Moghaddam, A., Arnold, C., & Penney, S. (2021). Becoming inclusive teacher educators: Self-study as a professional learning tool. *International Journal for the Scholarship of Teaching & Learning*, *15*(2), 1–9. https://doi.org/10.20429/ijsotl.2021.150204

Basham, J. D., & Blackorby, J. (2021) UDL next: The future of the framework. In K. A. Lowrey (Ed.), *Critical issues in universal design for learning* (pp. 43-63). Knowledge by Design, Inc.

Basham, J. D., Gardner, J. E., & Smith, S. J. (2020). Measuring the implementation of UDL in classrooms and schools: Initial field test results. *Remedial and Special Education*, *41*(4), 231-243. https://doi.org/10.1177/0741932520908015

Basham, J. D., Smith, S. J., & Satter, A. L. (2016). Universal design for learning: Scanning for alignment in K-12 blended and fully online learning materials. *Journal of Special Education Technology*, *31*(3), 147-155.

Bastedo, K., Sugar, A., Swenson, N., & Vargas, J. (2013). Programmatic, systematic, automatic: An online course accessibility support model. *Journal of Asynchronous Learning Networks*, *17*(3), 87-102. Retrieved February 22, 2023, from https://eric.ed.gov/?id=EJ1018300

Black, R. D., Weinberg, L. A., & Brodwin, M. G. (2014). Universal design for instruction and learning: A pilot study of faculty instructional methods and attitudes related to students with disabilities in higher education. *Exceptionality Education International, 24*(1), 48-64. https://doi.org/10.5206/eei.v24i1.7710

Black, R. D., Weinberg, L. A., & Brodwin, M. G. (2015). Universal design for learning and instruction: Perspectives of students with disabilities in higher education. *Exceptionality Education International, 25*(2), 1-26. Retrieved February 22, 2023, from https://ir.lib.uwo.ca/eei/vol25/iss2/2/

Boadu, G. (2021). Giving voice to teachers through interpretative phenomenological research: A methodological consideration. *Qualitative Research Journal, 21*(4), 408-423. https://doi.org/10.1108/QRJ-08-2020-0090

Bowe, F. G. (2000). *Universal design in education.* Bergin & Garvey.

Boylorn, R. M. (2008). Lived experience. In L. Given (Ed.), *The SAGE Encyclopedia of Qualitative Research Methods*. SAGE Publications, Incorporated. https://doi.org/10.4135/9781412963909

Bradshaw, D. G. (2020). Examining beliefs and practices of students with hidden disabilities and universal design for learning in institutions of higher education. *Journal of Higher Education Theory and Practice, 20*(15), 12-20. https://doi.org/10.33423/jhetp.v20i15.3933

Brandt, S., & Szarkowski, A. (2022). Universal design for learning in deaf education contexts: A scoping review. *American Annals of the Deaf, 167*(4), 489-502. https://doi.org/10.1353/aad.2022.0045

Burgstahler, S. (2007). *Equal access: Universal design of instruction.* University of Washington. Retrieved from http://www.washington.edu/doit/Brochures/Academics/instruction.html

Capp, M. J. (2017). The effectiveness of universal design for learning: A meta-analysis of literature between 2013 and 2016, *International Journal of Inclusive Education, 21*(8), 791-807. https://doi.org/10.1080/13603116.2017.1325074

Carlson, D., & Dobson, T. (2020). Fostering empathy through an inclusive pedagogy for career creatives. *International Journal of Art & Design Education*, *39*(2), 430-444.

Cash, C. M., Cox, T. D., & Hahs-Vaughn, D. L. (2021). Distance educators' attitudes and actions towards inclusive teaching practices. *Journal of the Scholarship of Teaching & Learning*, *21*(2), 15–42. https://doi.org/10.14434/josotl.v21i2.27949

CAST. (2011). *Universal design for learning guidelines version 2.0*. https://udlguidelines.cast.org/binaries/content/assets/udlguidelines/udlg-v2-0/udlg_fulltext_v2-0.doc

CAST. (2018). *Universal design for learning guidelines version 2.2*. http://udlguidelines.cast.org

Charters, E. (2003). The use of think-aloud methods in qualitative research: An introduction to think-aloud methods. *Brock Education*, *12*(2), 68-82. https://doi.org/10.26522/brocked.v12i2.38

Chen, B., Bastedo, K., & Howard, W. (2018). Exploring design elements for online STEM courses: Active learning, engagement & assessment design. *Online Learning Journal*, *22*(2), 59-75.

Chi, M. T. H. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *The Journal of the Learning Sciences*, *6*(3), 271-315.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Sage.

Crevecoeur, Y. C., Sorenson, S. E., Mayorga, V., & Gonzalez, A. P. (2014). Universal design for learning in K-12 educational settings: A review of group comparison and single-subject intervention studies. *The Journal of Special Education Apprenticeship, 3*(2), 1-23. Retrieved February 22, 2023, from https://scholarworks.lib.csusb.edu/josea/vol3/iss2/1

Cumming, T. M., & Rose, M. C. (2022). Exploring universal design for learning as an accessibility tool in higher education: A review of the current literature. *The Australian Educational Researcher, 49,* 1025–1043. https://doi.org/10.1007/s13384-021-00471-7

Cunningham, M. P., Huchting, K. K., Fogarty, D., & Graf, V. (2017). Providing access for students with moderate disabilities: An evaluation of a professional development program at a Catholic elementary school. *Journal of Catholic Education, 21*(1), 138-170. https://doi.org/10.15365/joce.2101072017

Dalton, E. M., Lyner-Cleophas, M., Ferguson, B. T., & McKenzie, J. (2019). Inclusion, universal design and universal design for learning in higher education: South Africa and the United States. *African Journal of Disability, 8*, 1–7. https://doi.org/10.4102/ajod.v8i0.519

Davies, P. L., Schelly, C. L., & Spooner, C. L. (2013). Measuring the effectiveness of universal design for learning intervention in postsecondary education. *Journal of Postsecondary Education & Disability*, *26*(3), 195–220.

Dean, T., Lee-Post, A., & Hapke, H. (2017). Universal design for learning in teaching large lecture classes. *Journal of Marketing Education, 39*(1), 5–16. https://doi.org/10.1177/0273475316662104

de Witt, L., & Ploeg, J. (2006). Critical appraisal of rigour in interpretive phenomenological nursing research. *Journal of advanced nursing*, *55*(2), 215–229. https://doi.org/10.1111/j.1365-2648.2006.03898.x

Dibley, L., Dickerson, S., Duffy, M., & Vandermause, R. (2022). *Doing hermeneutic phenomenological research: A practical guide.* SAGE Publications Ltd. https://doi.org/10.4135/9781529799583

Diedrich, J. (2021). The elusive nature of UDL. In K. A. Lowrey (Ed.), *Critical issues in universal design for learning* (pp. 3-9). Knowledge by Design, Inc.

Drysdale, J. (2021). The story is in the structure: A multi-case study of instructional design teams. *Online Learning Journal*, *25*(3), 57–80. https://doi.org/10.24059/olj.v25i3.2877

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Edyburn, D. (2010). Would you recognize universal design for learning if you saw it? Ten propositions for new directions for the second decade of UDL. *Learning Disability Quarterly*, *33*(1), 33-41.

Ericsson, K., & Simon, H. (1980). Verbal reports as data. *Psychological Review*, *87*(3), 215-251.

Espada-Chavarria, R., González-Montesino, R. H., López-Bastías, J. L., & Díaz-Vega, M. (2023). Universal design for learning and instruction: Effective strategies for inclusive higher education. *Education Sciences*, *13*(6), 1-14. https://doi.org/10.3390/educsci13060620

Evmenova, A. (2018). Preparing teachers to use universal design for learning to support diverse learners (EJ1184985). ERIC. *Journal of Online Learning Research*, *4*(2), 147-171. https://eric.ed.gov/?id=EJ1184985

Evmenova, A. S., Johnson, K. M., Okolo, C. M., & Moore, E. J. (2022, April 18). *UDL instruments and measurements.* Learning Designed. https://www.learningdesigned.org/resource/udl-instruments-and-measurements

Ewe, L. P., & Galvin, T. (2023). Universal design for learning across formal school structures in Europe—A systematic review. *Education Sciences, 13(9), 1-26*. https://doi.org/10.3390/educsci13090867

Fornauf, B. S., & Erickson, J. D. (2020). Toward an inclusive pedagogy through universal design for learning in higher education: A review of the literature. *Journal of Postsecondary Education and Disability*, *33*(2), 183–199.

Fovet, F. (2020) Universal design for learning as a tool for inclusion in the higher education classroom: Tips for the next decade of implementation. *Education Journal*, *9*(6), 163-172. https://doi.org/10.11648/j.edu.20200906.13

Fovet, F. (2021). Developing an ecological approach to the strategic implementation of UDL in higher education. *Journal of Education and Learning, 10*(4), 27-39. https://doi.org/10.5539/jel.v10n4p27

Fovet, F., & Mole, H. (2013). UDL- from disabilities office to mainstream class: How the tools of a minority address the aspirations of the student body at large. *Collected Essays on Learning and Teaching, 6*, 121-126. https://doi.org/10.22329/celt.v6i0.3762

Fovet, F., Mole, H., Jarrett, T., & Syncox, D. (2014). Like fire to water: Building bridging collaborations between disability service providers and course instructors to create user friendly and resource efficient UDL implementation material. *Collected Essays on Learning and Teaching, 7*(1), 68-75. https://doi.org/10.22329/celt.v7i1.3999

Friesen, N., Henriksson, C., & Saevi, T. (2012). *Hermeneutic phenomenology in education: Method and practice.* Sense Publishers.

Gagné, A., & Grimaldi, A. (2021). Designing together from moment to movement: A faculty framework for access online. *The Journal of Applied Instructional Design, 10*(1). Retrieved February 22, 2023, from https://edtechbooks.org/jaid_10_1/designing_together

Galleta, A. (2013). *Mastering the semi-structured interview and beyond.* New York University Press.

Garrad, T. A., & Nolan, H. (2023). Rethinking higher education unit design: Embedding universal design for learning in online studies. *Student Success*, *14*(1), 1–8. https://doi.org/10.5204/ssj.2300

Gronseth, S. L., & Hutchins, H. M. (2020). Flexibility in formal workplace learning: Technology applications for engagement through the lens of universal design for learning, *TechTrends, 64*, 211-218. https://doi.org/10.1007/s11528-019-00455-6

Hamilton, L. G., & Petty, S. (2023). Compassionate pedagogy for neurodiversity in higher education: A conceptual analysis. *Frontiers in Psychology*, *14*, 1-9. https://doi.org/10.3389/fpsyg.2023.1093290

Heidegger, M. (1962). *Being and time* (J. Macquarrie & E. Robinson, Trans.). Blackwell (Original work published 1927).

Herring, T., Morrison, A., Young, K., Kleinfeld, E., & MacDonald, L. (2017). Take a sip of this: Peer-to-peer promotion of strong instructional practice. *International Journal of Teaching and Learning in Higher Education, 29*(3), 571-579. Retrieved February 22, 2023, from https://files.eric.ed.gov/fulltext/EJ1151088.pdf

Higbee, J. L. (Ed.). (2003). *Curriculum transformation and disability: Implementing universal design in higher education.* General College, Center for Research on Developmental Education and Urban Literacy.

Higher Education Opportunity Act of 2008. Pub. L. No. 110-315, 122 Stat. 3078 (2008).

Hills, M., Overend, Al., & Hildebrandt, S. (2022). Faculty perspectives on UDL: Exploring bridges and barriers for broader adoption in higher education. *The Canadian Journal for Scholarship of Teaching and Learning, 13*(1). https://doi.org/10.5206/cjsotlrcacea.2022.1.13588

Hitch, D., Macfarlane, S., & Nihill, C. (2015). Inclusive pedagogy in Australian universities: A review of current policies and professional development activities. *The International Journal of The First Year in Higher Education, 6*(1), 135-145. https://doi.org/10.5204/intjfyhe.v6i1.254

Hollingshead, A., Lowrey, K., & Howery, K. (2022). Universal design for learning: When policy changes before evidence. *Educational Policy, 36*(5), 1135-1161. https://doi.org/10.1177/0895904820951120

Howery, K. (2021). The language we use to speak UDL. In K. A. Lowrey (Ed.), *Critical issues in universal design for learning* (pp. 11-41). Knowledge by Design, Inc.

Hromalik, C. D., Myhill, W. N., & Carr, N. R. (2020). "All faculty should take this:" A universal design for learning training for community college faculty. *TechTrends, 64*, 91-104. https://doi.org/10.1007/s11528-019-00439-6

Hromalik, C. D., Myhill, W. N., Ohrazda, C. A., Carr, N. R., & Zumbuhl, S. A. (2021). Increasing universal design for learning knowledge and application at a community

college: The universal design for learning academy. *International Journal of Inclusive Education*, 1-16. https://doi.org/10.1080/13603116.2021.1931719

Individuals with Disabilities Education Act. 20 U.S.C. §§ 1400-1482 (1990).

Ismailov, M., & Chiu, T. K. F. (2022). Catering to inclusion and diversity with universal design for learning in asynchronous online education: A self-determination theory perspective. *Frontiers in Psychology, 13*, 1-14. https://doi.org/10.3389/fpsyg.2022.819884

Izzo, M. V., Murray, A. and Novak, J. (2008) The faculty perspective on universal design for learning. *Journal of Postsecondary Education and Disability, 21*, 60-72.

Katz, J., & Sugden, R. (2013). The three-block model of universal design for learning implementation in a high school. *Canadian Journal of Educational Administration and Policy, 141*. http://136.159.200.199/index.php/cjeap/article/view/42841

Kennette, L. N. & Wilson, N. A. (Spring 2019). Universal design for learning (UDL): Student and faculty perceptions (EJ1214930). *Journal of Effective Teaching in Higher Education*, *2*(1), 1-26. Retrieved February 22, 2023, from http://files.eric.ed.gov/fulltext/EJ1214930.pdf

Kieran, L., & Anderson, C. (2019). Connecting universal design for learning with culturally responsive teaching. *Education and Urban Society, 51*(9), 1202-1216. https://doi.org/10.1177/0013124518785012

Kilpatrick, J. R., Ehrlich, S., & Bartlett, M. (2021). Learning from COVID-19: Universal design for learning implementation prior to and during a pandemic. *The Journal of Applied Instructional Design, 10*(1). https://dx.doi.org/10.51869/101jkmbse

King-Sears, S. A., Evmenova, A. S., Rao, K., Mergen, R. L., Owen, L. S., & Strimel, M. M. (2023). Achievement of learners receiving UDL instruction: A meta-analysis. *Teaching and Teacher Education, 122*, 1-15. https://doi.org/10.1016/j.tate.2022.103956

Kirsch, B. (2023). The universal design for learning academy for faculty across disciplines. *Journal of Technology-Integrated Lessons and Teaching*, *2*(1), 39–50. https://doi.org/10.13001/jtilt.v2i1.7655

Kirsch, B. A. & Luo, T. (2023). Universal design for learning implementation in higher education: Survey of faculty and instructional designers. *The Journal of Applied Instructional Design, 12*(4). Retrieved December 15, 2023, from https://edtechbooks.org/jaid_12_4/universal_design_for_learning_implementation_in_higher_education_survey_of_faculty_and_instructional_designers

Kleinfeld, E. (2018). Taking an expansive view of accessibility: The writing center at Metropolitan State University of Denver. *Composition Forum, 39.*

LaRocco, D. J., & Wilken, D. S. (2013). Universal design for learning: University faculty stages of concern and levels of use: A faculty action-research project. *Current Issues in Education*, *16*(1), 1-14. Retrieved February 22, 2023, from http://cie.asu.edu/ojs/index.php/cieatasu/article/view/1132

Larsen, H. G., & Adu, P. (2021). *The theoretical framework in phenomenological research: Development and application*. Routledge. https://doi.org/10.4324/9781003084259

Lauterbach, A. A. (2018). Hermeneutic phenomenological interviewing: Going beyond semi-structured formats to help participants revisit experience. *The Qualitative Report, 23*(11), 2883-2898. https://doi.org/10.46743/2160-3715/2018.3464

Leighton, J. P. (2017). *Using think-aloud interviews and cognitive labs in educational research.* Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199372904.001.0001

Linder, K. E., Fontaine-Rainen, D. L, & Behling, K. (2015). Whose job is it? Key challenges and future directions for online accessibility in US institutions of higher education. *Open Learning, 30*(1), 21-34. http://dx.doi.org/10.1080/02680513.2015.1007859

Lowenthal, P. R., Greear, K., Humphrey, M., Lowenthal, D. A., Conley, Q., Giacumo, L. A., & Dunlap, J. C., (2020). Creating accessible and inclusive online learning: Moving beyond compliance and broadening the discussion. *Quarterly Review of Distance Education, 21*(2), 1-21.

Magruder, O., Arnold, D. A., Edwards, M., & Moore, S. (2019). What is an ID? A survey study. *Online Learning Journal, 23*(3), 137-160. https://doi.org/10.24059/olj.v23i3.1546

Martin, N. (2021). Universal design for learning (UDL) in higher education: A UK, USA comparison. *Journal of Inclusive Practice in Further and Higher Education, 13*(1), 20-49.

McGuire, J. M. (2014). Universally accessible instruction: Oxymoron or opportunity? *Journal of Postsecondary Education and Disability*, *27*(4), 387-398.

Merriam-Webster. (n.d.). Inclusive. In *Merriam-Webster.com dictionary*. Retrieved August 1, 2023, from https://www.merriam-webster.com/dictionary/inclusive.

Meyer, A., & Rose, D. H. (1998). *Learning to read in the computer age*. Brookline Books.

Moore, C. S. (2020). Universal design for learning: Everybody gets to learn. In J. Quinn (Ed.), *The learner-centered instructional designer: Purpose, process, and practicalities of creating online courses in higher education* (pp. 93-105). Stylus Publishing, LLC.

Moore, E., Smith, F., Hollingshead, A., & Wojcik, B. (2018). Voices from the field. *Journal of Special Education Technology, 33*(1), 40-53. https://doi.org/10.1177/0162643417732293

Nilsen P. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science, 10*, 53-66. https://doi.org/10.1186/s13012-015-0242-0

Ok, M. W., Rao, K., Bryant, B. R., & McDougall, D. (2016). Universal design for learning in pre-k to grade 12 classrooms: A systematic review of research. *Exceptionality: A Special Education Journal, 25*(2), 116-138. https://doi.org/10.1080/09362835.2016.1196450

Olesova, L., & Campbell, S. (2019). The impact of the cooperative mentorship model on faculty preparedness to develop online courses. *Online Learning Journal, 23*(4), 192-213. https://doi.org/10.24059/olj.v23i4.2089

Olivier, E., & Potvin, M. C. (2021). Faculty development: Reaching every college student with universal design for learning. *Journal of Formative Design in Learning, 5,* 106–115. https://doi.org/10.1007/s41686-021-00061-x

Oyarzun, B., Bottoms, B. L., & Westine, C. (2021). Adopting and applying the universal design for learning principles in online courses. *The Journal of Applied Instructional Design, 10*(1), 78-87. Retrieved February 22, 2023, from https://edtechbooks.org/jaid_10_1/adopting_and_applyin

Pacansky-Brock, M., Smedshammer, M., & Vincent-Layton, K. (2020). Shaping the futures of learning in the digital age humanizing online teaching to equitize higher education. *Current Issues in Education, 21*(2), 1-21.

Palmer, J., & Caputo, A. (2003). *The universal instructional design implementation guide.* Retrieved from http://www.uoguelph.ca/tss/uid/UID%20implimentation%20guide%20v13.pdf

Peoples, K. (2021). *How to write a phenomenological dissertation: A step-by-step guide*. Sage.

Rao, K., & Cook, S. (2021). UDL implementation research: Building an evidence base. In K. A. Lowrey (Ed.), *Critical issues in universal design for learning* (pp. 67-87). Knowledge by Design, Inc.

Rao, K., Ok, M. W., & Bryant, B. R. (2014). A review of research on universal design educational models. *Remedial and Special Education, 35*(3), 153-166. https://doi.org/10.1177/0741932513518980

Rao, K., Ok, M. W., Smith, S. J., Evmenova, A. S., & Edyburg, D. (2020). Validation of the UDL reporting criteria with extant UDL research. *Remedial and Special Education, 41*(4), 219-230. https://doi.org/10.1177/0741932519847755

Rehabilitation Act of 1973. 29 U.S.C. §§ 701-796 (1973).

Rehabilitation Act. 29 U.S.C. § 794d (1998).

Reinhart, A., Evans, C., Luby, A., Orellana, J., Meyer, M., Wieczorek, J., Elliott, P., Burckhardt, P., & Nugent, R. (2022). Think-aloud interviews: A tool for exploring student statistical reasoning. *Journal of Statistics and Data Science Education, 30*(2), 100-113. https://doi.org/10.1080/26939169.2022.2063209

Richardson, J., Ashby, I., Alshammari, A., Cheng, Z., Johnson, B., Krause, T., Lee, D., Randolph, A., & Wang, H. (2019). Faculty and instructional designers on building successful collaborative relationships. *Educational Technology Research and Development, 67*(4), 855-880. https://doi.org/10.1007/s11423-018-9636-4

Richman, L. J., Haines, S., & Fello, S. (2019). Collaborative professional development focused on promoting effective implementation of the next generation science standards. *Science Education, 30*(3), 200-208. https://doi.org/10.33828/sei.v30.i3.6

Ritzhaupt, A. D., & Kumar, S. (2015). Knowledge and skills needed by instructional designers in higher education. *Performance Improvement Quarterly, 28*(3), 51–69. https://doi.org/10.1002/piq.21196

Rodesiler, C. A., & McGuire, J. M. (2015). Ideas in practice: Professional development to promote universal design for instruction. *Journal of Developmental Education, 38*(2), 24-26, 28-31.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). The Free Press.

Rogers, S. A., & Gronseth, S. L. (2021). Applying UDL to online active learning. *The Journal of Applied Instructional Design, 10*(1), 7-20. Retrieved February 22, 2023, from https://edtechbooks.org/jaid_10_1/applying_udl_to_onli

Rogers-Shaw, C., Carr-Chellman, D., & Choi, J. (2018). Universal design for learning: Guidelines for accessible online instruction. *Adult Learning, 29*(1), 20-31. https://doi.org/10.1177/1045159517735530

Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). Sage.

Schelly, C. L., Davies, P. L., & Spooner, C. L. (2011). Student perceptions of faculty implementation of universal design for learning. *Journal of Postsecondary Education and Disability*, *24*(1), 17–30.

Scott, L. A., Thoma, C. A., Puglia, L., Temple, P., & D'Aguilar, A. (2017). Implementing a UDL framework: A study of current personnel preparation practices. *Intellectual and Developmental Disabilities, 55*(1), 25-36. https://doi.org/10.1352/1934-9556-55.1.25

Scott, S. S., McGuire, J. M., & Shaw, S. (2001). *Principles of universal design for instruction.* Center on Postsecondary Education and Disability, University of Connecticut.

Seok, S., DaCosta, B., & Hodges, R. (2018). A systematic review of empirically based universal design for learning: Implementation and effectiveness of universal design in education for students with and without disabilities at the postsecondary level. *Open Journal of Social Sciences, 6,* 171-189. https://doi.org/10.4236/jss.2018.65014

Sheridan, L., Durksen, T. L., & Tindall-Ford, S. (2019). Understanding the reasoning of pre-service teachers: A think-aloud study using contextualized teaching scenarios. *Teacher Development, 23*(4), 425-446. https://doi.org/10.1080/13664530.2019.1640281

Singleton, K., Evmenova, A., Jerome, M. K., & Clark, K. (2019). Integrating UDL strategies into the online course development process: IDs' perspectives. *Online Learning Journal, 23*(1), 206-235. https://doi.org/10.24059/olj.v23i1.1407

Smith, F. (2012). Analyzing a college course that adheres to the universal design for learning (UDL) framework. *The Journal of Scholarship of Teaching and Learning, 12*(3), 31-61. Retrieved February 22, 2023, from https://scholarworks.iu.edu/journals/index.php/josotl/article/view/2151

Smith, S. J., Rao, K., Lowrey, K. A., Gardner, J. E., Moore, E., Coy, K., Marino, M., & Wojcik, B. (2019). Recommendations for a national research agenda in UDL: Outcomes from the UDL-IRN preconference on research. *Journal of Disability Policy Studies, 30*(3), 174-185. https://doi.org/10.1177/1044207319826219

Smith Canter, L. L., King, L. H., Williams, J. B., Metcalf, D., & Myrick Potts, K. R. (2017). Evaluating pedagogy and practice of universal design for learning in public schools (EJ1138000). ERIC. *Exceptionality Education International, 27*(1), 1-16. https://eric.ed.gov/?id=EJ1138000

Suddick, K., Cross, V., Vuoskoski, P., Galvin, K., & Stew, G. (2020). The work of hermeneutic phenomenology. *International Journal of Qualitative Methods, 19,* 1-14. https://doi.org/10.1177/1609406920947600

Sugar, W. A., & Luterbach, K. J. (2016). Using critical incidents of instructional design and multimedia production activities to investigate instructional designers' current practices and roles. *Educational Technology Research and Development, 64*(2), 285–312. https://doi.org/10.1007/s11423-015-9414-5

Takemae, N., Dobbins, N., & Kurtts, S. (2018). Preparation and experiences for implementation: Teacher candidates' perceptions and understanding of universal design for learning. *Issues in Teacher Education, 27*(1), 73-93.

Tobin, T. J. (2014). Increase online student retention with universal design for learning. *Quarterly Review of Distance Education, 15*(3), 13-24.

Tobin, T. J., & Behling, K. T. (2018). *Reach everyone, teach everyone: Universal design for learning in higher education.* West Virginia University Press.

Toutain, C. (2019). Barriers to accommodations for students with disabilities in higher education: A literature review. *Journal of Postsecondary Education and Disability, 32*(3), 297-310.

Twenty-first Century Communications and Video Accessibility Act of 2010. Pub. L. No. 111-260, 124 Stat. 2751 (2010).

Vagle, M. D. (2018). *Crafting phenomenological research* (2nd ed.). Routledge.

Valentine, K., Kopcha, T., & Vagle, M. (2018). Phenomenological methodologies in the field of educational communications and technology. *TechTrends, 62*(5), 462-472. https://doi.org/10.1007/s11528-018-0317-2

van Kraayenoord, C. E., Waterworth, D., & Brady, T. (2014). Responding to individual differences in inclusive classrooms in Australia. *Journal of International Special Needs Education*, *17*(2), 48–59. https://doi.org/10.9782/2159-4341-17.2.48

van Manen, M. (2001). *Researching lived experience: Human science for an action sensitive pedagogy*. Althouse Press.

van Manen, M. (2017). Phenomenology in its original sense. *Qualitative Health Research, 27*(6), 810-825. https://doi.org/10.1177/1049732317699381

Veronis, E. M. (2015). From barriers to bridges: Approaching accessibility in course design. *The International Journal of Information and Learning Technology, 32*(3), 138-149. https://doi.org/10.1108/IJILT-12-2014-0033

Waitoller, F. R., & Thorius, K. A. K. (2016). Cross-pollinating culturally sustaining pedagogy and universal design for learning: Toward an inclusive pedagogy that accounts for dis/ability. *Harvard Educational Review, 86*(3), 366-389.

West, E. A., Novak, D., & Mueller, C. (2016). Inclusive instructional practices used and their perceived importance by instructors. *Journal of Postsecondary Education and Disability, 29*(4), 363-374.

Westine, C. D., Oyarzun, B., Ahlgrim-Delzell, L., Casto, A., Okraski, C., Park, G., Person, J., & Steele, L. (2019). Familiarity, current use, and interest in universal design for learning among online university instructors. *International Review of Research in Open and Distributed Learning, 20*(5), 20-41. https://doi.org/10.19173/irrodl.v20i5.4258

Xie, J., A, G., Rice, M. F., & Griswold, D. E. (2021). Instructional designers' shifting thinking about supporting teaching during and post-COVID-19. *Distance Education, 42*(3), 331-351. https://doi.org/10.1080/01587919.2021.1956305

APPENDIX A

Eligibility Survey

Do you work in higher education?
- Yes
- No
- I did previously

At which type of institution do you work?
- University
- 4-year College
- Community College
- Technical College or Trade School

What is your current (or recent) role in higher education?
- Instructional designer or educational technology
- Faculty Member (list discipline)

Have you previously implemented one or more aspects of the Universal Design for Learning (UDL) framework in your work in higher education in a course or helped others implement UDL in higher education?
- Yes
- No

How many years have you been implementing UDL in higher education?
- less than one year
- 1-2 years
- 3-4 years
- 5 or more years

How many courses or projects have you implemented UDL in within higher education?
- 1
- 2-3
- 4-5
- more than 5

Are you willing to participate in two semi-structured interviews related to UDL implementation in higher education? The first interview is expected to take 1-2 hours; the second interview is expected to take 30-45 minutes. Both interviews will be audio recorded via Zoom in order to create a transcript. The transcript will be edited for accuracy before the Zoom recordings are deleted after the research is completed. These Zoom recordings will be kept on a password protected computer until they are deleted. Transcripts will be kept on a password protected computer and a print copy for coding will be kept in a locked desk drawer.
- Yes
- No

During the second half of the first interview, are you willing to participate in a think-aloud activity related to UDL implementation in higher education? This will involve you thinking about a prompt and verbalizing your thought processes and responses to the prompt. A brief practice think-aloud activity will be used to help prepare participants for this method.

Yes
No

If you responded yes to the last two questions, please share the email address you would like to be contacted at regarding this study.

Back Submit

APPENDIX B

Semi-Structured Interview Protocols

Initial Semi-Structured Interview for Faculty

Opening Questions

- To help protect your privacy, I would like you to give me a pseudonym that you would like me to use instead of your name. What would you like your alias to be?
- Please provide a little background on the college or university where you work (no need to share the name of your institution) and your student population.
- Can you share your current position and the types of courses you teach or design or have previously taught or designed?

Interview Questions

- What does universal design for learning mean to you?

In this study, we will define UDL as a framework. We will focus on the practical perspective of implementing specific UDL guidelines and checkpoints within the framework.

- Can you tell me about how you first learned about UDL?
- When was the last time you implemented UDL in a course?
- Tell me the story of a time that you implemented UDL in higher education. What was your experience like? Please share all of the details that you can remember.
- What does the implementation of UDL in higher education mean to you?
- Why did you choose to implement UDL?
- What worked well when you implemented UDL?
- Are there particular UDL guidelines that you focus on implementing in your courses?

    - Why did you focus on those guidelines?
    - What challenges did you experience in implementing UDL?
    - What benefits did you experience or witness with your students after implementing those guidelines?
    - How did you feel about implementing UDL?
- How would you evaluate this UDL implementation?

Initial Semi-Structured Interview for Instructional Designers

Opening Questions

- To help protect your privacy, I would like you to give me a pseudonym that you would like me to use instead of your name. What would you like your alias to be?
- Please provide a little background on the college or university where you work (no need to share the name of your institution) and your student population.
- Can you share your current position and main duties at your institution?

Interview Questions

- What does universal design for learning mean to you?

In this study, we will define UDL as a framework. We will focus on the practical perspective of implementing specific UDL guidelines and checkpoints within the framework.

- Can you tell me about how you first learned about UDL?
- How have you used UDL in your work, either yourself or when supporting faculty?
- When was the last time you used UDL guidelines or checkpoints?

- Tell me the story of a time that you implemented UDL in higher education, either yourself or supporting faculty in integrating UDL guidelines in their courses. What was your experience like? Please share all of the details that you can remember.
- What does the implementation of UDL in higher education mean to you?
- Why did you choose to use UDL?
- What worked well when you have applied UDL?
- Are there particular UDL guidelines that you most frequently use?
    - Why did you focus on those guidelines?
    - What challenges did you experience in applying UDL?
    - What benefits did you experience or witness after using those guidelines?
    - How did you feel about implementing UDL?
- How would you evaluate this UDL implementation?

Final Semi-Structured Interview

- Can you provide more details about how you learned about UDL?
- Can you clarify what you meant when you described your UDL implementation?
- After participating in the think-aloud activity, how did you feel about the process of implementing UDL?
- Did participating in the think-aloud activity change what UDL and UDL implementation means to you?
- Can you expand on what UDL means to you?
- Do you have anything else you would like to share about your experience implementing UDL in higher education?

APPENDIX C

Think-Aloud Activity Protocol

Thank you for participating in this think-aloud activity. As described in the initial email and recruitment survey, this study focuses on understanding the meaning of UDL in higher education for faculty and instructional designers, the lived experience of implementing UDL in higher education, and the process of implementing the UDL framework. This think-aloud activity will focus on the final aspect of this study: the process of implementing the UDL framework.

You will read aloud the following prompt related to creating an instructional unit (about one week's worth of content for a course) and then say out loud what you are thinking as you complete the activity. I would like you to verbalize everything that passes through your mind as if you were talking to yourself about planning, designing, and developing this instructional unit from beginning to end. I will ask you to keep talking if you are silent for approximately five to ten seconds. After you are done, I will ask a few follow-up questions. Let's practice with a brief activity to try this out since it can be awkward to think-aloud at first. Please know that you will not be evaluated on your thoughts or responses. Before we begin the practice activity, do you have any questions?

You've been asked to give a presentation about something current in your field of study. Walk me through the process of how you decide what topic to present at a conference.
Great, now that you've had a chance to practice thinking aloud, it's time for the activity prompt. Please read the prompt aloud and then respond out loud to the prompt.

Faculty Prompt

In this scenario, you will choose an important concept in your subject area that you regularly teach students about in your courses. State the concept that you will teach students.

Describe your average classroom of students (number of students, characteristics of your students, etc.). Now, think-aloud how you will apply different UDL guidelines and/or checkpoints to teach students about your important concept. Discuss what steps you would use to plan, design and develop, and then implement course content and assessment methods to teach students about the important concept.

Retrospective questions for debriefing part of the think-aloud interview:

- What parts of the UDL framework did you utilize in your planning? Why did you use those parts?
- What constraints are there that might prevent you from using specific guidelines or checkpoints from the UDL framework?
- What methods would you use to implement UDL for this instructional concept (optional if not shared in enough detail during the think-aloud)?
- How would you evaluate this UDL implementation if you used it in a course?
- How did you feel during this activity?
- Do you have anything to add about the process you used for applying UDL during this activity?
- How might your implementation process differ in a real course or if you had all the time in the world?

Instructional Designer Prompt

In this scenario, you are training faculty about your favorite pedagogy or learning theory. State the topic that you will cover with faculty. Describe the faculty at your institution, such as your relationship with them and their characteristics. Now, think-aloud how you will apply different UDL guidelines and/or checkpoints when training faculty about your favorite pedagogy

or learning theory. Discuss what steps you would use to plan, design and develop, and then implement training content and assessment methods to train your faculty for this scenario.

Retrospective questions for debriefing part of the think-aloud interview:

- What parts of the UDL framework did you utilize in your planning? Why did you use those parts?
- What constraints are there that might prevent you from using specific guidelines or checkpoints from the UDL framework?
- What methods would you use to implement UDL for this training pedagogy or learning theory (optional if not shared in enough detail during the think-aloud)?
- How would you evaluate this UDL implementation if you used it in training?
- How did you feel during this activity?
- Do you have anything to add about the process you used for applying UDL during this activity?
- How might your implementation process differ in a real training scenario or if you had all the time in the world?

VITA

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Education

PhD: *May 2020 – current,* Old Dominion University, Norfolk, VA
Degree: expected PhD in Education, Instructional Design and Technology

Masters: *Jan. 2018 – Dec. 2019,* University of South Carolina Aiken, Aiken, SC
Degree: Master of Education, Educational Technology in December 2019

Masters: *Aug. 2007 – Dec. 2008,* Dominican University, River Forest, IL
Degree: Master of Library and Information Science (MLIS) on January 10, 2009

Undergraduate: *Aug. 2001 – May 2005,* Bucknell University, Lewisburg, PA
Degrees: Bachelor of Arts in Animal Behavior, Bachelor of Arts in Anthropology

Selected Professional Experience

August 2023-current
Briar Cliff University, Sioux City, IA 51104
Associate Provost for the Library and Information Technology, University Librarian
August 2018-2023
Bishop Mueller Library- Briar Cliff University, Sioux City, IA 51104
University Librarian
August 2009- July 2018
University of South Carolina Upstate Library, Spartanburg, SC 29303
Public Services Librarian, Coordinator of Emerging Technologies

Selected Teaching and Training Experience

- Planned and led a Universal Design for Learning academy for faculty to make courses more inclusive and accessible for students from 2021-current.
- Organized a one-day Regional Librarian Conference on June 7, 2019.
- Created a series of instructional modules to introduce the threshold concepts in the ACRL Framework for Information Literacy.
- Participated in the Quality Enhancement Plan by teaching a technology intensive course.
- Organized a one-day conference on May 5, 2016: Transforming Librarians through Technology.
- Developed a transfer student game with four librarians on information literacy concepts.

Publications, Presentations, and Skills

- Two books, seven book chapters, fourteen articles.
- Two preconference sessions, 39 presentations, three posters, and moderated two conference sessions.
- Teaching, leadership, management, grant writing, reference, and collection management experience.
- Experience using learning technologies (Adobe Creative Suite, PowToon, Padlet, Kahoot, etc.).