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A UNIVERSAL DESIGN FOR INCLUSIVE ONLINE LEARNER SUCCESS IN NURSING EDUCATION

BY

ANN MARY CELESTINI

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Approval of Dissertation

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Abstract

Enrolment in online post-secondary nursing education is growing exponentially diverse in age, background, circumstances, and ability (Statistics Canada, 2021a); therefore, it is essential that educators build a responsive and inclusive environment for varied learners to optimize learning and success. Universal Design for Learning (UDL) is a theoretical framework that holds significant potential for guiding instructional practices that aim to minimize learning barriers and promote inclusivity of diverse learner needs in online post-secondary nursing education. A descriptive case study of a large first-year Bachelor of Science in Nursing course that was redesigned using UDL-based instructional strategies for online delivery was conducted. The purpose was to explore how learners rated and described the effectiveness of instructional strategies used in supporting inclusivity of diverse learning preferences and needs in an online environment. A convergent mixed methods analysis of mixed secondary data collected in the fall 2020 semester using an online survey, Inclusive Teaching Strategies Inventory-Students (n=40) and focus group interview (n=7) supplemented with my co-instructor notes, informed this research. Survey respondents rated accessible course material, inclusive lecture strategies, accommodations, inclusive assessment and classroom constructs of the tool, as being most inclusive of diverse needs. Focus group participants described assessment methods, instructor presence, and UDL-based course design elements, as the preferred instructional strategies used in the curriculum, with group work and navigation issues being most problematic. A purposeful combination of synchronous and asynchronous UDL-based instructional strategies by nurse educators that integrates

multiple means of engagement, representation, action and expression, offered an inclusive online environment for diverse learning needs.

Keywords: inclusive online nursing education, large first-year undergraduate course, universal design for learning, learner perspectives

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Definition of Terms

For the purposes of this study, the following definitions of key terms are provided:

Accessibility: Accessibility is based on student experiences of their ability or capacity to engage with the course material, peers, and the instructor (Iwarsson & Ståhl, 2003).

Accommodations: Accommodations are "a means of preventing and removing barriers that impede students with disabilities from participating fully in the educational environment in a way that is responsive to their own unique circumstances " (Ontario Human Rights Commission [OHRC], n.d., Principles of Accommodation section). This term is used interchangeably with academic accommodations in this study.

Curriculum: Curriculum includes four interrelated components: goals, methods, materials, and assessments (CAST, 2011a).

Documented Disabilities: Documented disabilities includes any degree of impairment related to physical, mental, developmental, or learning dysfunction (OHRC, 2005*).*

Expert Learner: CAST (2011a) describes an expert learner as having developed three broad characteristics: 1) resourceful, knowledgeable, 2) strategic, goal-directed, and 3) purposeful and motivated learners.

Hosting University: The hosting university represents the facility that offered the online post-secondary course.

Inclusive Education: Inclusive education is defined as a "process of reaching out to all learners by addressing all forms of exclusion and marginalization; disparities; and

inequalities in access, participation, and learning outcomes" (United Nations Educational, Scientific and Cultural Organization - UNESCO, 2019, UNESCOs Response section).

In-person Place-based: The term in-person place-based will be used in this study to refer to the place-based face-to-face delivery of education to differentiate it from virtual face-to-face context.

Learner Diversity: Diversity involves the existence of a range of human personalities and characteristics within a group, institution, or culture (Government of Ontario, 2009). In this research study, learner diversity includes differences in learner ages, backgrounds, and abilities to learn.

Online Post-secondary Education: For the purposes of this study, online post-secondary education, or online higher education, refers to any program or course offered through a fully remote educational delivery method based in either a college or university setting.

Universal Design: Universal Design is defined as the "design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Center for Universal Design 1997, p. 1).

Universal Design for Learning: UDL philosophical principles are used to guide the focus of the study findings. CAST defines UDL as a "research-based set of principles that together form a practical framework for using technology to maximize learning opportunities for every student" (Rose & Meyer, 2002, p. 5).

Chapter 1. Introduction

Student admission numbers have been steadily climbing in post-secondary online nursing education, resulting in an increased number and a wider range of diverse learner characteristics. Traditional pedagogical approaches primarily used by educators are restricted to more passive and standardized instructional strategies that may create barriers for learners and limit accessibility to the course content for others. Academic accommodations are available for students with documented disabilities (SWDD) in post-secondary settings yet are not inclusive of those who choose not to disclose their status and other students without a diagnosed disability (SWODD) who may also need learning support. Nurse educators can use Universal Design for Learning (UDL) principles when designing course curriculum to reduce the prevalence of learning barriers and need for academic accommodations. Offering inclusive instructional strategies to diverse learners is one remedy to overcome barriers experienced by online post-secondary learners. While this potential positive impact on students is evident, the use of UDL-based instructional strategies to support inclusive and accessible practices for diverse learner needs is not well known, used, or researched among nursing faculty in post-secondary settings (Coffman & Draper, 2021; Levey, 2018).

To target this research gap, a descriptive case study was conducted using a convergent mixed methods analysis of a mixed secondary data set. Following authors' permission, the Inclusive Teaching Strategies Inventory- Student (ITSI-S) online survey questionnaire developed by Garwonski et al. (2016) and focus group interview were used by a hired research assistant to gather data. This initial data set was collected from undergraduate students enrolled in the fall 2020 online offering of a large first-year

Bachelor of Science in Nursing (BScN) course designed using UDL principles to answer the research question posed. Prior to describing the study, it is important to clearly establish and identify the problem that was addressed.

Statement of Problem

Post-secondary education student enrolment numbers have been continually rising in Canada (Usher, 2019). Similarly, the number of students registering in online post-secondary study are significantly growing. Fully online student enrolments have been expanding rapidly over the last five years, with class sizes increasing by approximately 10% per year in universities and 15% in colleges (Bates, 2018). In 2015, online course registrations comprised 16% of all student admissions at Canadian universities and 12% in colleges outside Québec (Bates, 2018, p. 11). Currently, these numbers have increased because of the pandemic-driven emergency to a remote online learning environment. Data collected from 100,000 post-secondary students in Canada from April 19 to May 1, 2020, indicated that COVID-19 resulted in an overall shift to online learning (Statistics Canada, 2020a). Most participants (75%) had all courses moved to an online delivery format. While this type of academic disruption varied widely by field of study, health care (41%) ranked among the highest in numbers (Statistics Canada, 2020a). Additionally, adjusting to online learning could have been impacted by the added stress of coping with the COVID-19 pandemic.

Increasing enrolment numbers in post-secondary education also means larger learner cohorts with greater variation in backgrounds, preparation levels, abilities, and previous life experiences (Michalski et al., 2017; Statistics Canada, 2020b). Similar heterogeneity exists among nursing program students (MacDaniel, 2020). Enrolment in

health and related fields of study have consistently increased over the past five years (2015-2020) at Canadian universities and colleges (Statistics Canada, 2021b). From these admission numbers, registered nursing students represented the largest subgroup of graduates within all the health programs (Statistics Canada, 2021a).

Learner diversity is typically welcomed by institutions in post-secondary education (Burgstahler, 2020). Nevertheless, supporting student success using standardized traditional pedagogical practices that are rigid in structure presents challenges for educators, as these strategies lack the curricular flexibility required for an inclusive online learning environment (Center for Applied Special Technology [CAST], 2011a; Tobin & Behling, 2018). Historically, learners have been classified as sharing typical characteristics or styles for learning (Kolb, 1971). As knowledge evolved, the notion of individuals possessing one learning style has since been replaced with the concept of learning as involving multiple preferences, which are not static in nature but contextually dependent and vary over time (Garner, 2000). Additionally, learners use variable routes to attaining similar curricular goals, which adds to the complexity and multitude of possibilities in learning differences. Despite these obvious variations, many learners are still being educated in standardized, traditional, and uniform methods that must be supplemented with academic accommodations for students who require diverse learning support (Meyer et al., 2014).

Academic accommodations in post-secondary settings are complex and typically require learner documentation of a disability for access to supports (Burgstahler, 2020). Current campus culture, policy, and practice specific to access, diversity, and inclusion usually support this deficiency-based approach to accommodations in post-secondary

settings. While organizational policies and support are in place at most post-secondary institutions, the practice and use of available accommodations by learners still falls short of what is required by many students to succeed in education. To magnify the complexity of the issue, learners requiring academic accommodations or other learning supports, are often hesitant to access assistance in post-secondary education (Neal-Boylan & Miller, 2017).

Within changing learner demographics, evidence about equity, diversity, and inclusion (EDI) in higher education has been primarily focused on studying the experiences of SWDD (Fovet, 2019). These initial attempts for inclusion were intended to increase accessibility for SWDD and those with special needs. However, the benefits for other potentially disadvantaged learners such as people with hidden disabilities, and those who choose not to disclose a disability should be explored. Furthermore, learners whose native language is not English, older more senior students, and members of other marginalized groups still need to be investigated (Burgstahler, 2020). The latest research has begun to provide evidence of these accessibility advantages for students from Indigenous (Fovet, 2021a), and international (Fovet, 2019) backgrounds, and those experiencing mental health challenges (Fovet, 2020). Therefore, the need to examine the impact of UDL-based instructional strategies on diverse learners in post-secondary nursing education, including SWODD is essential.

Diversity of the Learner Defined

Academic performance issues are not specific to only those students who have documented evidence of a need for learning support (Burgstahler, 2020). Temporary health conditions and new or difficult situations may also warrant the need for learners without

documented disabilities to access learning support, magnifying the urgency for a successful instructional strategy. For example, the current pandemic situation has heightened the demand to accommodate accessibility challenges experienced by students who are not accustomed to online learning (Pichette et al., 2020). These unique learner needs, and circumstances are underscored by the online learning context and digital technology requirements necessary to actively participate in a course (Bloomberg, 2021).

Despite an increasingly diverse post-secondary student population, no single instructional approach has proven to be beneficial for every learner, topic, and situation. Thus, a disconnect between student diversity, including their individual needs, and using a one-size-fits all approach to education necessitates attention. The hesitancy of students to disclose any learning needs or disabilities to faculty further compounds this dilemma. Similar issues have been experienced by nurse educators and are evident among nursing students enrolled in their first year of undergraduate study, as many courses are not typically designed to accommodate an inclusivity of various learner needs and preferences (Hitch et al., 2019).

To address this problem, it is essential that nurse educators build a flexible and inclusive online learning environment for diverse learners to optimize their potential and success, while minimizing barriers to learning. An inclusive learning environment involves offering equitable opportunities for everyone to succeed (ABLE Solution Consultants, 2020). Accessibility to course resources and comprehension of this material by learners are both required. The value of creating an inclusive learning environment is primarily understood by nurse educators, yet some may encounter challenges when trying to move from this plan to action, as many are content experts and not typically trained in pedagogy

or instructional design (Beard, 2014). Other faculty may be confused about their role in the disability services accommodations process on campus (Izzo et al., 2008), or are unfamiliar with the techniques required to develop an inclusive online course and learning environment (Bloomberg, 2021). Prior to exploring the purpose of the study, it is essential to understand the background of the case.

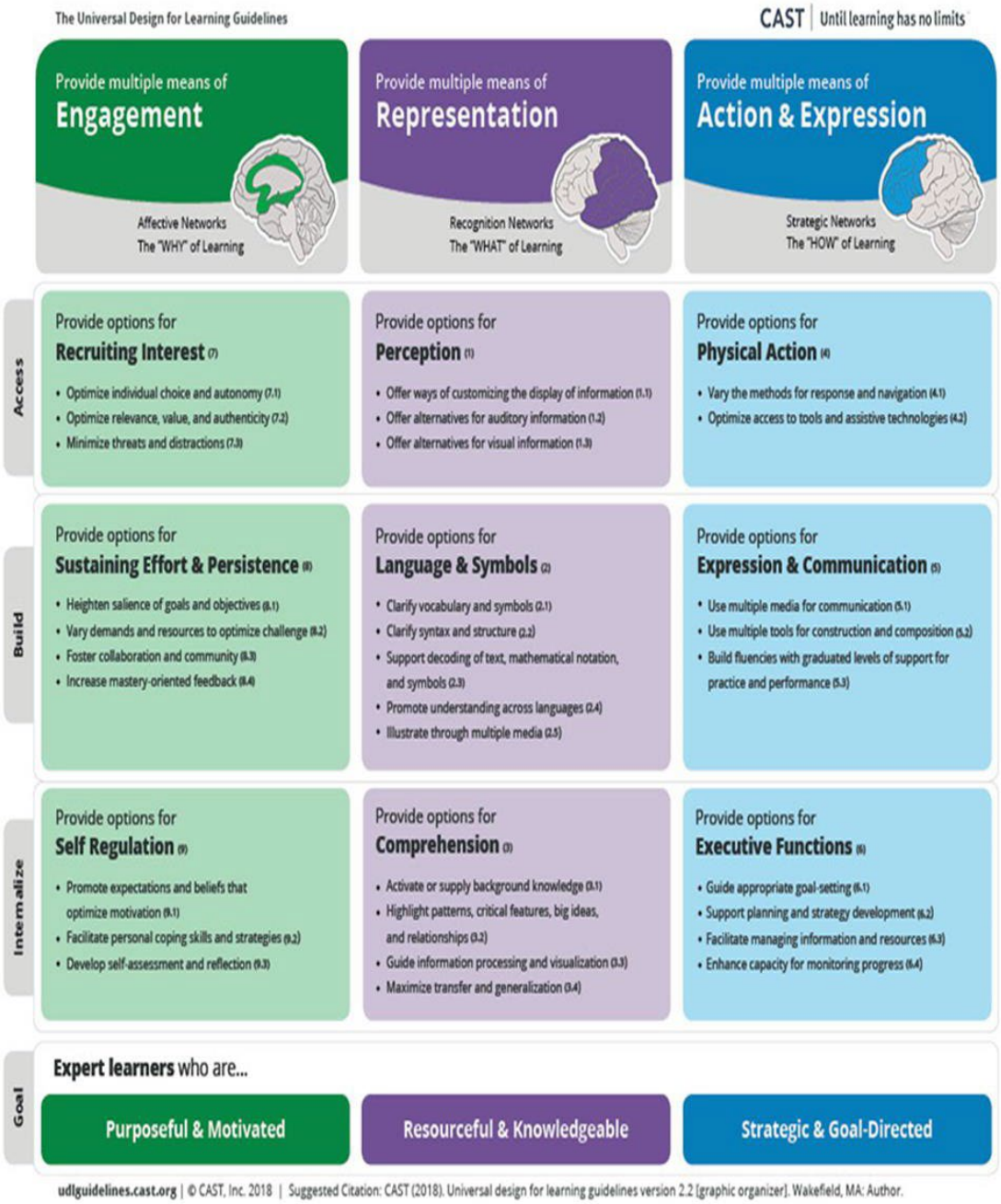
Context of the Study

The subject or *case* in this study was a first-year undergraduate BScN course that I redesigned as one of the co-instructors over a two-year period, using UDL principles for online delivery at a Canadian university. To contextualize this *case*, details regarding the UDL theoretical framework, the institution, program, course design, and learners, are provided. In addition, the connection of instructional strategies used to the principles of UDL, and corresponding framework checkpoints are explored using tables (see Tables 1-4) that represent each of the four components of a UDL curriculum: goals, assessments, materials, and methods (Meyer et al., 2014).

UDL is a theoretical framework that can promote the development of a flexible, and inclusive learning environment by using three core principles of multiple means of engagement, representation, action and expression (CAST, 2011a; Meyer et al., 2014). Nine more specific UDL guidelines and thirty-one checkpoints, as detailed below in the most recent graphic organizer by CAST (2018) (see Figure 1) offer educators concrete suggestions for implementing this framework in practice.

Figure 1

CAST (2018) UDL Graphic Organizer 2.2



The course, or *case* for this study is typically offered in the fall semester at a midsized university in Ontario, Canada. Undergraduate and graduate studies are available

at the university in a variety of disciplines through in-person place-based, online, and blended delivery formats. Three undergraduate programs leading to a BScN degree are offered through the School of Nursing at various locations including: a collaborative four-year program, compressed three year fast-track route, and two-year post-bridge Practical Nurse to BScN path.

The case in the study was this first-year foundational course required in both the collaborative and compressed program degree streams. Course content includes introducing the learner to themselves as a healthy individual, learner, and future nurse. Key concepts introduced within this course include the metaparadigm of nursing, critical relational inquiry, communication, stress, coping, individual health behaviour change, and cultural sensitivity.

This introductory course is typically offered in-person by two co-instructors during the fall semester, over a twelve-week period, to a new annual cohort of approximately 230 learners. Prior to the redesign of the course curriculum, weekly classes were historically delivered in large theatre-style classrooms for one hour and fifty minutes by one of the co-instructors. Weekly fifty-minute instructor led seminars were normally held with nine smaller groups of twenty-five learners; to encourage an individualized application of the knowledge in a supportive environment. Seminars were originally focused on developing preliminary clinical skills, such as bathing, bed-making, and transfers. After a program need in building interpersonal communications skills was identified by department faculty, the course curriculum was revised.

Course Curriculum Redesign

As part of the UDL framework, course curriculum has been identified as having four instructional components: goals, assessment, methods, and materials (Meyer et al., 2014). The course curriculum evolved over a two-year period from 2019 to 2020.

In-person Curriculum Changes 2019

In 2019, as one of the co-instructors, I led the revision of the course to focus on building interpersonal communication and collaboration skills among learners. Certain UDL-based principles were used to inform modifications that resulted in major pedagogical changes to this in-person course and the initial collaborative study as principal investigator in 2019 (Celestini et al., 2021). Most significantly, the midterm exam was changed from a multiple-choice type of format to an online version that integrated application-based questions and was offered through the learning management system (LMS), Blackboard. The final exam was replaced by a group project to unfold over a six-week period in the latter half of the semester during scheduled in-person seminars with learners. As a result, seminars were lengthened, restructured, and held during weeks six through eleven for one-hour and fifty-minutes each, to permit an increased level and depth of engagement. Clinically based skills were moved to another course in the program and replaced with a focus on assessment, relational, and communication proficiencies. The weighting of learner assessment was also more evenly distributed across assignments. Care was further taken when revising assessment content, to minimize anxiety-producing language in the course, for instance, points versus grades, and formative review versus midterm exam (Celestini et al., 2021). Several new instructional strategies were introduced to encourage more active learner participation, while offering varied means of knowledge

expression and assessment opportunities. For example, participation based adaptive quizzes aligned with textbook readings, five themed in-class activities, and an opportunity for two extra bonus points to attend an Indigenous Blanket Ceremony, were offered during the semester. Findings from this 2019 study are described in the review of literature in Chapter 2.

Remote Curriculum Changes 2020

In 2020, as a result of the pandemic situation, I further redesigned this large in-person place-based course for online delivery using similar UDL-based principles and conducted a study to gather data for this dissertation research, which was used one year later. The content from twelve weekly lectures was reformatted primarily from PowerPoint-based instructor-led presentations into weekly units that were available to learners online through the course LMS site. Specific modifications were made to support the integration of UDL strategies throughout the course curriculum.

Curriculum Goals

Curriculum goals, or learning expectations, represent the knowledge and skills that a learner should master in the course (CAST, 2011a). Course goals were identified in the syllabus, with specific learning objectives listed at the beginning of each weekly unit on the LMS. The syllabus provided learners with details about the course goals, weekly unit schedule, readings, assessment methods, important dates, and key university policies including an accessibility statement. Prior to the start of the fall 2020 semester, an accessibly formatted version of the syllabus was available in a common file format to learners through a weblink in the course LMS site.

A welcome video, twelve-weekly unit videos, and assignment videos with closed

captioning features were prepared by the instructors and posted throughout the course site to supplement the written guidance provided. The unit objectives and weekly content were designed to progressively build on crucial course concepts learned throughout the semester. A checklist of actions requiring completion prior to moving forward was also included for learners to help keep them on track. Cognitive supports were provided in each unit by summarizing key points and identifying upcoming content for the following week. Additional scaffolding, such as frequent instructor announcements, email notifications, and monthly calendars with timelines were available in a separate tab on the LMS for learners. Access to course content was released in two-week blocks by instructors, to accommodate different learning paces and minimize learners from falling behind or getting too far ahead of the class.

The purpose, objectives, specific guidelines, and rubrics for each assignment were also posted as separate Microsoft Word documents on Blackboard. *Flex time* is a term that was used for this course and refers to extended timelines or due dates, offered to all students to use as needed to complete specific assignments in the course. Additional flex time was permitted for the written essay and incorporated into the response time for the online formative review, without the need for learners to seek permission from the instructors. The connection of these goal focused strategies to the three key UDL principles and specific thirty-one checkpoints (CAST, 2018), can be noted in Table 1.

Table 1

Curriculum Goals and Corresponding UDL Principles With Checkpoints

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
Goals: Syllabus, Weekly Units, Communication & Assignment Guidelines			
Course Syllabus (e.g., goals/objectives identified;	Minimize threats/distractions	Offer alternatives for auditory information	Use multiple media for communication

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
offered different accessible formats; detailed; early access)		Offer alternatives for visual information	Use multiple tools for construction and composition Support planning/strategic development Facilitate managing information and resources
Weekly Units (e.g., scaffolded content; closed captioning; alternative formats; checklists, summaries, objectives; variety of activities; released in two-week blocks; instructor/weekly/assignment videos)	Optimize choice/autonomy Heighten salience of goals/objectives Promote expectations and beliefs that optimize motivation	Offer ways of customizing the display of information. Offer alternatives for auditory information Offer alternatives for visual information Clarify syntax and structure Highlight, critical features, big ideas, relationships Guide information processing and visualization Maximize transfer and generalization	Use multiple media for communication Guide appropriate goal setting Support planning/strategic development Facilitate managing information and resources Enhance capacity for monitoring progress
Course Communication (e.g., email; announcements, monthly calendars with timelines; synchronous sessions; forums)	Minimize threats/distractions Increase mastery-oriented feedback Promote expectations to optimize motivation	Clarify syntax and structure Highlight, critical features, big ideas, relationships Maximize transfer and generalization	Use multiple media for communication Support planning/strategic development Facilitate managing information and resources
Assignments and Flex Time (e.g., purpose, objectives; guidelines, rubrics; extended due dates)	Optimize choice/autonomy Heighten salience of goals/objectives Promote expectations to optimize motivation	Offer ways of customizing the display of information. Offer alternatives for auditory information Offer alternatives for visual information Clarify syntax and structure Highlight, critical features, big ideas, relationships	Guide appropriate goal setting Support planning/strategic development Facilitate managing information and resources Enhance capacity for monitoring progress

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
		Guide information processing and visualization Maximize transfer and generalization	

Curriculum Assessments

Assessment as part of a UDL curriculum involves the process of using an assortment of methods and materials to obtain information related to a learner's performance and course goals (CAST, 2011a). Assessments in this course were designed to allow for multiple means of engagement, representation, action and expression of learning. Four different means of assessment each worth 25% of the final grade were used in the course. These included: (a) participation: (unit activities [5 % plus 2% bonus], seminar activities [5%], group work [5%], and adaptive quizzing [10%]), (b) written essay 25%, (c) formative review (25%), and (d) group project process (20%), and peer evaluation (5%). Purpose, objectives, processes required, and rubrics were provided to learners for each appropriate assignment. The weighting of most assignments remained the same as the year prior in 2019, however, the group project presentation was decreased to fifteen percent of the final grade. This difference of five percent was redesignated to an individual versus group reflection process, to better balance the distribution of the assignment mark. Additionally, this offered an opportunity for learners to reflect on the group dynamics and processes used during completion of the project. Participation was a vital aspect of the course.

For this redesigned course, the participation-based portion of the grade included unit activities, adaptive quizzing modules, seminar activities, and group project work. Ten

themed unit activities were available weekly throughout the semester to support an application and understanding of the course content. Learners were able to select and complete any five of these unit activities, worth one point each towards their participation mark. Two additional activities could be completed for bonus points. This allowed learners an opportunity to make up any missed synchronous participation points throughout the semester.

Learners also had an opportunity to complete adaptive quizzes from ten modules that were aligned with the nursing skills textbook readings as part of their participation grade. These quizzes were a low-stakes opportunity for students to accumulate points and practice adaptive multiple-choice test-taking questions that are similar to the final nursing registration exam.

Seminar activities held during weeks six to eleven focused on practice scenarios specific to the group process, health promotion, cultural assessment, cognitive assessment, and communication skills. Randomly assigning learners to these weekly activities through the breakout room feature of Zoom permitted interaction with a variety of learners in the seminar time. Once the activity was completed, learners returned to share their experiences in a group discussion so that all members could learn from each other. During the last fifty minutes of the weekly synchronous seminar time, learners were separated into groups of four to five members, to collaboratively work on a health promotion care plan progressively over a six-week period with the support and formative feedback of the instructor. These meetings were purposefully scheduled for the second half of the seminar to offer a convenient opportunity for all group members to meet and further provide an option for learners to obtain guidance, feedback, and support from the instructors

throughout the process. Further to these participation-based approaches, the completion of a written essay based on an interview was the next major assignment in the course.

The written essay has been a valuable form of assessment in this course for many years. Completing the assignment offers learners an opportunity to practice basic interviewing skills with a registered nurse, while gaining an awareness of the impact this professional role may have on an individuals' biopsychosocial and spiritual well-being. An exploration of both the benefits and challenges associated with the nursing profession are discussed during the interview. Learners must then identify appropriate strategies to manage these potential challenges in their future role as a nurse. An appendix of the interview conducted could be attached as either a video or audio transcript as evidence of its completion. An early due date was purposefully set for this assignment to help stagger timelines for learners. Flex time was used to give all learners an extra week to submit their work without incurring penalties. This assignment was not significantly altered; however, substantial change was made to the midterm exam in this course.

The formative review, or midterm exam, was scheduled during week nine of the semester to allow sufficient time to cover content prior to application, while also attempting to stagger the due dates with other first-year nursing courses. The formative review was scheduled to be held during the originally booked lecture time through Blackboard, to ensure learners would not have conflicts with other courses. Learners could access the content through the Blackboard course site for a specific timeframe from home. The review included fourteen questions that were inclusive of weeks one through eight of the course content and worth twenty-five percent of the final grade. Short answer responses were primarily required to address application-based questions that utilized a combination

of text, image, and video clip formats, to present any needed background information. All questions were visible at once to the learners to permit scrolling back and forth between questions in the review. Any image used to supplement questions included an alternative text description. Video clip scenarios allowed the user to adjust the video and audio clip features.

Initial ideas of using a proctoring software during the formative review were reconsidered by instructors to avoid causing additional learner stress. Learners were all given two and a half hours to complete the review, which allotted double time to answer each question. Arrangements for any other needed accommodations were offered in advance to learners. Instructors were available via a Zoom link for questions or issues throughout the review.

The group project included: (a) synchronous group participation (5%), (b) asynchronous group project presentation (15%), (c) individual group process report (5%), and (d) an individual peer feedback component (5%). An authentic case study common to many first-year learner post-secondary transitions was provided for members in each group. This case was modified to align with a first-year learner staying in residence during the pandemic circumstances. During booked seminar time, these smaller groups worked together to develop a health promotion plan based on one concerning health behaviour identified and selected from the case study provided. Weekly, groups worked together using the template available that was based on the five-step critical reasoning framework and nursing process to complete the plan. Groups were required to select and apply three key course concepts into this health promotion plan to demonstrate their understanding of these ideas within the context of the case study. Each week a different group member

assumed a facilitation role. This gave an opportunity for all learners to have an equal say in the project and provided a chance for everyone to build facilitation skills. The facilitator was responsible for completing a Group Project Planning Template based on the reasoning and care planning processes learned in class. At the end of each seminar, this updated template was submitted to the instructors for participation points, while providing a means to monitor group weekly roles, responsibilities, and progress. To scaffold the care planning and project development processes over a six-week period, a practice case study was reviewed as one of the seminar activities, and an example of a completed health promotion care plan was posted for learner reference. However, groups could choose the specific focus of the health promotion plan, course concepts to integrate, and format of their final project presentation. After the last seminar, groups were required to post one copy of the final project into a designated forum on Blackboard.

During week 12, learners were each required to attend the Virtual Project Presentation Forum and review one other groups project using the appropriate feedback template provided. Each group member also had to complete a Group Process Form, answering questions about their group experience to provide reflection and insight into the processes used. Confidentiality of these submissions was important to maintain for learners, to permit an opportunity to capture the group dynamics through self-reflection and assessment processes. The corresponding UDL principles and checkpoints associated with each assessment strategy used in the course are identified in Table 2.

Table 2

Curriculum Assessments and Corresponding UDL Principles With Checkpoints

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
Assessments: Participation			

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
Unit Activities (e.g., select 5 of 10 themed activities: 2 additional bonus-make up)	Optimize choice/autonomy Minimize threats /distraction Facilitate personal coping skills/strategies Develop self – assessment-reflection	Illustrate through multiple media Activate or supply background knowledge Highlight, critical features, big ideas relationships	Use multiple media for communication
EAQ Adaptive Quizzing software-(e.g., aligned with textbook; practice with low risk; similar to NCLEX)	Optimize choice/autonomy Minimize threats /distraction Vary demands/ resources to optimize challenge Foster collaboration/community Increase mastery-oriented feedback Develop self – assessment-reflection	Illustrate through multiple media	Vary the methods for response/navigation Use multiple media for communication Build fluencies with graduated levels of support for practice and performance Guide appropriate goal setting Enhance capacity for monitoring progress
Seminar Session Activities and Group Work Participation (e.g., practice case scenarios; scaffolding; random assignment; smaller/larger discussions break out rooms; formative/summative feedback)	Optimize choice/autonomy Optimize relevance, value, and authenticity Minimize threats /distraction Heighten salience of goals/objectives Vary demands/resources to optimize challenge Foster collaboration/community Increase mastery-oriented feedback Promote expectations to optimize motivation Facilitate personal coping skills/strategies Develop self – assessment-reflection	Promote understanding across languages Illustrate through multiple media Activate or supply background knowledge Highlight, critical features, big ideas relationships Guide information processing and visualization Maximize transfer and generalization	Vary the methods for response/navigation Use multiple media for communication Build fluencies with graduated levels of support for practice and performance Guide appropriate goal setting Support planning/strategic development Facilitate managing information and resources Enhance capacity for monitoring progress
Assessments: Assignments			
Written essay (e.g., interviewing skills; benefits/challenges of practice; management strategies for future practice)	Optimize relevance, value and authenticity Promote expectations to optimize motivation Facilitate personal coping skills/strategies	Highlight, critical features, big ideas relationships	Facilitate managing information and resources
Formative Review (e.g., via LMS at home; scheduled	Facilitate personal coping skills/strategies	Offer ways to customize the display of information	Vary the methods for response/navigation

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
time; instructor support; application questions; short answer; two-step multiple choice; audio/video clips; images; extended 2.5 time)		Offer alternatives for auditory information Offer alternatives for visual information Illustrate through multiple media Activate or supply background knowledge	Build fluencies with graduated levels of support for practice and performance
Group Work Presentation and Process Reflection; Peer Feedback(e.g., case study; relevant; facilitate; group work; instructor support; scaffolded with templates; pre booked group work time with instructor support; collaboration; peer feedback, reflection; application-based activities/role playing/assessments)	Optimize choice/autonomy Optimize relevance, value and authenticity Heighten salience of goals/objectives Vary demands/resources to optimize challenge Foster collaboration/community Increase mastery-oriented feedback Promote expectations to optimize motivation Facilitate personal coping skills/strategies Develop self – assessment-reflection	Illustrate through multiple media Activate or supply background knowledge Highlight, critical features, big ideas relationships Guide information processing and visualization Maximize transfer and generalization	Build fluencies with graduated levels of support for practice and performance Guide appropriate goal setting Support planning/strategic development Facilitate managing information and resources Enhance capacity for monitoring progress

Curriculum Materials

Materials in a UDL curriculum includes the media used to present the course content, and what learners will use to demonstrate their understanding of the information (CAST, 2011a). Blackboard was used to link learners to the course site, content, and resources including the instructors and classmates. Ally (https://ally.ca) software was available through the course site to offer learners access to diverse downloadable formats of the material posted if needed. The software also served as a check of content accessibility for the instructors when setting up the course site. H5P an authoring tool (https://h5p.org), provided a means of integrating practice questions and interactive activities into the weekly units on Blackboard. Two textbooks were required as part of this course including a communication and a foundational nursing skills textbook, which is

used throughout the program.

Textbooks were available in an electronic or print format. A package was developed in collaboration with the publisher to help minimize the cost of purchasing the textbooks. Two extra print copies were available on loan through the library for learners who were not able to access either resource. Links to additional readings were embedded into each unit and available through Leganto (https://exlibrisgroup.com/products/leganto-reading-list-management-system/), a new software offered to facilitate learner access to readings through the university library.

Yuja (https://www.yuja.com), a program that offers features such as video management, lecture capture, and live streaming of content was available for use by learners and faculty. The program allowed instructors a simple method of recording, captioning, and sharing pre-recorded or synchronous meetings. Yuja was also used by learners to record and share videos for assignments and activities with the instructors. This program was useful in capturing two guest speaker lectures from 2019 that were shared with this cohort of learners in the relevant units. Finally, Zoom was used as the platform to support synchronous interaction between learners and instructors. Table 3 specifies the link of this curriculum material to the UDL principles and checkpoints (CAST, 2018).

Table 3

Curriculum Materials and Corresponding UDL Principles With Checkpoints

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
Materials			
Blackboard (e.g., link learners; course content; offer other features; embedded links/resources)		Offer ways to customize display of inform Highlight, critical features, big ideas relationships	Vary methods for response/navigation Optimize access to tools and assistive technology Use multiple media for communication

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
			Facilitate managing information and resources
Ally (e.g., accessibility tool; various formats)		Offer ways to customize display of inform Offer alternatives for auditory information Offer alternatives for visual information Illustrate through multiple media	Optimize access to tools and assistive technology Use multiple media for communication
H5P (e.g., authoring tool; various linkable activities)		Illustrate through multiple media Highlight, critical features, big ideas relationships	Use multiple media for communication Build fluencies with graduated levels of support for practice and performance Support planning/strategic development
Textbooks (e.g., different formats available; linked with EAQ: extra copies; package available)		Offer ways to customize display of inform Offer alternatives for visual information Offer alternatives for audio information	
Leganto (e.g., linked through course site, link to course readings via library)		Clarify vocabulary and symbols	Facilitate managing information and resources
Yuja (e.g., record/share videos; lecture capture; live streaming)		Offer alternatives for auditory information Offer alternatives for visual information	Use multiple media for communication
Zoom (e.g., support interaction; provide guidance support)	Increase mastery-oriented feedback Facilitate personal coping skills/strategies		Use multiple media for communication

Curriculum Methods

Methods as part of the UDL curriculum, typically includes the use of evidence-based instructional strategies by educators to support and enhance learning (CAST, 2011a). Variety and flexibility of these methods are essential to adjust as needed, based on learner

progress. A combination of asynchronous and synchronous methods was integrated into the course to support and enhance learning.

Asynchronous Approaches. Asynchronous weekly material was structured through a designated Blackboard site to help learners meet the course and weekly objectives. To maintain consistency and support ease of navigation, twelve weekly units were set up on the course LMS site in a consistent manner. Each unit was comprised of a video introduction of highlights by lead instructor, unit objectives, graphic organizer of key topics, readings, weekly content, resources, links to adaptive quizzing, unit activities, seminar preparation, and group work meetings held throughout the semester. A variety of interactive questions and activities were embedded in multiple formats throughout each unit, such as stop and think prompts, word clouds, mix and match activities, and multiple-choice questions to name a few. Self-care themed music breaks and relevant images with alternative text descriptions were integrated throughout each unit to supplement understanding of the content, while encouraging time for a learning break.

Numerous learner supports were offered throughout this course to promote success. Prior to the beginning of the semester, a welcome video, course announcement, and detailed syllabus were available through the course site to introduce enrolled learners to the instructors, course expectations, and format. Monthly schedules highlighting important dates were posted in a separate tab on the LMS for reference. Learners in the course were supported by an Online Learning Student Assistant (OLSA). This upper year student was available to learners via email to help navigate the transition to university-level online learning and answer any time-management questions.

The LMS housed several learner resources, such as an APA workshop tailored to

the written essay assignment, and instructions for using the multimedia required in the course. An unmonitored Learner Lounge was created to enable informal conversation among students in the class. Microsoft Outlook email was used by instructors to communicate and respond promptly to learner questions or concerns. Assignments were graded through Blackboard and returned within a two-week period as communicated to learners. Finally, an online question forum was set up in the course site to allow an opportunity for learners to ask the instructors questions throughout the semester.

Synchronous Sessions. In addition to these asynchronous activities, several synchronous sessions were incorporated into the course semester. The Zoom conferencing tool supported synchronous interaction with learners in both larger and smaller group meetings. This included an initial course welcome and orientation session during week one; formative review week nine; and six synchronous, one-hour and fifty-minute seminars sessions held from week six through eleven. Prebooked in-person weekly lecture and seminar times for the fall semester were utilized to hold synchronous online activities that provided an opportunity for interaction with peers and the instructor.

To welcome these first-year learners during this atypical pandemic and potentially isolating program start, a synchronous orientation session with instructors was held using Zoom for those who wanted and were able to attend. A recording was posted on the Blackboard course site following the session for others who were unavailable to join. Personal and professional introductions to instructors were presented with the aid of images and storytelling, prior to highlighting some of the key course expectations. Two interactive activities were planned for this orientation session. The session provided a means for learners to meet other classmates, instructors, and familiarize themselves with

using this new media tool. Holding the orientation session also allowed an opportunity for instructors to practice using the conferencing tool and breakout rooms with this large group for upcoming seminar activities and group work. Providing sufficient instructor support was crucial to the success of learners.

Synchronous seminars were grouped into six one-hour and fifty-minute sessions held during the latter half of the semester by instructors with nine groups of approximately twenty-five learners in each. During the first hour, learners practiced role playing and assessment scenarios specific to the course content using the breakout room feature of Zoom. Learners then worked in groups of four to five for the latter half of the seminar to work on the project. In Table 4, the application of UDL principles and checkpoints are listed for each of these asynchronous and synchronous curriculum methods implemented.

Table 4

Curriculum Methods and Corresponding UDL Principles With Checkpoints

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
Methods: Multiple Modes of Instruction: Asynchronous			
Weekly Units (e.g., consistent set up; instructor video highlights; key topics; objectives; graphic organizers; readings; resources; links; multiple activity formats; embedded themed music breaks; summary; upcoming content)	Minimize threats /distraction Foster collaboration/ community Promote expectations to optimize motivation Develop self – assessment-reflection	Offer ways of customizing display of information Offer alternatives for audio information Offer alternatives for video information Clarify vocabulary and symbols Clarify syntax and structure Promote understanding across languages Illustrate through multiple media Activate or supply background knowledge Highlight, critical features, big ideas relationships	Vary the methods for response/navigation Use multiple media for communication Use multiple tools for construction and composition Support planning/strategic development Facilitate managing information and resources

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
		Guide information processing and visualization Maximize transfer and generalization	
Online Learning Learner Assistant (e.g., navigation assistance; time-management strategies)	Foster collaboration/ community Promote expectations to optimize motivation Facilitate personal coping skills/strategies		
Student Workshops and Media Tools (e.g., APA; Yuja; Zoom)	Promote expectations to optimize motivation	Clarify syntax and structure Illustrate through multiple media	Use multiple media for communication
Learner Lounge (e.g., informal peer support)	Foster collaboration/ community		Use multiple media for communication Enhance capacity for monitoring progress
Instructor Support (e.g., email; announcements; flexible office hours; online (Q & A forum)	Increase mastery-oriented feedback Facilitate personal coping skills/strategies		Enhance capacity for monitoring progress
Methods: Multiple Modes of Instruction: Synchronous			
Synchronous Orientation (e.g., welcome, meet and greet; interactive activity; content highlights; questions)	Minimize threats /distraction Increase mastery-oriented feedback		Use multiple media for communication
Synchronous Seminars (e.g., larger/smaller group discussions; role playing, assessment scenarios related to content; scaffolded application; instructor presence and support with formative feedback)	Optimize choice/autonomy Optimize relevance, value and authenticity Minimize threats /distraction Heighten salience of goals/objectives Vary demands/resources to optimize challenge Foster collaboration/ community	Promote understanding across languages Illustrate through multiple media Activate or supply background knowledge Highlight, critical features, big ideas relationships Guide information processing and visualization	Vary the methods for response/navigation Use multiple media for communication Build fluencies with graduated levels of support for practice and performance Guide appropriate goal setting Support planning/strategic development

UDL Principles with Checkpoints	Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action and Expression
	Increase mastery-oriented feedback Promote expectations to optimize motivation Facilitate personal coping skills/strategies Develop self – assessment-reflection	Maximize transfer and generalization	Facilitate managing information and resources Enhance capacity for monitoring progress
Co-instructed Course (e.g., increased interaction; office hours; perspectives)	Increase mastery-oriented feedback Facilitate personal coping skills/strategies		Build fluencies with graduated levels of support for practice and performance Enhance capacity for monitoring progress

Students Enrolled in the Course

The case structure is as follows. The impact on learners enrolled in the Fall 2020 offering of this course were considered subcases, or units of analysis within the reported case study (Yin, 2018). Typically, this large first-year course consists of a range of diverse part-time and full-time learners from both the three-year compressed and four-year collaborative streams of the BScN undergraduate program. An average annual enrolment consists of approximately 230 learners. Students range in age, background, and ability. After appropriate REB approval was received on September 23, 2020, participants were drawn from an initial enrolment of 230 full-time and part-time learners, registered in the fall 2020 semester of the first-year undergraduate course. The perspectives of both students with and without documented disabilities were included. Learners who enrolled but dropped out of the course prior to full completion were not incorporated in the study. UDL principles and concepts provide post-secondary nurse educators with a framework to guide the integration of instructional strategies into course curriculum components to support inclusivity of diverse learner needs.

UDL Curricular Components and Framework Concepts

UDL is a structural framework that exhibits promise in proactively reducing curricular barriers for increasingly diverse learners in online post-secondary educational settings (Tobin & Behling, 2018). For this case study, UDL is viewed as a curricular design and theoretical learning framework that creates an accessible and inclusive learning environment by using the core principles of multiple means of engagement, representation, action and expression (CAST, 2011a; Meyer et al., 2014). Three UDL principles, nine guidelines, and thirty-one checkpoints, each provide incremental detail to support educator implementation of the framework into the proactive design of course curriculum to minimize learning barriers (CAST, 2011a; Meyers et al., 2014; Rose & Meyer, 2002; 2006). The goal is to create equal opportunities for all students with varying abilities to succeed. It is important to mention that while UDL may meet the learning needs of some students, it may create barriers for others, and does not eliminate the need for individual accommodations (Griful-Freixenet et al., 2017).

UDL is an instructional framework that has been successfully implemented in a variety of educational settings and contexts. UDL has been specifically addressed in post-secondary accessibility policy, practice, and organizational climate (Burgstahler, 2020). The UDL framework was initially conceptualized for use in special education efforts in middle school settings (Meyer et al., 2014). The initial development of electronic books integrating built-in options for children with learning disabilities, led to the conceptualization of UDL as a framework that offers these feature benefits to every learner (Rose & Meyer, 2002). Since its inception as a framework, UDL has expanded in scope to target learners in post-secondary education.

At the post-secondary level, UDL is growing increasingly familiar on campuses nationwide. UDL-based strategies have been successfully integrated into a variety of in-person place-based, blended, and online learning environments by educators to support inclusivity of learner differences (Fovet, 2021b; Novak & Thibodeau, 2016; Novak & Tucker, 2021). Quantitative, qualitative, and mixed research methodologies have all been used to explore UDL in higher education settings. The heart of UDL lies in instructional design (Edyburn, 2010), and likely why past research efforts seem primarily limited to the education department in both undergraduate and graduate levels of study (Fornauf & Erickson, 2020). UDL principles and content have also been extensively integrated into professional development opportunities for educators (McCarthy & Butler, 2019).

Positive learner experiences and impact have also been associated with using UDL in other disciplines for both students with, and without documented disabilities in post-secondary environments. Course subjects include a variety of topics such as psychology (Davies et al., 2013; Schelly et al., 2011), marketing (Dean et al., 2017), library instruction (Zhong, 2012), criminal justice (Baker & Wolfer, 2006), social science (Watt et al., 2014), biology (Bongey et al., 2010), health sciences (Kumar & Wideman, 2014), general arts and science (Kennette & Wilson, 2019), nursing (Celestini et al., 2021; Dickinson, 2018), and statistics (Jang, 2021). Learners enrolled in an introduction to university course (Dracup et al., 2016) and registered at a community college (Gawronski et al., 2016) have also been studied in the past.

The experiences of SWDD registered in undergraduate science, technology, engineering, and math (STEM) courses (Street et al., 2012), history (Simoncelli & Hinson, 2008), and biology lab tutorial (Webb & Hover, 2015), have also been researched in

similar studies. Additionally, the benefits for students registered as having a documented disability have been explored in several campus-wide studies of disabilities services (Black et al., 2015; Griful-Freixenet et al., 2017).

UDL framework concepts and practices are not well known or researched in nursing education (Levey, 2018). Academic accommodations in the nursing classroom are the focus of this research; however, comparable processes in clinical practice have generally been considered in the literature, and are more complex to address because of potential diverse placement environments (Mack et al., 2021). Inquiry by instructors into the concept of accommodating SWDD in clinical practice has generally been discussed (Halligan et al., 2019; Heelan et al., 2015).

UDL-based instructional strategies provides educators with an opportunity to move beyond compensatory accommodation measures typically offered to only learners who qualify, towards transforming the pedagogical practices used to support all learners in classrooms across campus. Given the positive impact UDL has on the learner in a variety of post-secondary settings (Burgstahler, 2020; Fovet, 2021b; Tobin & Behling, 2018), it stands to reason that additional research specific to undergraduate student education is necessary. Specifically, a disparity and need for research investigating undergraduate student perceptions of inclusivity in online post-secondary nursing education was evident.

Purpose of Descriptive Case Study

Considering the significance of the problem, the purpose of this descriptive case study was to answer the research question: How do learners describe and rate the effectiveness of instructional strategies used in a large first-year BScN course based on UDL principles, in supporting inclusivity of diverse learning preferences and needs in an

online environment? To answer this question, a mixed secondary data set was obtained and analyzed using a convergent mixed-method approach prior to describing the results and related discussion (Creswell & Plano Clarke, 2018).

Summary

In Chapter 1, background information about the case was presented supporting the significance of the problem, rationale, and need for the research study. After the case context was described, the research problem, purpose, question, and UDL theoretical framework were identified to provide context for the direction and scope of this research study. The subsequent Literature Review in Chapter 2 established a need for this research and explored the underlying theoretical framework used in the study. Chapter 3 follows the Literature Review with a detailed description of the Methodology, specifying the processes involved in the study. The results from the analysis of data are shared in Chapter 4, establishing any links or trends to the literature through an analysis and discussion of findings in Chapter 5. Finally, in Chapter 6 prior to concluding, the implications and recommendations for consideration are described, followed by an identification of any limitations noted in the study, highlighting areas for future research.

Chapter 2. Review of the Literature

Universal Design for Learning provides a proactive framework to facilitate the removal of barriers in the curriculum (Meyer et al., 2014). UDL is viewed as both a theoretical and instructional framework that can promote the development of an inclusive learning environment by using multiple means of engagement, representation, action and expression (CAST, 2011a). The purpose of this literature review is to provide a reflective and comparative discussion of the seminal works related to the focus and theoretical underpinnings of my doctoral study, further providing the rationale for the importance of this research. Books, journal articles, dissertations, government documents, and other online material significant to this area of research and the formulation of the research study are discussed. A variety of key word combinations were used to search the literature from the following themes: universal design for learning, online post-secondary education, student perspective, inclusivity, and nursing education.

In-person place-based, blended, and online classrooms in higher education are growing increasingly larger and diverse. Within this diversity, barriers to inclusion have historically been placed on the explicit exclusion of individuals because of their race, gender, ability or disability, language, and other socially defined restrictions including class (Michalski et al., 2017). While the need for inclusivity is evident, traditional pedagogical approaches in higher education have remained primarily inflexible to individual learning needs, limiting comprehensive practices (Burgstahler, 2015; Meyer et al., 2014). Therefore, it is essential that educators in post-secondary settings create a flexible, more responsive, inclusive, online learning environment for diverse learners, to optimize their potential and success. Nursing courses designed by instructors using a UDL

framework minimizes learning barriers for diverse learners in online post-secondary settings.

Online Post-Secondary Enrolment and Diversity

Globally, student enrolment in undergraduate online education is growing exponentially diverse (Michalski et al., 2017). Canadian universities offering online education in nursing are no exception to this trend (Yarborough, 2020). As institutions of higher learning continue to push enrolment capacities; student diversity and resulting class sizes within these settings continue to climb (Dean et al., 2017). Within these changing learning environments, education must be accessible to students from increasingly diverse backgrounds, abilities, and learning preferences. Diverse learner age, enrolment, family obligations, and work status may further add to the complexities of the situation and solution**.**

Societal changes in culture and the advancement of technology have led to developments in education that have significantly influenced the composition of traditional classrooms in post-secondary settings (Bracken & Novak, 2019). Educators at all levels from preschool to post-secondary programs now deal with a diverse population of learners. In the first year of post-secondary education, an increasing emphasis on retaining diverse learners is essential (Hitch et al., 2019).

Diversity involves the existence of a range of human personalities and characteristics within a group, institution, or culture (Government of Ontario, 2009). A 2019 survey of 45 Canadian universities, reported findings of first-year students demographics as being composed primarily of Canadian citizens (85%), 18 years or older (77%), and female (65%) (Canadian University Survey Consortium [CUSC], 2019).

Within this group, many self-identify as a member of a visible minority (44%), or from an Indigenous heritage (4%). Eleven percent identify as being the first-generation to pursue post-secondary studies. Many students live in on-campus housing (40%); whereas older students are more likely to live with a partner and have children (CUSC, 2019). Overall, 36% of students were employed, and 64% have received financial award from their university, 33% of which would not have been able to attend school without this financial assistance (CUSC, 2019).

Approximately 24% of these students self-identify as having a disability, with over half (14%) specific to a mental health issue. While 24% self-identify with a disability, only 5% of all students describe their disability as always impacting their daily activities (CUSC, 2019). Within nursing programs similar rising disability trends are evident, which further emphasize the need for an inclusive approach to education (Horkey, 2019). Subsequently, despite these rising trends in learner diversity in post-secondary settings, many educators are still using traditional one-size-fits-all pedagogical approaches in their course curriculum.

Traditional Pedagogy

Large, traditional, in-person place-based nursing courses that are lecture-based, have remained the norm in post-secondary settings. Traditional pedagogy in post-secondary education is rooted in a history of passive and receptive content sharing between the educator and learner. While the value of lecturing has existed as the gold standard among educators for centuries at in-person place-based post-secondary institutions; the limits of their worthiness to support diverse learner needs is increasingly becoming evident in the literature (French & Kennedy, 2017). As class sizes and resulting diversity continue

to rise in these settings, the confines of these preferred rigid instructional strategies are coming to the surface. For example, the effectiveness of passive and instructor driven lecture-based approaches has come into question as it may lack opportunities to foster critical thinking and authentic application-based skills among learners (Zheng et al., 2016).

The convenience of sharing information with large classes and associated cost savings are apparent; however, lecturing alone may create barriers for learners who require additional access to visual and kinaesthetic learning supports (Bajak, 2014). The shift to online learning in post-secondary settings makes the need for more active and varied forms of instruction evident (Burgstahler, 2021). One-size-fits-all instructional approaches do not respect the composition of the 21st century learner population that has been broadly identified as a need for EDI in the literature (Universities Canada, 2019). Traditional pedagogical approaches have been observed to limit accessibility to academic resources in higher education and require accommodations for learners to support equitable access to information (French & Kennedy, 2017).

Academic Accessibility and Accommodations

Accessibility is a term that is frequently used in the literature, yet it has been less commonly defined. *Accessibility* is a relative concept and based on the encounter between the person or group's functional capacity and the design and demands of the physical environment (Iwarsson & Ståhl, 2003). Accessibility refers to compliance with social norms and standards, thus being mainly objective in nature. More simply, accessibility is a measure of how a person can participate in an activity (Iwarsson & Ståhl, 2003).

The *Canadian Charter of Rights and Freedom (1982)* guarantees persons with disabilities the right of freedom from discrimination at a federal level (Government of

Canada, 2020). Provincially the *Ontario Human Rights Code* (1990) outlines an accommodation providers responsibility to ensure that persons with disabilities receive appropriate accommodations (Government of Ontario, 2020). It focuses on the need to accommodate based on functional impairments, whether these are permanent or temporary. In 2005, legislation was adopted through the *Accessibility for Ontarians with Disabilities Act.* Within this document, the definition of disability includes any degree of impairment related to physical, mental, developmental, or learning dysfunction (OHRC, 2018).

Accessibility standards relevant to higher education were subsequently created by the Government of Ontario (2020). The complexity and variety of services and supports for SWDD can make it difficult to locate and access needed services. This may be especially difficult for students making the transition from the much more structured accommodation processes of the primary and secondary educational systems in Ontario to a post-secondary setting (OHRC, 2018). As accessibility standards become common place in the built environment on campuses; appropriate academic accommodations in the classroom still lag behind what is necessary and sought by some students.

The shift to online post-secondary education may also create accessibility barriers for diverse learners in this environment (ABLE Consultants, 2020; Burgstahler, 2021). Issues of accessibility in online learning, differ from other delivery methods, and may present as additional complexities for learners, such as limited technological resources or literacy, limited quiet space, or internet connection (Bloomberg, 2021; Tobin & Behling, 2018). During the pandemic, accessibility to facilities that offer access to these types of resources were further limited (Ives, 2021). Educators in this setting are ultimately responsible for removing these barriers by integrating minimum online accessibility

requirements to accommodate diverse learner needs and selecting the appropriate online tools to use (Burgstahler, 2021; Government of Ontario, 2020).

Accommodations are "a means of preventing and removing barriers that impede students with disabilities from participating fully in the educational environment in a way that is responsive to their own unique circumstances" (OHRC, n.d., Principles of Accommodation section). The accommodation process for post-secondary students with disabilities can be a complex one, as it is not subject to the same detailed legislative structures as at the primary and secondary levels (Bowe, 2000; Lombardi et al., 2011; OHRC, n.d., Post-secondary Education; Scott et al., 2003). Access in postsecondary education for those with documented disabilities historically has relied on a legally mandated provision of accommodations to those who choose to apply. Educators in K-12 settings are notified of students with disabilities. However, in post-secondary education, faculty must rely on the self-disclosure of student disabilities, which may not accurately represent actual learner needs (Bowe, 2000; Condra et al., 2015). Additionally, the process of setting accommodations for each student, every course, and each semester is seen as an inefficient and ineffective approach to course delivery (Houghton & Fovet, 2012).

Within nursing education, graduates with disabilities have reported that they did not ask for academic accommodations during their education (Neal-Boylan & Miller, 2017). While some faculty have expressed frustration that learners fail to disclose their specific learning needs (Ashcroft & Lutfliyya, 2013), others are not supportive when students decide to disclose their accommodation requirements (Olaussen et al., 2019). Therefore, it is essential that nurse educators select a pedagogy that offers an equitable opportunity for

diverse learners to succeed, minimizes academic barriers in the curriculum, and provides an inclusive approach for education.

Inclusive Nursing Education

Inclusivity has been described as the intentional incorporation of strategies and practices that promote meaningful interactions and a feeling of belonging among people, regardless of any differences (Bleich et al., 2015). The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines *inclusive education*, as a "process of reaching out to all learners by addressing all forms of exclusion and marginalization; disparities; and inequalities in access, participation, and learning outcomes" (2019, UNESCOs Response section).

Excellence within nursing education involves the intentional use of inclusive pedagogical strategies that nurture a sense of belonging by fostering meaningful connections among persons representing different characteristics, experiences, and capabilities (Bleich et al., 2015). The drive for inclusivity presents a challenge for educators using the traditional one-size-fits all approach that restricts information processing, performance expression, and accountability (Metzger et al., 2020; Meyer et al., 2014). Inclusive teaching practices require faculty to respect and value equity and fairness among students by considering learner differences as they develop curriculum, pedagogy, and assessment (Chardin & Novak, 2021; Hockins, 2010; Meyer et al., 2014). An inclusive learning environment offers equitable opportunities for all students to succeed, so that those with diverse learning needs experience the course and its content as accessible and comprehensible. While the focus of the research study is on establishing an inclusive online post-secondary environment for diverse nursing student needs; inclusivity in

education resulted from an initial drive to minimize barriers in the physical environment using Universal Design.

Universal Design

In the 1970s, the concept of Universal Design (UD) was popularized by Ron Mace, an architect, founder, and former director of the Center for Universal Design (CUD) at North Carolina State University. After contracting polio as a child, Mace was forced to rely on the use of wheelchairs for his mobility needs. Resulting frustrations with the barriers encountered in the built environment led to Mace's drive to overcome these obstacles (Bowe, 2000). Ron Mace and his colleagues defined UD as a "design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Center for Universal Design, 1997, p. 1). Seven principles of UD were developed with specific guidelines for additional direction. The notion of UD was initially envisioned as a marketing tactic to design the built environment of homes to be more friendly, benefiting all people, for instance, curb cuts and levered door handles (Bowe, 2000). Universal design developers took the concept of accessibility which carries connotations of disability and government mandated design features and marketed the idea as something that appeals to everyone. UD integrates the characteristics of accessibility and usability into the design of the environment that is inclusive of all people (Burgstahler, 2015). This consideration of barriers in the design of buildings, preceded deliberation of similar obstacles in education curriculum (Bowe, 2000).

Universal Design Models in Education

Insight into the origins of UD is essential to gaining knowledge of their connection and application in academic environments. The primary difference is on its focus

specifically on teaching and learning rather than accessibility (Gravel et al., 2015). The expansion of UD principles into other disciplines, such as education, has resulted in the development of several associated structural models or frameworks, each using slight variations in terminology. Five foundational versions of similar UD based principles exist: Universal Instructional Design (UID) (Silver et al, 1998; Palmer & Caputo, 2006); Universal Design in Education (UDE) (Bowe 2000); Universal Design for Instruction (UDI) (Scott et al., 2001, as cited in McGuire et al., 2003); Universal Design for Learning (UDL) (Rose & Meyer, 2002); and Universal Design in Instruction (UDI) (Burgstahler, 2008) that was further refined in 2020 (Burgstahler, 2020). While the principles each model uses varies, the primary goal of proactively providing a flexible and inclusive learning environment for all is a consistent theme.

UDL was selected because of its successful history in effective use in K-12 settings and roots in the cognitive neuroscience of learning research. However, despite this growth in interest, these terms are frequently variably described and referred to in the literature, which convolutes clarity in the findings. Therefore, to maintain consistency in this document, the UDL framework and related terms originally developed by Rose and Meyer (2002) from CAST are used throughout.

Universal Design for Learning

CAST was founded by Rose and Meyer in 1984, with a mission to develop and apply technologies to expand learning opportunities for people with disabilities (Rose & Meyer, 2002). Since the late 1980s CAST has led the efforts in the application of UD to educational software and technology, especially for children. Over time, the use of UDL principles have expanded into post-secondary settings. CAST defines UDL as a “research-

based set of principles that together form a practical framework for using technology to maximize learning opportunities for every student" (Rose & Meyer, 2002, p. 5). UDL is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn.

UDL draws from and aligns with a variety of research-based evidence and concepts from the fields of learning sciences, cognitive psychology, and neuroscience (CAST, 2011a). Affective, recognition, and strategic classes of networks were selected for the UDL framework because this was seen as the most practical way to partition the learning brain considering developments in similar fields (Meyer et al., 2014; Rose & Meyer, 2002). Additionally, many learning theorists categorize learning into three different domains. For example, Benjamin Bloom's Taxonomy of Educational Objectives (1956) divides educational objectives into three comparable areas of cognitive, psychomotor, and affective domains (Bloom et al., 1956). The cognitive category is comprised of objectives that include the development of knowledge and intellectual skills. The focus is on the ability to recall and recognize facts, patterns, and concepts that serve to develop intellectual skills. The second domain is the psychomotor, manipulative or motor-skill area. Finally, the affective domain includes objectives that describe interest, feelings, values, motivations, attitudes, appreciation, and adequate adjustment (Bloom et al., 1956).

Similarly, three vital components of learning described by Jean Piaget (1936), were considered in the construction of the UDL framework. Piaget introduced the notion of knowledge construction, thinking, and learning as relating information to existing knowledge that each learner already possesses. According to this theory, Piaget suggested three vital components of learning: organization, adaptation (assimilation, and

accommodation), and equilibration (Woolfolk-Hoy, 2019). People have an innate propensity to organize thinking into schemes, or psychological structures that are used for interacting and understanding their environment. In this theory, adaption involves a tendency for individuals to use assimilation and accommodation when adapting to their environment. Assimilation requires the learner to use existing schemes to try and understand new information; whereas accommodation involves changing existing schemes to respond to the new information by adjusting thinking. Cognitive changes take place through equilibration, or the act of searching for balance (Woolfolk-Hoy, 2019).

The three UDL principles also parallel and build on the three prerequisites for learning described by Lev Vygotsky (1978) Sociocultural Theory of Cognitive Development: (1) engagement with learning goals; (2) recognition of information to be learned; and (3) information processing strategy. The zone of proximal development characterizes the ideal challenge as a level just beyond easy reach but attainable with scaffolds and assistance of others. Faced with either an insufficient or overwhelming level of challenge, learners may be able to complete the task without significant effort or can lose interest to stay engaged (Meyer et al., 2014). Therefore, it is essential to emphasize the importance of graduated learning scaffolds that can be slowly removed as the novice learner gains expertise.

Past scientific research on individual learner differences concentrated primarily on the composition and functions of different brain regions that were believed to include one comprehensive learning capacity (Rose & Meyer, 2002). Advances in neuroscience and imaging technology currently identify the brain as an integrated and overlapping system of complex networks. Cortical brain tissue has a unique role in connecting these intricate

networks when learning. Learning is seen as a process of changing the connections between these neural networks (Meyer et al., 2014). While thousands of networks specialized for different learning functions exist, only three primary classes are represented as principles within a UDL framework: affective, recognition, and strategic. These neural networks map onto the three main principles of engagement, representation, action and expression used in UDL (CAST, 2011a; Meyer et al., 2014).

Affective Networks

Affective networks represent the *why* of learning, or why individuals aspire to learn. Specialized networks located in the core of the brain are used by the learner to evaluate patterns, and assign emotional importance that invokes or inhibits their engagement with the task or learning required (Meyer et al., 2014; Rose & Meyer, 2002). Various factors such as interest, memory, personality, motivation, mood, and biological state, may all influence an individual's interaction with the object or task.

Differences exist among the affective networks that influence a learner's ability to engage with learning. Certain affective characteristics such as depression and anxiety are associated with measurable neurological diversity (Meyer et al., 2014). Emotional responses that are instinctual, such as anxiety prior to an examination, may be counterproductive to learning by distracting or overwhelming certain students and diminishing performance. Affective networks play a central role in motivating learners to engage with the task, however, are frequently not given priority in a curriculum by educators. The first core UDL principle of multiple means of engagement requires educators to target affective networks by using multiple options for student engagement (CAST, 2011a; Meyer et al., 2014).

Recognition Networks

Recognition networks exemplify the *what* of learning, or the task, or content to learn. Networks located in the posterior aspect of the brain are involved in sensing, perceiving, and transforming information in the learning environment into usable knowledge (Meyer et al., 2014; Rose & Meyer, 2002). Recognition networks enable the learner to identify and interpret various patterns of sound, light, taste, smell, and touch. These processes also allow learners the ability to recognize faces, voices, and words. Power, flexibility, and speed of recognition networks are critical to how people experience surroundings, build factual knowledge, and relate new information to what is known (Meyer et al., 2014; Rose & Meyer, 2002).

Typically, recognition network patterns are presented in one way for learners, but differences suggest that diverse message presentation can meet more learner needs (Meyer et al., 2014; Rose & Meyer, 2002). The second principle in the UDL framework requires educators to support recognition learning by providing multiple means of presentation or representation of the curriculum content for learners.

Strategic Networks

Strategic networks represent the *how* of learning, or the actions used by a learner to express understanding, knowledge, and skill acquisition (Meyer et al., 2014). This motor network is located primarily in the frontal lobes of the brain, an area that oversees complex capacities such as planning, organizing, monitoring goals, and self-monitoring. To acquire skills, good instruction must be accompanied by examples, opportunities to practice, and ongoing instructor feedback (Meyer et al., 2014). Differences manifest in various ways such as executive function, motor disorders, and speech difficulties, to identify a few. For

instance, certain learners require practice to attain perfection in performing a skill; whereas others may be able to successfully demonstrate their understanding after reading about the steps in a textbook. Strategic learning is supported when the third principle of permitting multiple methods of expression and action, is targeted by an educator (Meyer et al., 2014; Rose & Meyer, 2002).

Affective, recognition, and strategic networks work together and share two learning features: (1) lateral processing across different brain regions that operate in parallel; and (2) hierarchical processing, which enables managing sensory information and contextual influences (Meyer et al., 2014; Rose & Meyer, 2002). Learning activities targeting these three networks of the framework are distinguishable but closely associated, and function simultaneously; however, each can produce different outcomes. Therefore, it is not recommended that educators concentrate on any one network in the UDL framework. Interaction is necessary across all three networks to support a diversity of learner needs (Meyer et al., 2014; Rose & Meyer, 2002).

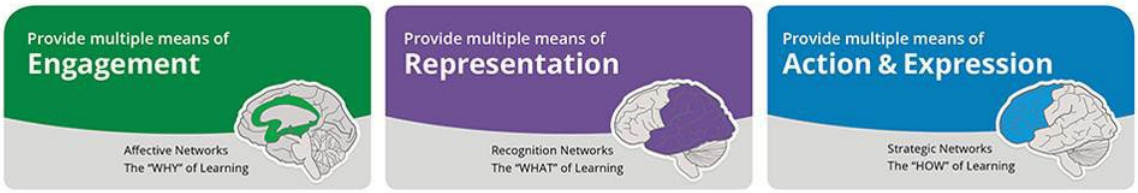
To accomplish this, specific UDL guidelines offer educators concrete suggestions for implementing this framework that can be applied to any discipline to ensure that accessible opportunities are offered to all learners. These guidelines are informed by the latest research in the field and continually get updated by experts. Four versions of graphic UDL organizers have been developed: 1.0 (CAST, 2008), 2.0 (CAST, 2011b), 2.1 (CAST, 2014), and 2.2 the most recent (CAST, 2018) (see Figure 1).

The 2.2 version of the UDL framework graphic organizer, as depicted in Figure 1, represents the three principles, nine guidelines, and thirty-one checkpoints of the framework (CAST, 2018). Each level provides incremental detail to support educator

implementation of these principles in practice. The content in each version of the graphic organizer is arranged in both a vertical and horizontal manner. Vertically, the content is categorized according to the three key principles of UDL: engagement, representation, action and expression (see Figure 2). Each principle is additionally broken down into nine guidelines that have corresponding checkpoints to provide more detailed recommendations for educators (CAST, 2011a).

Figure 2

UDL Three Key Principles



Note. Copyright © CAST (2018). Universal Design for Learning Guidelines version 2.2

The content in the graphic organizer is also organized horizontally: access, build, internalize, and goal. The preliminary row includes guidelines that recommend ways to improve access to the learning goal by enlisting learner interest and by extending alternatives for perception and physical action (see Figure 3) (CAST, 2011a).

Figure 3

Guidelines: Access

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Next, the second row offers other suggestions for educators to consider when creating the curriculum. The build row includes guidelines that propose ways to develop effort and persistence, language and symbols, and expression and communication (see Figure 4) (CAST, 2011a).

Figure 4

Guidelines: Build

Note. Copyright © CAST (2018). Universal Design for Learning Guidelines version 2.2

The third row in the UDL framework is focused on strategies that support the internalization of learning or knowledge, among learners. The internalize row includes recommendations that propose ways to empower learners through self-regulation, comprehension, and executive function (see Figure 5) (CAST, 2011a).

Figure 5

Guidelines: Internalize

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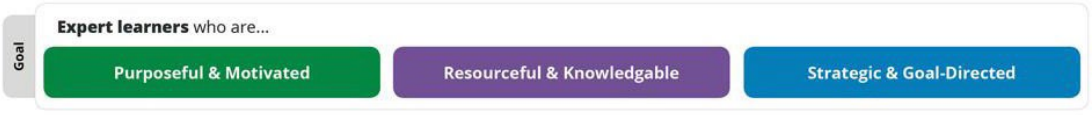
Finally, the last row, titled goals, refers to learner outcomes. When used together, each row moves closer towards achieving the goal of UDL to develop expert learners who are, in their own way, purposeful and motivated, resourceful and knowledgeable, strategic and goal-directed, (see Figure 6) (CAST, 2011a).

Figure 6

Expert Learners: Goals



Note. Copyright © CAST (2018). Universal Design for Learning Guidelines version 2.2

UDL is based on an evolving framework, however, the three principles of engagement, representation, action and expression have remained central and constant over time. Several key shifts have been made to these UDL guidelines since their inception. Changes in the theory, practice, environment, and media used to convey UDL have been made (Meyer et al., 2014). Adjustments to the theory and practice of UDL include an updated view of goals, individual learner differences, individual interactions, cognition and affect, guidelines, and assessment. The early versions of UDL focused on individual differences, competency-based goals, and knowledge acquisition (Meyer et al., 2014). Learner strengths and weaknesses were seen as residing within an individual, regardless of learning context or environment. In these past framework versions, affect was seen as necessary but separable from cognition and education. Assessment was discussed as part of a UDL curriculum but had been listed at the end of four instructional components implying a summative nature.

Additional shifts can be noted in the changes in wording and organization over time. The focus of the most recent UDL framework version of competency-based goals has changed to encompass a larger context of becoming an expert learner as part of a process (Meyer et al., 2014). An emphasis on individual differences was modified with developments in neuroscience to include consideration of a predictable normal variability

that exists where the learners' functions fall along a continuum. A shift from a concentration on the learner versus student, and the use of the word variability versus disability are two key adjustments that were noted. Learning was extended to include dynamic interactions with the environment, and the affect principle was reorganized within the structure of the framework to be at the core or first column of the graphic organizer.

The importance of formative assessment was also made more clearly in the shift of concepts and their priorities. Societal changes in post-secondary education, accessibility legislation, the internet, and digital media technology have all contributed to these changes (Meyer et al., 2014). Currently, an international effort is being undertaken by a community of volunteer authorities to update these guidelines (Rose, 2022). Systemic barriers that result in inequitable learning opportunities will be explored more specifically by this group. However, the timelines for the release of the updated graphic organizer have not been established. While shifts in the framework seem welcomed and supported by creators, consistency is evident in the general structure of the graphic organizers over time. The graphic organizer provides educators in post-secondary settings with a tool and guidance on how to incorporate these inclusive practices into their course curriculum.

Course curriculum developed by educators can either present barriers or enhance learner understanding of the content. CAST considers a curriculum as including four interconnected elements: goals, assessments, methods, and materials (CAST, 2011a; Meyer et al., 2014). Goals, or learning expectations, represent the knowledge and skills that the learner should master in the course. Articulation of these goals acknowledges learner variability and differentiates these from the means used to attain them. Traditional curricula focus on student performance goals, whereas UDL focuses on developing expert

learners (Meyer et al., 2014). Assessment involves the process of using a variety of methods and materials to obtain information related to a learner's performance. Methods typically include evidence based instructional strategies used by educators to support and enhance learning. Finally, materials represent the media that are used to present the course content and what the learner will use to demonstrate their understanding of it (CAST, 2011a; Meyer et al., 2014).

UDL offers a flexible pedagogy, assessment, and tool that can support individualized learning not possible with traditional methods of instruction (Rose & Meyer, 2002; 2006). However, this does not eliminate the need for unique learner accommodations (Black & Moore, 2019; Burgstahler, 2020; CAST, 2011a; Meyer et al., 2014). Evidence supports an increase in student retention in an online environment when UDL principles are used (Tobin, 2014; Tobin & Behling, 2018). Therefore, my descriptive case study utilized the CAST framework as key principles are based on various learning theory concepts and science, provides clear guidelines, and offers extensive resources for practitioners to implement within a post-secondary educational environment (Meyer et al., 2014).

Universal Design in Post-Secondary Education

Universal Design for Learning has become increasingly familiar to educators in the K-12 setting (Mangiatordi & Serenelli, 2013; Meyer et al., 2014; Ok et al., 2017), however, the use of these inclusive practices has been slower reaching post-secondary settings (Capp, 2017; Fleet & Kondrashov, 2019; Fornauf & Erickson, 2020; Gawronski, 2014; Leichliter, 2010; Schreffler et al., 2019; Seok et al., 2018). Scholarly literature reviews of UDL-based practices in higher education suggest a lack of empirically based

studies that focus on undergraduate student perceptions related to the implementation of these principles into in-person place-based, blended, and online course formats (Al-Azawei et al., 2016; Boothe et al., 2018; Capp, 2017; Cumming & Rose, 2021; Fleet & Kondrashov, 2019; Fornauf & Erickson, 2020; Gidden & Jones, 2021; Maguire & Hall, 2018; Orr & Hammig, 2009; Roberts et al., 2011; Roberts et al., 2015; Schreffler et al., 2019; Seok et al., 2018). Although, each study used a different model of UD, the term UDL is used for consistency throughout this review.

Available literature on UDL in higher education focuses on the discussion, ideas for intervention, and need to implement key curricular principles by educators within in-person place-based, blended, and online post-secondary settings (Dell et al., 2015; McGuire et al., 2006; Rogers-Shaw et al., 2018; Scott & McGuire, 2017). Within this database, most empirical studies found in the literature in post-secondary education focus on understanding the perspectives of graduate and undergraduate level learners, specifically among pre-service and in-service educators. UDL is defined as a pedagogical framework and as a result being increasingly used to prepare teachers for practice (Fornauf & Erickson, 2020).

Pre-service and In-service Faculty Perspectives

Several studies examining UDL in higher education describe research findings from the perspectives of pre-service and in-service faculty. A need for more professional development and training was a reoccurring theme in the literature (Izzo et al., 2008; McGuire-Schwartz & Arndt, 2007; Moon et al., 2011; Spooner et al., 2007). In response to additional training, educators were better able to understand the benefits of UDL and need to change their teaching practices to address learner diversity in their classrooms. After

receiving UDL education, many of these practicing and pre-service instructors felt the UDL tools and resources used were helpful in developing lessons integrating these principles (McGhie-Richmond & Sung, 2013; Moon et al., 2011; Navarro et al., 2016; Spooner et al., 2007; Tzivinikou, 2014). Educator training positively affected student learning by providing an inclusive (McGuire-Schwartz & Arndt, 2007) and engaging environment (Pace & Schwartz, 2008; Smith, 2012). Instructor comfort in meeting the learning needs of students with disabilities was also increased (Izzo et al., 2008). Multiple and alternative means of assessment were used and seen as a viable option to support the expression of pre-service student teachers being educated whose native language was not English (Ragpot, 2011).

Comparable studies have been conducted in blended (Basham et al., 2010; Parker et al., 2008) and fully online post-secondary courses integrating UDL-based principles, to obtain the perspectives of practicing and pre-service educators (Boothe et al., 2020; Catalano, 2014; Evmenova, 2018; Fidaldo & Thormann, 2017; He, 2014; McGhie-Richmond & Sung, 2013; Rao & Tanners, 2011; Scott et al., 2015). Higher overall satisfaction with these redesigned courses (Catalano, 2014; He, 2014; Parker et al., 2008; Rao & Tanners, 2011; Scott et al., 2015), and benefits for improving self-efficacy and confidence in online learning were evident in the findings (He, 2014). Clear course expectations, use of multimodal resources, options and choices provided through different course elements were also appreciated by students (Boothe et al., 2020; Fidaldo & Thormann, 2017; Rao & Tanners, 2011). Thus, the benefits of integrating inclusive instructional strategies into education and pedagogy among this population of learners in a variety of settings is possible and evident.

Further to these positive findings, a qualitative phenomenological autoethnographic study by Aguirre and Duncan (2013) explored the perspectives of a graduate student with a disability and the instructor in their collaborative effort to redesign a hybrid social work course with UDL principles. It was determined that the proactive use of UDL principles in course design can minimize the need for academic accommodations in blended and online environments in higher education. Evidence from this study builds on the existing literature that supports the advantages of UDL based pedagogy for learners with a diagnosed disability in post-secondary environments.

Nurse educators are also faced with an increasing need to provide accommodations for students with disabilities in both theoretical and clinical aspects of the program. A practice brief by Heelan et al. (2015) included findings obtained from an inquiry-based discussion with 25 health professional experts who attended a summer workshop in 2013. The workshop was geared to academics in various roles who have responsibility for including students with disabilities in clinical placements. Open dialogue was used to explore the potential applicability of UDL principles in clinical placements (Heelan et al., 2015). Previous research efforts related to the application of UDL principles into clinical practice for nursing students with documented disabilities has been conducted. The investigation established a necessity to explore strategies that support learners with dyslexia and other needs, in the working environment because of the potential challenges it presents for implementation (Halligan et al., 2019). While instructor knowledge of UDL principles is essential to implementation, determining the impact on student learning and success should be a priority to meet outcomes. Therefore, a need to research undergraduate

student perspectives in other disciplines such as nursing is required to better understand the effect on inclusivity.

Undergraduate Student Perspectives

Few empirical studies have been conducted to gain insight into the perceptions about the inclusivity of UDL-based instructional strategies among undergraduate students; however, some limited information is available. Both SWDD and SWODD can benefit from UDL practices integrated into many different courses and learning environments.

Students With Documented Disabilities

Data gathered from studies conducted at in-person place-based, blended, and online post-secondary settings with SWDD; identified attributes of a good course and instructor as being aligned with UDL principles (Simoncelli, & Hinson, 2008; Street et al., 2012) and their learning preferences (Black et al., 2015). Qualities of a good course included clear expectations, multiple formats of content, provision of organizational material to support note taking, affirmative class experiences, frequent feedback, authentic learning opportunities (Black et al., 2015; McGuire & Scott, 2006; Webb & Hover, 2015), and engagement (Griful-Freixenet et al., 2017).

Greater satisfaction with involvement in small groups led by peer mentors trained in UDL-based strategies was also discovered (Street et al., 2012). Quality instructors were described as providing frequent feedback, being available to assist, and as approachable by students. Contrary to these findings, some website usability issues were raised among learners when using a biology lab tutorial created by librarians to support their course of study (Webb & Hover, 2015). However, it was found that by using a UDL mapping

technique, librarians could help to ensure online tutorials were inclusive of all users and help support students when searching for sections in the tutorial (Webb & Hover, 2015).

Current findings support the use of UDL-based strategies in providing an inclusive environment for undergraduate SWDD in post-secondary settings, but the benefit to all students ends here, as many do not seek assistance or qualify for this support. As the advantages of UDL-based strategies become more apparent in the literature for SWDD in post-secondary settings, negligible empirical research exists. Even fewer study efforts have focused on the perspectives of undergraduate SWODD in similar settings, particularly in nursing.

Students Without Documented Disabilities

A handful of empirical studies have been published about the experiences of SWODD in post-secondary education. While some of these studies report data on faculty or instructor experience, the findings discussed below are specific to undergraduate student perspectives and described in chronological order.

In 2006, Baker and Wolfer conducted an early study of two sections of an introduction to criminal justice course that integrated UDL, and Systematic Design Instruction (SDI) methods into their design, to establish advantages of applying these approaches to instruction (2006). Sixty-three (n=63) students were enrolled in the two sections of the course from a variety of academic backgrounds. Sixty-one (n=61) students enrolled to participate in the study. A survey instrument with 29 questions was administered to capture students learning experiences concerning the varied instructional approaches that used both computer and non-computer technology to help master the course content (Baker & Wolfer, 2006).

While computer technology was appreciated as a complement to instruction by students, respondents did not believe computers should replace instructor actions in supporting their learning of the course content (Baker & Wolfer, 2006). The study results revealed learner preferences for online practice quizzes and PowerPoint presentations. However, hands-on non-computer-based learning strategies, such as role playing, and group discussions were identified by students as more beneficial to learning. Computer-based approaches that integrated the human element of instructor involvement, such as emails or the posting of lecture notes, were essential to students experience of learning the course material but not necessarily for exam preparation (Baker & Wolfer, 2006). Generally, students seemed to prefer nontraditional, more active learning strategies.

Conflicting findings were noted by researchers with a low participant rating for critical thinking strategies and the high ratings received specific to the use of problem-solving activities (Baker & Wolfer, 2006). Considering the combined use of UDL and SDI frameworks in this study, generalization of these findings to UDL and undergraduate learners is limited. To build evidence supporting the effectiveness of UDL instructional strategies in offering an inclusive environment for undergraduate students, researchers began to focus future efforts on establishing these advantages in post-secondary settings (Baker & Wolfer, 2006).

Schelly, Davies, and Spooner (2011) conducted a landmark quantitative (one-group pre-post survey) study to measure the effectiveness of UDL instructor training, as indicated by undergraduate student perceptions of UDL implementation. It further sought to determine the feasibility of changing faculty behaviors using these experiences. Participants included five instructors and 1615 undergraduate students from nine sections

of an Introduction to Psychology course (Schelly et al., 2011). While the specific course offering format was not identified, the implication of an in-person place-based study was inferred with the data collection process described. No control group was used. A survey pilot using a newly developed questionnaire consisting of 27 questions was informally evaluated the semester prior to the study. From this total, 1,362 students (84%) filled out the first survey at the start of the semester and 1,223 (76%) students filled out the second survey at the end of the semester. Of these, 8% reported having a disability. Between surveys, instructors received UDL training (Schelly et al., 2011).

Findings supported the use of UDL education. Quantitative data analysis indicated that UDL education for instructors appeared to change students' perceptions about how their instructors present ideas, knowledge, engage students, and allow students to express their understanding of course content (Schelly et al., 2011). The importance of presenting concepts and offering course materials in multiple formats was highlighted. A need to summarize key concepts before, during, and immediately following instruction was also expressed (Schelly et al., 2011). To elaborate on these initial findings, similar studies began to follow in other disciplines.

Zhong (2012) conducted a pilot study to explore multiple UDL principles that could be applied in a library instruction course to evaluate the impact on the effectiveness of teaching on diverse learners. Fifty (n=50) first-year students at an American college completed a survey of the course.

Hands-on activities were reported as being most effective for different learning styles. Interestingly, the results did not support the use of traditional teaching practices in meeting new generational learning styles (Zhong, 2012). Certain approaches such as

lectures, textbooks, and notes, may lack the ability to actively engage students. PowerPoint slides, however, were still heavily relied upon by students for note taking. Thus, audio and video features should be integrated into presentations, including captions or transcripts as needed. It was also found that group activities benefited students as they study and learn more effectively when together. Although only a small number of students (n=3) from this class reported having disabilities, the majority reported the benefits of UDL-based instruction (Zhong, 2012). These promising findings sparked future interest among scholars to examine the perceptions of undergraduate students related to UDL-based practices more closely.

In 2013, a follow up study by Davies et al. built upon previous research regarding the effectiveness of instructor training from Schelly et al. (2011) by comparing student perceptions about an intervention group of instructors who received UDL training to a control group who did not. This quantitative experimental study focused on nine in-person undergraduate psychology classes as measured using a revised online survey tool. A total of 1164 students were enrolled in the nine sections of course offerings. From this total, 386 (33%) of the participants from the intervention group completed both the pre- and post-online questionnaires (Davies et al., 2013).

Students reported the most beneficial instructional strategies used by educators as (a) presenting material in multiple formats, (b) linking key concepts to larger course objectives, (c) offering an outline prior to lectures, (d) summarizing material throughout each class, (e) highlighting the main topics and use of instructional videos; and (f) using organized and accessible material (Davies et al., 2013). Students in the intervention group noted a positive change among their instructor's use of UDL strategies, specifically

approaches related to the principle of multiple means of representation. Learners in both the intervention and control groups reported increased levels of engagement in the course. Further to these preliminary studies, efforts to establish a link between specific instructional strategies and UDL principles began to spread globally.

A mixed methods case study was conducted in 2014 by Watt et al., of a level II, blended social science course at a Canadian university, to understand student experiences related to the ability of lecture capture technology, as a learning tool, to align with UDL principles. A two-stage mixed methods study design included the collection of data through an online questionnaire and individual in person interviews (Watt et al., 2014). One hundred and seventy-five (n=175; 32% response rate) students from a total course enrolment of 542, participated in the study. The questionnaire used in stage one obtained participant data about the utility of lecture capturing, academic accommodations, and perceptions of lecture capturing, citing any barriers (Watt et al., 2014). In stage two, individual in person interviews with students (n=8) and a faculty member (n=1) selected from phase one were conducted.

Most (89%) respondents believed that lecture capturing supported an equitable learning opportunity (Watt et al., 2014). Many participants (78%) felt their overall understanding of the course material was supported through lecture capturing by helping students retain the knowledge learned (Watt et al., 2014). While the findings from this study support the alignment of lecture capturing tools with UDL practices, additional evidence specific to other curricular elements in post-secondary education was still missing.

In 2016, Gawronski, Kuk, and Lombardi used a quantitative, cross-sectional online survey research design to study community college faculty and student perceptions of inclusive teaching practices based on tenets of UDL. Full-time and part-time students registered in a credit course and faculty teaching at the community college were surveyed. Two different online survey questionnaires were utilized to collect data in this study: the Inclusive Teaching Strategies Inventory (ITSI), for use with faculty (n =179) (Lombardi et al., 2011), and an adapted pilot student version, the Inclusive Teaching Strategies Inventory-Student (ITSI-S) survey, which was administered to students (n = 449) (Gawronski et al., 2016).

This study was the first to examine community college students' perceptions of faculty actions associated with inclusive instruction. Additionally, researchers sought to examine faculty and student attitudes toward, and actions associated with inclusive teaching to determine whether discrepancies existed and if certain demographic characteristics were predictors of this strategy use by faculty (Gawronski et al., 2016).

Students reported a favourable attitude towards inclusive UDL based instruction, yet felt these practices were not typically carried out in classrooms by faculty (Gawronski et al., 2016). This study also demonstrated the reliability and validity of the ITSI-S survey, as a tool for examining students' perceptions of faculty actions associated with inclusive instruction (Gawronski et al., 2016). Thus, the findings from this study were instrumental to the data collection processes I used as the principal investigator at the hosting university during the 2019 and 2020 research studies and essential to consider for the analysis of the mixed secondary data for this descriptive case study. As quantitative evidence exhibiting the potential of UDL-based strategies in supporting inclusive practices grew, a need to

capture more encompassing findings through additional qualitative study began to emerge in the form of mixed methods research approaches (Gawronski et al., 2016).

A mixed methods evaluation was conducted at an Australian university of an introduction to university study unit that was revised using UDL principles, to embed inclusive pedagogical practices (Dracup et al., 2016). Quantitative student grades, pass rates, and unit evaluation data were gathered by researchers. Qualitative data were also collected from student answers to a reflective examination question, surveys, focus groups, and interviews with teaching/support staff.

The success rate for students completing the unit were 7.5% higher than the previous year, with learners from low socioeconomic status and those with disabilities also showing analogous trends (Dracup et al., 2016). Students reported the assortment of lecturers in the unit as engaging, valued, and helpful. Feedback regarding digital skills developed and confidence with academic writing skills were also described as overwhelmingly positive by learners. However, UDL was negatively experienced by students who reported the number of resources offered in the unit as being overwhelming, requiring a better balance between activities and challenges in coping with large amounts of information during their first year of study (Dracup et al., 2016). This study emphasized the importance and need for educators to better establish a balance of UDL strategies within their course structure to support diverse learner needs in a first-year classroom. Further research into the study of specific UDL-based instructional strategies and tools are necessary to expand on the understanding of effective and supportive inclusive practices.

In 2017, Dean, Lee-Post, and Hapke, examined the usefulness of four instructional tools, PowerPoint, lecture notes, clickers, and Mind Tap, for their effectiveness in actual

and perceived student learning within an introductory in-person marketing course based on UDL principles. A quantitative survey was used to study two large classes of approximately 600 students each, over two semesters (Dean et al., 2017). Data was collected through an in-class survey administered on the last day of class of both semesters to assess student satisfaction with these instructional tools, perceived effectiveness, self-reported use, and perceived learning. A total of 928 of the 1285 survey responses were usable, a response rate of 72%.

Findings regarding student perceptions on valuable learning were credited primarily to instructor created course content, specifically PowerPoint and lecture notes, over third-party material such as Mind Tap (Dean et al., 2017). Perceived and actual learning were both enhanced using instructional tools that were accessible inside and outside of class. A connection of these selected UDL-based instructional strategies to improved perceived and actual student learning should further motivate educators to seek, integrate, and research various inclusive practices in post-secondary environments (Dean et al., 2017).

Research conducted at a community college by Mayes (2020) related to first-year student perceptions of the impact of UDL on content effectiveness, interactivity, and motivation to learn yielded mixed results. A survey completed by 109 first-year community college students was used to gather data about their experiences of content effectiveness, interactivity, and motivation to learn in Education and English course sections with one module designed using UDL-based principles (Mayes, 2020). Other similar unmodified sections of the course were used as a means of control and comparison.

Survey data (n=109) were analyzed using independent t test, single sample t test, and chi square statistics to answer nine research questions and null hypothesis.

No significant differences were noted about content effectiveness, interactivity, and perceived grades between learners in the redesigned module and control group sections of the study (Mayes, 2020). However, the English course with the UDL-based module was found to be more interactive than the Education class, which was likely a result of having choice and variety of activities not typically offered in the past (Mayes, 2020). Overall higher motivation to learn was found among rural learners and those over the age of 24 in the study. In addition to this study, an experimental methodology was used to conduct a summative evaluation of a large introductory statistics course that was redesigned using UDL principles for online delivery.

Recently, in the fall of 2020, Jang (2021) conducted a summative evaluation of a large course redesigned using UDL for online delivery of two sections of an introductory statistics class to accommodate neurodiverse engineering students. The purpose was aimed at improving interpersonal rapport in an online environment, while maintaining an appropriate level of academic effectiveness. Two introductory statistics courses were utilized in this summative evaluation that was conducted during the pandemic. One section was considered the experimental group (n=122) with access to UDL course components, and the other was used as a control group (n=117). However, this control element was breeched during the study as the control group members requested and were granted similar UDL benefits, thus lacks some rigor in findings. A formative assessment about the UDL implementation was conducted in the middle of the semester using the student evaluation of teaching (SET) tool (Jang, 2021). In section one, ninety-one (n=91)

participants responded to the survey, with seventy-five learners (n=75) responding from the second section of the course.

Section one received higher overall grade point averages than group two. Learners in section one also thought they learned more than in other courses, expressing that the pedagogies used promoted learning (Jang, 2021). The modifications were identified as reducing participant stress while further supporting learning. Extended exam time, frequent lecture breaks, available lecture recordings or class notes, digital textbook, final project options, and smaller tutor sessions were strategies identified in descending order of preference by learners (Jang, 2021). Overall, respondents favourably accepted the UDL strategies implemented in section one of the course offering. For educators, an initial investment of one years' time was required for successful development and implementation of the course, with a resulting increase in the amount of grading time necessary.

In summary, the benefits of UDL-based strategies among undergraduate SWDD and SWODD in post-secondary education surpasses any barriers experienced because of implementing these types of inclusive practices by educators. UDL principles were seen primarily by SWDD and SWODD as beneficial and being aligned with attributes of a quality course and instructor. Quality courses were identified as providing clear expectations, multiple formats of content, organizational material for notetaking, affirmative class experiences, and authentic learning opportunities, to support various learner needs. Importance was seen in instructor created material, especially when supported with closed captioning and transcripts of the content to offering equitable opportunities and overall understanding of the course material. Exceptional instructors

provided students with frequent feedback, were available to assist, involved in the course delivery, and were approachable. Learners preferred more active, engaging, hands-on activities such as role playing, discussions, and small group work over more technically based instructional tools in supporting success for a variety of learning preferences. Perceived and actual learning were enhanced using instructional tools that were accessible to learners both inside and outside of class. Despite these favourable findings, a need to overcome barriers and academic accommodations were not eliminated for learners by using UDL-based course strategies.

Regardless of delivery format or discipline focus, SWDD and students with hidden disabilities are reluctant to discuss their disability with faculty for fear of issues with stigma, lack of faculty awareness and willingness to make reasonable course adjustments. Website usability, lack of assessment choices, and ability to actively engage students with certain traditional instructional methods were all identified as potential learning barriers in the literature. It was also noted that a multitude of course options and assignment submissions required for UDL-based strategies may confuse students starting in post-secondary studies. Overall, students reported favourable experiences of inclusive UDL instruction, yet many felt these were not typically conducted in classrooms by faculty. Similar to other disciplines and settings, available research specific to the online delivery of nursing education is limited and primarily focused on faculty perspectives and recommendations for the implementation of principles (Levey, 2018).

Health Sciences and Nursing Education. Only two empirical studies specific to learner undergraduate perspectives of UDL-based nursing courses were found after an exhaustive search of the literature. However, a few research studies have been explored in the health science field specific to their implementation in higher education. In 2010, a pilot project by Bongey et al. (2010) was conducted at an American college of a blended undergraduate biology class, to establish whether a supplemental UDL-compliant online course site based in the LMS, extended the representational, strategic, and affective aspects of the course. Fifty students (n=50) from a total enrolment of 116 students; a response rate of 43%, completed an optional and anonymous survey (Bongey et al., 2010).

All respondents reported using the online site to supplement their experience in the course. Participants believed there was an added value in the UDL-enhanced site; however, evidence from this intervention did not lead to resulting improved student grades (Bongey et al., 2010). Researchers suggested that there may be an optimal blend of tools and approaches. Participants indicated attending class less frequently and relying on the online lecture notes, which could have further influenced the grades. While the benefits of an accompanying UDL-based online site added some value to the course among learners, the effect on learner grades continues to be mixed in the literature and a possible area for more focused research in the future (Bongey et al., 2010).

One of the most cited mixed methods study specific to the health care discipline was conducted by researchers at a Canadian university. Kumar and Wideman (2014) conducted a mixed methods study at a Canadian university to determine whether a UDL-based, technology-enhanced, in-person place-based first-year health science course correlated with improved accessibility as perceived by the students in this class. A sample

of participants was drawn from a total course enrolment of fifty students (Kumar & Wideman, 2014). Thirty-five students (n=35) completed an in-class survey questionnaire at the end of this course with two (n=2) of these learners self-identifying as having disabilities. Four participants also completed a semi-structured interview (n=4).

Study findings validated the use of UDL principles in supporting a learner-centered instructional approach (Kumar & Wideman, 2014). Participants indicated their satisfaction with the course flexibility, associated reduced levels of course-related stress, and the importance of an educator's social presence to overall success. Decreased learner academic workload and use of disability services were noted by both the educators and service provider at this university (Kumar & Wideman, 2014). Positive findings from this crucial Canadian study were followed by other researchers in a community college environment.

Two surveys were conducted at a Canadian college by Kennette and Wilson in 2019, including a student and faculty version. An initial survey which drew from an enrolment of approximately 600 students in the one-year in-person place-based General Arts and Science certificate program was conducted. Seventeen (n=17) students completed a 36-item survey adapted from each one of the lists of UDL checkpoints (CAST, 2011a), to rate their impressions of each item used in all their courses (6 per semester) and the effectiveness in supporting their learning (Kennette & Wilson, 2019).

Faculty feedback on assignments, communication outside of class, responding to emails, sharing rubrics and lecture slides, were perceived as most helpful for student learning. Regular communication with faculty and encouragement that motivates learners to do their best were very helpful (Kennette & Wilson, 2019). Many strategies that students did not frequently encounter (e.g., field trips, streaming lectures, choosing course content)

were not perceived as especially valuable. Students found most UDL elements useful to their learning, however, perceptions of usefulness were not backed up by performance data such as grades (Kennette & Wilson, 2019). Consequently, additional research is required to establish why the usefulness of UDL strategies is perceived as beneficial to undergraduate first-year nursing students in online post-secondary settings.

Dickinson (2018) conducted a study at a Japanese university, following the application of UDL guidelines into the design and implementation of goals, assessments, instructions, and learning tasks, of an English as Additional Language writing course. Forty (n=40) first-year nursing students were recruited to participate in completing a questionnaire survey about UDL-based instructional preferences offered in the course (Dickinson, 2018).

Collaborative writing opportunities were appreciated by respondents, as these practices fostered community, scaffolded support for practice to build fluencies, and offered an ability to monitor progress (Dickinson, 2018). Strong support for options in choice of topics and expression through the selection of assignment formats were evident in the findings. Collaborative writing, topic options, expressive assignment formats, online forum, and teacher feedback were approaches that were preferred overall by learners in the study of this course. More recently, a mixed methods case study was completed with BScN students at a Canadian university.

As discussed in Chapter 1, in 2019, I led the completion of a convergent mixed methods case study at a Canadian university, of a large in-person first-year BScN course that was redesigned using UDL-based principles to promote inclusive practices and minimize academic barriers for all learners. From the 223 students enrolled in the course, a

convenience sample was drawn from both full and part-time program registrants. Quantitative data were collected from thirty-two participants (n=32), using the Inclusive Teaching Strategies Inventory-Student (ITSI-S) survey (Garwonski et al., 2016), with many agreeing to share their final course work (n=206) for a document review at the end of the semester. Qualitative focus group data were obtained from twelve participants (n=12) through an interview conducted at the end of the semester (Celestini et al., 2021).

Findings supported the use of UDL principles by nurse educators in post-secondary settings in offering diverse learners a variety of flexible pedagogical practices and assessments, that were inclusive of diverse learning preferences and needs (Celestini et al., 2021). The presence of co-instructors and peers were identified by respondents as supportive of collaborative practices, learning, and engagement. Additionally, the variety of smaller assignments and activities supported an increased level of confidence and success among respondents completing the course, while minimizing overall stress experienced.

Despite these successes, problems arose with the lack of appropriate organizational support required to integrate some of the inclusive strategies used in the course (Celestini et al., 2021). Learners described an appreciation for the application-based nature of the formative review. However, certain learners identified obvious issues with the execution of this initial in person trial that could have been minimized with the availability of a room on campus to accommodate these technological needs (Celestini et al., 2021). While a few challenges were experienced by students, many learning barriers were proactively eliminated by co-instructors using an inclusive UDL instructional framework.

To summarize these findings, UDL-enhanced courses supplemented undergraduate student experiences of the course and instructor. UDL based principles were seen as an added value by learners in decreasing course-based stress and increasing flexibility. Instructor presence, frequent feedback, regular communication, prompt responses, and encouragement were seen as most helpful to learning. Additionally, sharing rubrics and notetaking tools such as lecture slides prior to class were beneficial for learners. UDL-based courses decreased academic workload for faculty and use of student support services on campus. The literature primarily provides evidence of positive learner experiences in undergraduate post-secondary education, however, similar to previous findings, UDL-based approaches were not consistently associated with improved grades (Mayes, 2020). Historically, UDL has been primarily positioned as an approach to SWDD (Capp, 2017; Fovet, 2019). While its advantages are becoming increasingly clear for a diverse group of learners, evidence related to these benefits among SWODD is sparce, particularly related to nursing education delivered in an online setting.

Summary

UDL-based instructional strategies have the capacity to positively impact learner experiences via an inclusive environment regardless of in-person place-based, blended, or online instructional delivery formats used. An extensive review of the literature related to UDL in post-secondary education provides a strong rationale for proactively using similar approaches in curriculum development by educators to support the diverse needs of all learners, and minimize barriers for all. Despite repeated calls for application-based research, a significant gap still exists related to undergraduate student perceptions of the effectiveness of UDL designed courses in supporting an inclusive online learning

environment. Evidence of findings are further limited in its focus on educator perspectives of effectiveness, a trend which is similarly evident in the nursing literature specific to fully online delivery methods.

Chapter 3. Methodology

In Chapter 3, the methodology is described, reiterating the study purpose, design, and research question. Details underlying the suitability of these research processes and my core paradigmatic philosophical assumptions are described to provide a foundation to support these decisions. Subsequently, an elaboration specifying the case boundaries, participant sampling, and secondary data collection strategies used are included. A description of the process used to obtain the mixed secondary data set are included, considering the reliability, validity, authenticity, and any ethical implications of the study. Specific steps that were used for the convergent mixed methods analysis of the mixed secondary data are described, followed by the delimitations of the descriptive case study methodology.

Descriptive Case Study

A descriptive case study methodology was used for this study, as this empirical technique can be used to explore a current phenomenon, or *case*, in depth and within its real-world context (Yin, 2018), which aligns with the context of the course, or case that was studied. A case study, according to Yin, can also embrace different philosophical orientations. While case studies can be qualitative in nature, Yin's (2018) approach was selected as it permits the use of multiple sources of both qualitative and quantitative data to provide a more fulsome understanding of the learners' experience.

A case study methodology was also chosen as it offered a means of building on existing knowledge of the case, while further supplementing this information with increasing levels of details to develop a thick description. Using this design permitted the creation and development of a database of various information about the case, which is

organized, categorised, complete, and accessible for future use (Yin, 2018). This method of research was also preferred because there were no variables manipulated, resulting in a more fluid rendition of the study findings. Case studies maintain a chain of evidence on which to base future similar research and provide a means to replicate the processes and compare it to other case study data. In addition to these benefits, a case study design is based in an evolving constructivist and learner focused approach (Yin, 2018), which further aligns with the main UDL principles (CAST, 2011a; Meyer et al., 2014). Generalizability of a single event such as in this case study, can be extended through replication and building on an existing body of knowledge (Cohen et al., 2018). Finally, the use of a case study approach parallels my pragmatic positioning in the research process.

Pragmatic Philosophical Assumptions

Study assumptions are an important aspect for a researcher to consider prior to conducting research. Three significant factors have influenced the development of my ontological, epistemological, and axiological philosophies as a novice researcher. Personally, these philosophies have grown through my interactions with others, such as family and friends, professionally as both a registered nurse and educator, and scholarly through years of academic study. A paradigm "is a way of looking at or researching phenomena, a world view," (Kuhn, 1962, p. 23). Several different paradigms exist within education research. A paradigmatic worldview resonates most with my beliefs as a novice researcher and is best suited to my research interests, question, and descriptive case study design.

I locate my nature of inquiry within a pragmatic ontological position, which consists of a truth that is based on what works best to solve the problem, not on the duality between subjective and objective approaches (Johnson & Onwuegbuzie, 2004). Pragmatists reject having to position their research in either a positivist or interpretivist paradigm while seeking to utilize the most appropriate approaches to gaining information by using every methodology that facilitates knowledge discovery and understanding of a phenomenon (Kivunja & Kuyini, 2017).

Like a pragmatic epistemological view, I believe that numerous ways of knowing should be utilized in research based on the nature and purpose of the inquiry. Pragmatism is based on a mixed methods approach to research that involves using the best combination of both qualitative and quantitative methods to obtain the fullness of understanding of the phenomena being investigated (Cohen et al., 2018). Knowledge and knowing should be grounded in multiple factors including embodied, relational, practical, experimental, subjective and objective experiences, so that the most comprehensive understanding of a phenomena can be captured. The central premise of this inquiry method is that a combination of qualitative and quantitative data, yields a supplementary understanding of phenomena beyond the information provided by either alone (Creswell & Creswell, 2018).

The research question for my descriptive case study starts with *how,* which favours the use of a case study methodology (Yin, 2018). When collecting data, the researcher should be practical, focusing on what works best to answer the research question. Thus, a mixed secondary data set including both qualitative and quantitative information was selected for the basis of analysis, as the data were drawn from subunits or students enrolled in the case studied and was relevant to the research question posed. Finally, my axiological

assumptions include values that encompass multiple stances with both biased and unbiased perspectives, which may have influenced the research conducted (Creswell & Plano Clark, 2018).

Purpose

A division between increasing learner diversity and need for inclusive instructional approaches in post-secondary online education exists. Thus, the purpose of this study was to discover how learners described and rated the effectiveness of instructional strategies used in a large first-year BScN course based on UDL principles, in supporting inclusivity of diverse learning preferences and needs in an online environment.

After appropriate permissions were sought, unpublished mixed secondary data that was collected in the fall 2020, through a quantitative ITSI-S online survey (n=40) and qualitative focus group interview (n=7) data were obtained. To support a holistic understanding of the case, this data was then analyzed using a convergent mixed methods approach (Creswell & Plano Clark, 2018). Co-instructor journal notes are included as appropriate in the discussion of this study to offer a supplemental and broader understanding of certain data but were not formally analyzed.

Study outcomes focused on capturing an accurate description and rating of learner voices regarding their experiences of the inclusiveness of UDL instructional strategies used in the course and determine which were most valuable in supporting diverse online learning needs. Thus, these two primary outcomes contributed to the larger intent of providing educators with direction that fostered the incorporation of inclusive UDL-based instructional strategies into the course design that support access for diverse learner needs in an online setting.

Bounding the Case

As described in Chapter 1, the case studied was a large first-year undergraduate BScN course that is required as part of the collaborative four-year and compressed three-year program streams at a Canadian university. This introductory course is intended to support the student in building a healthy lifestyle, learning environment, and future nursing practice. Principle concepts introduced include the metaparadigm of nursing, critical relational inquiry, communication, stress, coping, individual health behaviour change, and cultural sensitivity. The course was co-taught to a cohort of approximately 230 full-time and part-time learners over a twelve-week semester each fall. Each week students were expected to attend twelve in-person place-based one-hour and fifty-minute lectures with the entire class and fifty-minute seminars held by individual instructors with smaller groups of twenty-five learners. Seminars involved practice in learning basic clinical skills such as bedmaking, bathing, and transferring.

Significant modifications to this first-year course evolved over a two-year period from 2019-2020 as this course was not designed to accommodate different learner needs and preferences. In 2019, several considerable changes to the curriculum were made to provide a more inclusive in-person place-based classroom environment that supported diverse student needs and minimized learning barriers (Celestini et al., 2021). Clinically based skills were replaced with more appropriately aligned course concepts such as communication, assessment, collaboration, and interviewing. UDL-based principles were used to inform several major pedagogical course changes. For example, the midterm multiple-choice scantron exam was replaced with an application-based short answer format and offered through Blackboard, the LMS at this organization. A group project based on an

authentic case study, that unfolded over a six-week period in smaller seminars with learners, replaced the final examination that consisted of primarily multiple-choice and a few short answer style questions. Seminars were restructured from twelve weekly fifty-minute sessions to six one-hour and fifty-minute meetings during the latter half of the semester. Additional time in these seminars with learners provided an increased opportunity for facilitation, support, and engagement with the co-instructors and other classmates. Assessment weighting across assignments was more evenly distributed in the course.

Care during the assessment revisions was taken to minimize any language that invoked anxiety among the learners such as formative review versus midterm exam. A variety of innovative instructional UDL-based strategies were integrated into the course redesign to offer varied engagement, representation, action and expression for learners, while promoting more active participation. For example, adaptive multiple-choice quizzes associated with the course textbook readings, five themed activities held during class time, and option to earn two bonus points to attend an Indigenous Blanket Ceremony were a few strategies used in the redesigned course.

In 2020, the pandemic situation resulted in my decision as co-instructor, to redesign this large in-person course for online delivery using similar UDL-based strategies. Information from twelve weekly instructor-led lectures was reformatted from PowerPoint presentations into weekly units that were available online through the course LMS site to learners. Modifications were integrated into the goals, assessments, materials, and methods elements of the course curriculum as detailed in Chapter 1. While the case boundaries were

crucial to establish, the subunits, or diverse learners in this course were equally essential to consider.

Diverse Learners in the Course

To maximize gaining an in-depth understanding from the voices of these first-year learner experiences, all full-time and part-time undergraduate students registered in the fall 2020 course offering were eligible to participate in the data collection process at the hosting university. This cohort consisted of 230 students from a variety of ages, ability, preparation, socioeconomic, and cultural backgrounds. Some students decided to live on campus despite the restrictions in residence numbers, others learned from a distance and comforts of their own home. All students were eligible to participate including those with documented disabilities. However, learners who enrolled but dropped out of the course prior to full completion were not included in the study. After appropriate REB approval was received on September 23, 2020, (see Appendix A), learners from both the collaborative and compressed stream programs, who completed the entire twelve-week course, were offered an opportunity to participate. Mixed quantitative online survey and qualitative focus group interview data were collected by a hired research assistant following this approval at the hosting university.

Mixed Secondary Data Collection

Mixed secondary data were obtained for the study. As one of the course co-instructors and sole researcher for the 2020 study, my decision to utilize mixed secondary data stemmed from a need to align data collection for my dissertation research with the rare online offering of this large first-year BScN course, or case studied. Mixed secondary data also provides a feasible use of existing data and helps build on any future studies of

similar type cases. Following subsequent REB approval from Athabasca University one year later on September 23, 2021 (see Appendix B), unpublished anonymized mixed secondary data collected in the fall 2020 semester were accessed to conduct a convergent mixed methods analysis for my research. Quantitative results obtained at the end of the fall 2020 semester through the administration of an online survey questionnaire titled ITSI-S (Gawronski et al., 2016) were part of the mixed secondary data set used for analysis. Furthermore, qualitative data gathered through a focus group interview conducted with participants were included in the data set used for the study. Finally, the inclusion of my journal notes as one of the course co-instructors are threaded into the discussion section in Chapter 5 to supplement an understanding of the case being studied. While the other co-instructor did not actively participate in the study or keep specific notes, general course email and personal discussions were included into my journal for context.

Survey Questionnaire

The ITSI-S, a self-report survey questionnaire, was used by a hired research assistant to collect data from consenting participants at the end of the fall 2020 semester. This data collection tool was selected as it was the only appropriate one available and at the time of the 2019 research that was specific to inclusivity, UDL principles, and post-secondary education. Reliability of the ITSI-S tool was established initially by Garwonski et al. (2014) in fulfillment of a dissertation requirement. This tool was based on a similar one developed earlier by Lombardi et al. (2011) to capture faculty experiences of inclusivity. The ITSI has gone through multiple development and validation stages to confirm the structure including cross validation studies using exploratory and confirmatory factor analysis (Lombardi et al., 2013). The survey was initially administered online by

developers and researchers, but the questions were specific to an in person offering of the course. The same tool was used again in 2020 to maintain consistency between studies and aid in future comparative research.

Maintaining anonymity of learner responses from me as the researcher and co-instructor were essential processes. Following appropriate consent (see Appendix C) (n=40) participants from a total class enrolment of 230 students, a response rate of 17%, completed the survey through a Qualtrics application that was managed by the research assistant through the secure hosting university server. Question responses that were left blank by survey respondents were not included or imputed into the mean score and standard deviation calculations for this research.

Five initial survey questions focused on obtaining descriptive demographic participant data about students age, ethnicity, disability status, contact with the office of accessibility services, and diagnosed disability (see Appendix C). Three segments with a total of 80 Likert scale questions were included related to student (a) belief about UDL and inclusivity (BUI) (b) experience of instructor actions in the classroom (EIA), and (c) experience in class (EIC) (Gawronski et al., 2016). The BUI and EIA segments of the ITSI-S survey are further classified into six constructs with 33 questions in each: accommodations, accessible course materials, course modifications, inclusive lecture strategies, inclusive classroom, and inclusive assessment. The third and last section of the questionnaire, EIC consists of 14 questions related to the participants experience of UDL in the classroom. Questions in the BUI are formatted using a five-point Likert scale, which ranks the five possible responses as: 1*(strongly disagree);* 2 *(disagree);* 3 *(neither agree nor disagree);* 4 *(agree);* 5 *(strongly agree)*; whereas both EIA and EIC segments use a

five-point Likert scale to rank the options as: *(*1 = *I don't know;* 2 = *never;* 3 = *sometimes;* 4 = *most of the time;* 5 = *always).* Likert scales are particularly useful for gathering data on attitudes and opinions, which were desired for this case study (Cohen et al., 2018).

Focus Group Interview

At the end of the course, all students enrolled in the fall 2020 offering were invited to participate in a one-hour focus group interview held through an online Zoom session by a research assistant to maintain anonymity. Seven (n=7) of the ten participants initially recruited from this cohort of 230 learners, attended and actively participated in the interview discussion. After obtaining appropriate participant consent (see Appendix D), eight UDL based sub-questions were used to guide the discussion in the group.

Sub-questions:

1. What was your overall experience of UDL instructional strategies in the course this semester?
2. Which UDL components did you find most helpful? Least helpful? (e.g., class preparation activities, weekly content outline, e-book options, links to articles and videos on blackboard, video recording of weekly class, thinking and sharing in class, role play, flexibility in testing).
3. The assignments in this course were formatted using elements of UDL example presence of a rubric, emphasis on engagement and participation, group project, graded in class activities, seminar activities culminating in a grade rather than a final exam, formative review online, flex time, use of adaptive quizzing) which of these elements did you find helpful? Is there anything in any of these approaches that you say would say are not helpful?

4. What are your thoughts about the unfolding seminar-based assignment versus a final exam based on multiple choice type questions?
5. Can you name any specific technology that was of particular value to you within the course?
6. In this course, how did you know that you understood the concept or idea? How did you know that your teacher was aware of your knowledge?
7. Have you ever had the opportunity to decide how you want to present what you have learned?
8. In this course, how did your peers or classmates influence or affect your academic performance?

Following the focus group interview, data collected were transcribed by the research assistant from the Zoom session recording, permitting opportunities to review and recheck the transcription process and information for accuracy. Letters A thru G were ascribed to each participant by the research assistant to maintain anonymity of the comments made in the focus group. Categorization provided a means to establish the frequency of comments or themes without breaching the consent of participants obtained during the analysis of this data.

Journal Notes

As one of the co-instructors, I kept a journal with bullet point notes in a Word document to informally capture some of the course highlights that occurred in the fall 2020 semester. Co-instructor input was recorded in emails and personal discussions, but not included in the data set for my dissertation research. Having these notes as a reference permitted reflection on my practice, any course, and learner challenges or benefits

experienced with the instructional strategies used, and to build on in future class offerings. These notes offered additional context into the case study findings and analysis, further helping to establish the quality and authenticity of the data obtained.

Data Quality and Authenticity

A mixed methods case study methodology was used for the original research design and data collection process. Reliability and validity in mixed methods research integrates the standards of both quantitative and qualitative approaches to better establish the quality of data, results, and researcher's interpretation of the information obtained (Creswell & Plano Clark, 2018). While each form of data captured distinct types of information, each had strengths and limitations that needed to be considered to develop a stronger understanding of the study results (Creswell & Creswell, 2018). Several issues may have impacted the reliability and validity of the study findings, potentially limiting their degree of generalizability (Cohen et al., 2018).

Quantitative Reliability and Validity

In quantitative research, reliability and validity are prominent issues requiring consideration. Reliability in quantitative research can be used to demonstrate the consistency and stability of participant scores over time (Creswell & Plano Clark, 2018). Validity, as represented by construct validity provides an indication that participant scores are meaningful. Reliability and construct validity were established through the selection of a quality instrument for data collection by the researcher at the hosting university (Creswell & Plano Clark, 2018). The ITSI-S survey was chosen to maintain consistency with the initial 2019 study of the case and minimize variance between cases in future comparative research. Internal consistency was good overall with the ITSI-S questionnaire

that was used to collect information in the data set, with a Cronbach's α =0.83 (Gawronski et al., 2016).

Validity in quantitative research also involved consideration of internal, and external types (Cohen et al., 2018). Each has different purposes and depends on the study being conducted. Internal validity seeks to provide evidence that data supports and sustains the explanation of the data set in study elements (Onwuegbuzie & Leech, 2006). For this case study, internal validity was not appropriate to consider as the purpose of the research design and question were not to establish causality between two specific variables but to provide a description of learner perspectives.

External validity refers to the degree in which results can be generalized to the larger population from the sample taken (Cohen et al., 2018). Consequently, the need for a thick description of the research setting, participants, and observed processes were essential to any transferability and generalization of findings (Lincoln & Guba, 1985). Providing descriptive details offers readers an opportunity to make an informed conclusion about any parallels of this case study context to their own research and practice (Polit & Beck, 2010). This type of validity was in part supported as the researcher from the hosting university by clearly detailing the methodology, case boundaries, and structural theoretical assumptions used in the process. However, limitations related to generalization still exist. Data collection was conducted in the fall 2020 semester; thus, the data set is recent. The case boundaries were identified clearly, including the type of core design used and rationale for its selection prior to data collection, which helped minimize potential threats in the results. To maintain the integrity of the ITSI-S tool, minimal modifications were made prior to collecting data. Adapting validated surveys improved the likelihood that

results are valid (Cohen et al., 2018). Following these quantitative measures of quality, the qualitative authenticity of the data was also considered.

Qualitative Authenticity

Authenticity and verifiability are critical to qualitative data assessment. Checking data validity involved assessing the authenticity, or trustworthiness of the data in depicting the lived experiences of participants from the information obtained. In qualitative research, the focus is primarily on validity, not reliability and based on standards established by researchers, participants, and reviewers (Creswell & Plano Clark, 2018). To establish this type of validity, it was important to examine the extent to which the information was credible (internal validity), transferable (external validity), dependable (consistency or reliability), and confirmable (neutrality) (Lincoln & Guba, 1985). Lincoln and Guba replaced the term reliability with dependability, which includes establishing the fidelity, comprehensiveness, meaningfulness, and authenticity of data to real life (Cohen et al., 2018). To establish this validity, Creswell, and Plano Clark (2018) recommend that qualitative researchers use at least three strategies.

In the case study, triangulation, data review, reporting disconfirming evidence, and intercoder agreement were selected for this purpose. Triangulation was used as the researcher at the hosting university to establish validity. The use of a mixed methods research approach lent itself to triangulating the results of the qualitative and quantitative data by nature of this design (Creswell & Plano Clark, 2018; Seale 2018). Questions used for qualitative and quantitative data collection methods in the original study were based on the main principles of UDL to facilitate the merging and analysis of information while providing a means to support construct validity. To further establish the authenticity of

data, I asked a co-coder to examine the data using their own criteria (Creswell & Plano Clark, 2018). Additionally, disconfirming evidence was used to offer any contrary explanations to data that diverged from the positive results collected. As one of the co-instructors, I was emersed in the case with subunits for an extended time, informally witnessing the impact changes may have had on participants generally. These less formal journal notes are included to supplement the validity of data collected and conclusions drawn. To maintain transparency, a detailed description of all stages and aspects of the research study were kept.

Finally, the reliability of the mixed secondary qualitative data was also established through intercoder agreement with a co-coder to help in confirming the preliminary codes identified from the mixed secondary data set prior to starting the analysis of this information. While not as prominent of a concern in this method of research, ethical issues were also considered prior to using secondary data for analysis.

Ethical Considerations

As evidenced with other research methods, the use of existing mixed secondary data for the mixed method analysis in the reported case study required weighing any benefits and risks related to the use of this data set. The benefits included maximizing the value of prior researcher investment in data collection, while minimizing the burden to respondents (Cohen et al., 2018). Two ethical risks were considered prior to the use of the mixed secondary data for analysis in my study: (a) reidentification of participants as students; and (b) possible disclosure of sensitive information.

To manage these risks in my descriptive case study, appropriate permissions were sought from the hosting university to use the mixed secondary data for analysis. It was

important to establish evidence that appropriate REB approval was obtained prior to conducting the study with these human participants. Considering my overlapping roles as researcher of the study and course co-instructor at the hosting university, data were anonymized by a hired research assistant prior to sharing it. Participation was voluntary and informed with evidence of consents obtained by the research assistant prior to the collection of any data from respondents. Additionally, provisions were made in the consent form to disclose to participants the later use of their data for my dissertation studies as described in this study. REB approval was obtained on September 23, 2020, at the hosting university prior to the research assistant collecting any data (see Appendix A). Risks were also mitigated during the data collection process by limiting study specific interactions between learners and me as the researcher and co-instructor throughout the fall 2020 semester. Approval from the REB at Athabasca University was obtained on September 23, 2021, prior to beginning the study and analysis (see Appendix B). After appropriate ethical approvals were obtained, an analysis of the mixed secondary data began.

Analyzing Mixed Secondary Data

A convergent mixed methods approach was used to analyze the anonymized mixed secondary data from the course, or case for the study (Creswell & Plano Clark, 2018). This analysis strategy was selected primarily to bring the results of both quantitative and qualitative data collection together, to compare the two findings with the intent of obtaining a more complex understanding of the case subunits or learners, and as a means of validating these results with each other to determine if participants responded in a similar manner. A convergent mixed methods analysis was also suited to the preliminary case study design used and my philosophical assumptions. Multiple sources of evidence,

supplement the richness of findings and answer to the research question posed (Creswell & Plano Clark, 2018).

The mixed secondary findings from both qualitative and quantitative data were analyzed separately, each using slightly different approaches described in the next section, then merged to gain an extensive understanding of the problem and insight into the research question posed. The intent of this integration was to provide more comprehensive results that optimize a researcher's ability to confirm or validate the findings. Secondary qualitative and quantitative data collected were prioritized, or weighted equally, when analyzing the findings despite the differences in sample sizes and questions.

After completion of each separate analysis, a comparison of the two databases was conducted to look for common concepts or themes across both sets of findings. A joint display table of the highlights from the two sets of data was developed including subjective evidence, to compare qualitative and quantitative result highlights for each concept or construct identified from the information (Creswell & Plano Clark, 2018). An interpretation of the findings began once this was complete, further considering any validating and invalidating results that were directed at answering the research question posed. To conduct this analysis, specific steps for both quantitative and qualitative processes were in place.

Survey Questionnaire

To analyze the quantitative data from the ITSI-S questionnaire (Gawronski et al., 2016), a numeric value was assigned to each anonymous response on an Excel sheet, prior to using simple descriptive means and standard deviations functions within the Excel software to calculate the results. A visual inspection of the data was conducted initially to

gain a sense of the distribution of findings (Creswell & Plano Clark, 2018). The information was checked for any data entry errors or other problematic issues and incomplete data was removed as needed. Sixty-two respondents (n=62) initiated the ITSI-S survey through Qualtrics, which was managed by the research assistant. Twenty-two (n=22) were removed as all survey questions about the course were left completely blank. From this total, fourteen (n=14) participants provided consent and did not respond to any other questions, seven (n=7) did not provide consent or respond to the questions, and one (n=1) respondent completed the demographic questions but did not answer anything else. Therefore, forty (n= 40) or approximately 65% of the respondents completed all or most questions. From these forty submissions, 13 participants missed answering one or more of the questions and 39 learners entered the draw for the gift certificate. The forty completed surveys (n=40) were used for analysis, with any missing question ratings left blank and not imputed for the calculation of mean and standard deviation scores.

A codebook using the ITSI-S three segments (BUI, EIA, and EIC) and six constructs (accommodations, accessible course materials, course modifications, inclusive lecture strategies, inclusive classroom, and inclusive assessment) was developed in a Word document. Mean scores and standard deviations for each of the three tool segments and six constructs for the BUI and EIA segments were calculated using simple descriptive statistics functions in the Excel software. The mean scores with standard deviations of each of the six survey constructs for the BUI and EIA are summarized in the text of the study report and compared to the qualitative data obtained (Creswell & Plano Clark, 2018). Each of the three survey segment means were compared to each other and the constructs where applicable to establish any connections. Demographic information obtained were not

further compared to determine whether any links were evident in the results, as it was not relevant to the nature of the research question posed and descriptive focus of the study. An independent recalculation of the descriptive statistics was conducted by the co-coder, then compared with my results to ensure the accuracy of data tabulation prior to analysis (see Appendix E). Once completed, the qualitative focus group interview data were analyzed to establish emergent themes from the participant voices of their experiences.

Focus Group Interview

A systematic content analysis approach developed by Creswell and Plano Clark (2018) was used to identify themes and analyze the data obtained through the focus group interviews held. The data was read through to gain an overall sense of the information collected. Preliminary thoughts were noted in bullet point format on paper, prior to establishing codes of these themes in a word document (Creswell & Plano Clark, 2018).

Each instructional strategy was used to guide this preliminary categorization. Data from the focus group was initially highlighted on a print document, according to the instructional strategies used in the course or case studied. Each instructional strategy was highlighted in a different colour to provide visual evidence of their reoccurrence in the paper document of these transcripts, then further classified into positive, negative, and suggestion comments to aid in comparison. Transcript data were coded and associated with the most appropriate instructional strategy using the comments feature in the Word document and checked by the co-coder prior to grouping similar information (Creswell & Plano Clark, 2018). A codebook was established with these initial codes and subsequent groupings were developed and described based on identified themes as indicated by

counting the frequency of word or phrase occurrences from each participant in the transcript.

A table was created in word document using colour coded highlights obtained from positive and negative comments, with suggestions from the transcript to classify and compare findings. Interrelated categories or a smaller set of themes were established by conducting several iterations of this process until no new themes were identified (see Appendix F). Participant quotes are incorporated as evidence of qualitative data (Creswell & Plano Clark, 2018). The codebook of categories is included (see Appendix G) to present the key descriptions and themes identified from the focus group data and guide the reporting of the analysis. Major findings were summarized, and results described in terms of answering the research question posed and in relation to the UDL- based instructional strategies, which supports inclusive educational approaches.

Delimitations

The scope of this descriptive case study included a mixed secondary data set that was obtained from an original study of students who were enrolled in the fall 2020 online offering of a first-year course of the BScN degree program at a single university in Ontario, Canada. The descriptive case study design, aim, research question, and UDL theoretical framework adopted as the basis for the study further delimited the focus of this research.

Summary

In Chapter 3, the research methodology including my philosophical assumptions underpinning the study purpose and design, were identified. Specifying case boundaries, learner characteristics, secondary data collection methods, including the reliability,

validity, authenticity, and ethical consideration of research processes; served as a foundation for the analysis in this descriptive case study. Providing these important details also minimized threats to the results.

Chapter 4: Results

In Chapter 4, the results from the mixed secondary data set obtained are presented to establish the foundation for the convergent mixed methods analysis that I conducted. Quantitative ITSI-S survey questionnaire (Gawronski et al., 2016) and qualitative focus group interview data are described and presented in a table for comparison prior to an analysis and discussion of these findings. To answer the research question posed in the study the mean score results are organized using the ITSI-S six constructs and three segments as rated by respondents. Following this, qualitative focus group interview data categorized according to instructional strategies preferred by learners are described prior to a comparison of highlights in a table of the merged results. Co-instructor journal notes are not integrated into these findings.

ITSI-S Quantitative Findings

The ITSI-S questionnaire was used to gather information about the learners' attitudes and perceptions about the implementation of UDL-based principles into this large online course. This 80-item Likert scale survey aims to measure six constructs related to inclusive instructional practices that were developed based on UDL tenets (Gawronski et al., 2016). Quantitative data were analysed from forty (n= 40) of the sixty-two participants (n=62) who initiated the ITSI-S survey questionnaire. The mean scores (*M*) and corresponding standard deviations (*SD*) for each of the three tool segments and six constructs are included following a brief description of demographic information obtained.

Demographics

The forty (n=40) survey respondents were between 18 and 48 years of age. Eight respondents, or twenty percent, indicated having documentation of a disability; seven had

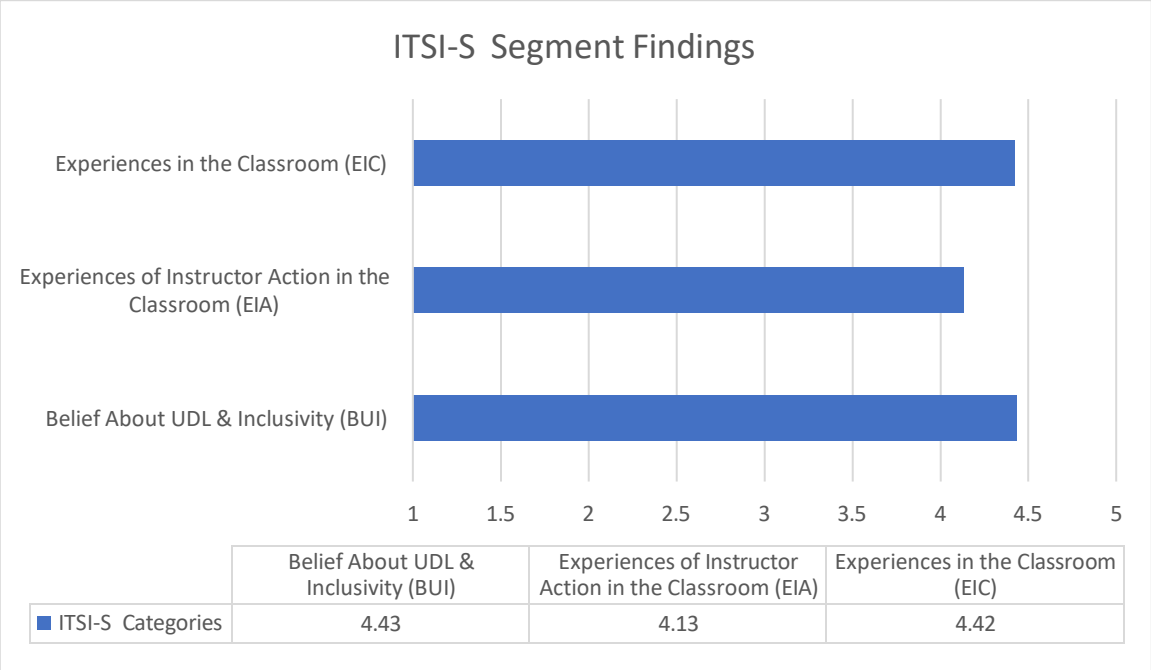
formally registered with the Student Accessibility Services (SAS) at the university. Of the total respondents, 23 identified as Caucasian (non-Hispanic); 12 as Asian/South Asian; one as multi-ethnic; one as other; one respondent refrained from responding, and one blank entry was noted. Most respondents (85%) identified as female in gender, five identified as male, with one participant who did not respond to this question. Data related to these characteristics were collected as part of the ITSI-S tool to minimize modifications made to the survey and collect data for future comparative research of specific variables.

ITSI-S Segments

The mean scores were calculated for each of the three ITSI-S tool segments student beliefs about UDL and inclusivity[attitudes] (BUI); student experiences of instructor actions in the classroom[actions] (EIA); and experiences in the classroom (EIC) (Gawronski et al., 2016). Each segment is based on a five-point Likert scale where 5 (*strongly agree* or *always*) is the most positive position and 1 (*strongly disagree* or *I don't know*) is the most negative response. The mean scores for each of the three segments fell between the 4 (*agree* or *most of the time*) and 5 (*strongly agree* or *always*) ratings: BUI (M = 4.43, SD = 0.39), EIA (M = 4.13, SD = 0.61), and EIC (M = 4.42, SD = 0.74) correspondingly (see Figure 7).

Figure 7

Inclusive Teaching Strategies Inventory-Student (ITSI-S) Segment Findings



BUI and EIA Segment Constructs

The BUI and EIA segments of the ITSI-S tool, include six constructs: accommodations, accessible course materials, course modifications, inclusive lecture strategies, inclusive classroom, and inclusive assessment (Gawronski et al., 2016). Accommodations is the first of the six ITSI-S constructs.

Accommodations

The accommodations construct consists of eight questions specific to student BUI; and EIA, related to permitting SWDD to use technologies to complete tests, and record class sessions (Gawronski et al., 2016). Also, questions about the instructor's willingness to provide SWDD with copies of lecture notes, outlines, overhead or PowerPoint

presentations are included. Three questions about the flexibility of exam response options, extended timelines, and due dates for students with documented disabilities were also considered. From these questions, students rated their BUI ($M = 4.59$, $SD = 0.51$) slightly higher than their EIA ($M = 4.39$, $SD = 0.77$), indicating that most learners *agreed* to *strongly agreed* that instructors were accommodating of varied learner needs *most of the time* to *always* in class. In addition to accommodations, accessible course materials, is the next construct identified.

Accessible Course Materials

The second ITSI-S construct is accessible course materials. This construct consists of four questions about the instructor's use of a course website, providing lecture notes, electronic versions of handouts, and flexibility in assignment submission options that support all students (Gawronski et al., 2016). Data specific to student BUI ($M = 4.56$, $SD = 0.45$) mirrored findings from the EIA ($M = 4.56$, $SD = 0.52$), demonstrating that learners *agreed* to *strongly agreed* that the course materials were made accessible by the instructor *most of the time* to *always* in the course. Further to the accessible course materials construct, course modifications was explored.

Course Modifications

Four questions are included in the course modifications construct of the ITSI-S tool that are specific to the attitudes and actions of instructors in permitting SWDD and SWODD to complete extra credit assignments and reduce their overall course reading load (Gawronski et al., 2016). Student BUI ($M = 3.51$, $SD = 0.97$), were noted as being slightly higher than the EIA responses for the same questions ($M = 3.20$, $SD = 1.42$). The mean scores of both BUI and EIA segment constructs received the lowest ratings in comparison

to the other five constructs. This signified that those participants *neither agreed* nor *disagreed* that instructors were providing learners with opportunities to complete extra credit assignments or decrease course reading load *sometimes* or *most of the time* in the class. In addition to course modifications data, findings from the inclusive lecture strategies construct were examined.

Inclusive Lecture Strategies

The inclusive lecture strategies construct includes four questions about the instructor's ability to offer an overview of key topics prior to class, repeat questions back before answering, begin with an outline of the topics to cover, and connect these with course objectives (Gawronski et al., 2016). Student BUI ($M = 4.73$, $SD = 0.46$) and EIA ($M = 4.41$, $SD = 0.69$) were similar, demonstrating that respondents *agreed* to *strongly agreed* that the lecture strategies offered were inclusive of diverse needs *most of the time* to *always* in the course. An inclusive classroom was the next construct rated by participants.

Inclusive Classroom

Nine questions in the inclusive classroom construct focus on establishing the instructors use of technology to present course material in a variety of formats and offer alternative format options. Questions about the instructors' use of interactive technology to facilitate communication and engagement through small group, peer assisted, and hands-on activities were also included (Gawronski et al., 2016). Inquiry into the instructor's ability to anticipate physical barriers and reach out to SWDD to discuss any individual learning needs was also sought. Respondents' BUI mean score **(**$M = 4.64$, $SD = 0.40$) aligned with similar actions that were being conducted by instructors in class or EIA ($M = 4.07$, $SD = 0.78$). These findings suggest that learners *agreed* to *strongly agreed* that the classroom

actions used by instructors were inclusive *most of the time* to *always,* and slightly lower than the mean score for BUI. The inclusive assessment construct is the last that was rated by respondents.

Inclusive Assessment

The final construct, inclusive assessment, consists of four questions about whether the instructor allowed all students to demonstrate knowledge in ways other than traditional tests; express knowledge in multiple ways and provide flexibility in response options (Gawronski et al., 2016). The mean of student BUI (M =4.56, SD = 0.45) was slightly greater than student EIA (M = 4.18, SD = 0.78), demonstrating learner agreement that both actions and attitudes aligned with the use of inclusive assessment strategies in the course. While data from these six constructs are essential to understanding the BUI and EIA tool segments, the EIC findings are described separate from the other tool segments as the nature of questions are not further categorized into constructs.

Experience In-Class Segment

The last 14 questions of the ITSI-S survey represent the EIC segment of the tool (Gawronski et al., 2016). While the survey was initially intended for use in an in-person place-based course delivery format, these questions were used to collect data from learners in this remote offering of the class. Three questions are focused on capturing whether the instructor presented information in multiple formats, identified expectations that were consistent with learning objectives, and provided a detailed descriptive syllabus for all learners in the course. The next question sought to establish if participants felt the material was accessible, organized clearly, and easy to use. The learner's experience of assignment feedback, expression of knowledge comprehension, meaningfulness, and level of challenge

were captured by four different survey questions, including their motivation to learn. Inquiry into establishing whether learners were able to grasp key points from any instructional videos posted by the instructors and if lectures or readings were supplemented with visual aids, was also obtained from participants. Finally, the four questions sought to determine whether instructors offered flexible contact formats, were approachable, available, and supported a class climate that respected learner diversity, further exploring the importance and connection of content to real-world topics with students (Gawronski et al., 2016). Overall, the EIC mean score (M = 4.42, SD = 0.74) for this segment indicates that respondents *agreed* to *strongly agreed* that these qualities were being offered *most of the time* to *always* in the classroom or virtual class in this case.

To summarize, the quantitative findings from each of the six ITSI-S constructs in the BUI (M = 4.43; SD = 0.46) segment of the tool are listed as rated by participants in descending order of mean scores, with all results falling between the 3 (*neither agree* nor *disagree*) and 5 (*strongly agree*) ratings. Five of the six construct findings had mean scores between 4 (*agree*) and 5 (*strongly agree*). These constructs were: inclusive lecture strategy (M = 4.73; SD = 0.46), inclusive classroom (M = 4.64; SD = 0.40), accommodations (M = 4.59; SD = 0.51), accessible course material (M = 4.56; SD = 0.45), and inclusive assessment (M = 4.56; SD = 0.49). The course modifications mean score was the only construct that was rated by respondents between the 3 (*neither agree nor disagree*) (M = 3.51: SD = 0.97) and 4 (*agree*) classifications of the scale.

Additionally, the EIA (M = 4.13, SD = 0.61) segment constructs are listed in descending order of preference as rated by participants. Five of the six construct mean scores were rated between 4 (*most of the time*) and 5 (*always*) ratings. Accessible course

material (*M* = 4.56; *SD* = 0.52), inclusive lecture strategy (*M* = 4.41; *SD* = 0.69), accommodations, (*M* = 4.39; *SD* = 0.77), inclusive assessment (*M* = 4.18; *SD* = 0.78), and inclusive classroom (*M* = 4.07; *SD* = 0.40) constructs fell in this ranking. The mean score for course modifications (*M* = 3.20; *SD* = 1.42) was rated lowest of all the constructs as occurring between 3 (*sometimes*) and 4 (*most of the time*) by respondents. The quantitative ITSI-S survey provided an opportunity for learners to rate their beliefs about UDL and inclusivity, and experiences with the inclusivity of the course and instructor actions. Qualitative focus group interview data was also obtained for the study to provide an in-depth explanation of the participant voices.

Focus Group Interview

At the end of the fall 2020 course offering, all students were invited to participate in a one-hour focus group interview, held through an online Zoom session by a research assistant, following consent. A total of seven (n=7) students participated in the focus group interview from the ten who originally registered. Demographics were not obtained from this group of respondents considering the descriptive scope of research and need to maintain confidentiality of learner identity. Participants were asked a total of eight questions to capture the learners' overall experiences with the UDL-based instructional strategies used in the course. Learners were prompted to elaborate on the methods that were most and least beneficial to learning.

Input about student preferences for a seminar-based assignment such as the group project over a final exam with traditional multiple-choice questions was also obtained. Feedback about the value of technology used in the course was gathered and learners were asked to elaborate on how they knew if they had understood a course concept or idea.

Focus group participants were asked to share any prior experiences with being able to select the method of presenting information learned in a course for an assignment and whether their peers or classmates influenced their academic performance. Finally, respondents were asked for any suggestions for improvement in the course.

Using a systematic thematic analysis approach (Creswell & Plano Clarke, 2018), key participant comments were identified from the data reviewed and classified according to instructional strategy categories. These included:

- assessment,
- instructor presence,
- UDL course design,
- synchronous and asynchronous activities,
- unit activities,
- weekly units,
- written essay with flex time,
- seminar activities,
- Elsevier Adaptive Quizzing (EAQ) modules,
- technology use,
- group project, and
- formative review.

To gain a better understanding of instructional approach preferences, data within each instructional strategy category were further classified as a positive, negative, or suggestion comment, to identify frequency, patterns, and trends among the data. Assessment methods were perceived as primarily positive among learners in the focus group.

Assessment Methods

Six of the seven focus group participants commented favourably on the assessment methods used in the course, one negative response, and no suggestions were received. A few of the focus group participants, including student "D" described appreciating having the group project over a formal final examination. Furthermore, the option of having multiple smaller assignments were seen as a "confidence booster, you know you're getting marks as you're going along, and they do add up." Student "A" described the group presentation as "a really fun project" and believed "it was a good idea for practicing the skills." Offering a variety of different assignments was valued by other respondents such as participant "A" who claimed being unsuccessful in the past with multiple-choice based testing. The learner further explained that offering a variety of assignments for learner assessment tested "your knowledge in different ways rather than your ability to take a test." Student "B" appreciated "the different types of evaluation used in the course." A few respondents, such as student "G" favourably remarked on the benefits of providing rubrics by instructors for the assignments before submission, "so we knew what to do to get marks."

However, contrary to these positive comments, one learner described not having any choices related to the course assessments. In addition to the assessment methods category, instructor presence was another instructional strategy used in the course.

Instructor Presence

Four of the seven focus group interview participants positively commented on various aspects of instructor support offered throughout the course. No negative remarks or suggestions were identified in the focus group transcript. All comments about the co-

instructors were positive and described them as being knowledgeable, supportive, approachable, caring, hardworking, truthful, reliable, and as stated by participant "E" most prominently "on top of their communication." In addition to providing thorough feedback on assignments, frequent and prompt communication were highlighted as positive in several focus group remarks. For example, certain responses were related to the ease of being able to contact and get a quick response from co-instructors. Other participants, including student "E" stated that the co-instructors "always responded to my e-mails even on the weekend, they would respond within 24 hours." Respondent "F" further described that when emailed "late one Friday night… the instructor responded within 20 minutes." Participant "D" felt that the co-instructors were "really checking in" on students and were "a huge priority for them." Similarly, student "E" remarked that the co-instructors "actually cared that we learned the information." A couple of learners described co-instructors as modelling the professional qualities of future nurses that were being taught in the course, "D" stating "we learned about characteristics of nurses…these two professors showed that to us as teachers, instead of just reading it." Further to this praise of instructor presence, several key UDL-based course design elements used in the course were positively described by learners.

UDL-based Course Design Elements

Four of the seven focus group participants commented in support of the variety of UDL-based teaching and learning strategies used in the course. Only one negative response was obtained, with one suggestion made about this strategy. Participants commented positively about the diversity and flexibility of instructional strategies used in better facilitating their learning, especially through application-based approaches in a risk-free

environment. Student "E" appreciated "not just being tested the whole time and being able to interact with people," elaborating that the use of multiple learning strategies "actually facilitated learning much better."

In contrast, one participant described preferring a different course format. Another respondent suggested sharing this course with other nursing instructors, as an example of best practice. As part of the curriculum design, both synchronous and asynchronous methods were integrated into the course by co-instructors.

Synchronous and Asynchronous Formats

Three focus group participants specifically commented on synchronous and or asynchronous techniques used in the course. From these segments, all three were identified by respondents as positive and no negative comments or suggestions were received. For example, participant "G" appreciated the various learning activities that were integrated into the course design by instructors specifying "that it was not all synchronous," and "really appreciated it being asynchronous," as it permitted the learner to work at their "own pace," after putting their son to bed. Student "D" claimed it was "… the only course where our teachers catered welcome meet and greet for classmates," and described it as important in establishing connections with classmates, particularly in a fully online environment. Being able to ask questions during synchronous time and office hours were also appreciated by learners who had trouble understanding the course content. Respondent "A" found it helpful to have the option "to go to an extra lecture with other students and talk to the professor directly to get more information." Both synchronous and asynchronous strategies were used to engage learners with the course material, peers, and instructors.

Unit activities offered a means for the asynchronous engagement of learners with the course content.

Unit Activities

Comparatively, completing asynchronous participation-based weekly unit activities offered learners the choice of selecting any five of the ten available activities that aligned with the content for that unit. An option to complete an additional two-unit activities throughout the semester as bonus points was offered to all learners. None of the comments were negative and no one offered any suggestions for improvement. However, three of the seven participants in the focus group responded positively about the unit activities. For example, student "C" appreciated having a choice of activities to complete because some weeks became "super busy," and "didn't have time to add that." Further to these unit activities, completing the written essay was another asynchronous learning approach that has been used for many years in the course. Flex time was added to the paper guidelines in 2019 to offer extended time for all learners to complete the assignment without having to ask for an extension or incur any penalties.

Written Essay With Flex Time

Two of the seven participants commented positively about the flex time associated with extended essay deadlines. No negative comments or suggestions were received about this instructional strategy, or assignment. Participant "D" described the flex time, or extended deadline as, "really great, …because it allowed everyone to have extra time." Respondent "F" who disclosed having a disability identified this "time flexibility," as most helpful to learning because despite a need, was never going to request accommodations from student services on campus. While traditional assignments such as the written essay

are essential to offer, weekly units were another source of asynchronous instruction used in the course design.

Weekly Units

Questions related to posting lecture notes were not applicable to the online format design of the twelve weekly units developed. Four students commented on the weekly unit format. Three of these were positive comments and one negative remark. No suggestions were put forward about the unit format. Student “B” found that “once you got into the course, the layout made sense.” This participant described an appreciation for the different learning activities and approaches used in the weekly units including the use of graphic organizers and other learning activities versus simply reading text as "it's more hands-on.” Respondent “G” expressed enjoying the highlights at the beginning of each unit with the inclusion of weekly learning objectives, so learners “knew what we need to focus on in our reading.” The variety of practice questions was appreciated by participant “D” as offering “lots of different ways to test our knowledge.” These weekly units offered an asynchronous means for learners to interact with the course material. Technology served as the ideal vehicle to supplement asynchronous methods with synchronous instructional strategies.

Technology Use

Four of the seven students commented about the use of different technology in the course. From the data, three positive and one negative comment were received with two suggestions for improvement. A few participants commented positively about the use of Zoom for synchronous remote meetings. Student “D” stated, “once we figured out how to use Zoom and the breakout rooms, we really utilized those attributes very well.” Frustration was noted by participant “B” because between all the other classes, “they all

used different quizzing platforms...it was confusing sometimes." Two suggestions to post Zoom instructions on the course Blackboard site were received and respondent "D" suggested the use of "Google docs and Google slides as helpful," when completing the group work versus the template developed for this purpose. Technology was essential in supporting both asynchronous and synchronous course activities, permitting an opportunity to integrate interaction into the seminar sessions that were held by co-instructors.

Seminar Activities

Five of the seven respondents commented on the seminar activities. Three commented positively, three were negative, and no suggestions were identified. Focus group respondents perceived the seminar activities as beneficial for discussing weekly highlights with the instructor and establishing the connection to the group project. These activities also prompted conversation among classmates in smaller groups and reconfirmed understanding or misunderstanding of the course concepts. For example, participant "D" appreciated that the instructor "would ask a question and you would come up with an answer - you may not answer it yourself, but you could see if your peers or if the professor gave the same rationale." A few students, valued this interaction with co-instructors as if offered "check-in moments," for learners and "helped to reassure … understanding the information." Participant "A" elaborated by stating "it helped to understand it from a different perspective because we were able to talk about it."

All negative comments about the seminar session activities were specific to the challenges in navigating or finding the weekly material, especially for the seminar activities and group work held during weeks six through eleven in the semester. Learner "G" described searching several different places where the course material was "located in

Blackboard, and …found it challenging to navigate." Student "B" similarly identified having trouble finding course content but specified "it was more for the seminars." Participant "D" had a similar opinion and found the organization of seminar content "a bit disjointed." The use of real time synchronous learning sessions supplemented the use of other asynchronous instructional strategies used in the course such as the EAQ software.

EAQ Software

Three positive and one negative comment were received from four of the seven focus group participants about the EAQ participation-based asynchronous modules that aligned with the textbook. Most of the participant comments were positive about the EAQ quizzes for participation versus real-time point deduction type questions. For example, student "D" stated, "I was learning, and by getting that feedback in the EAQs in real time…rationales behind them and then the test tip … really helpful." Participant "E" commented that "instructors don't always release answers to you," thus found the EAQs most helpful in "facilitating actual learning." This respondent expressed relief in being able to guess for unknown answers, and not be penalized when incorrect. Learner "E" elaborated that the correct answer and rationale were provided, which made it a "learning opportunity." Respondent "B" appreciated getting participation points, while also learning stuff," and the opportunity it provided to "really understand the material." Focus group participant "D" described the EAQ modules as helpful to applying "knowledge and reading the rationale helped to make sure," that responses matched their "personal selection of an answer." These quizzes offered this same respondent personal confirmation in the choice of the right answer, and further helped to confirm their "thinking process and understanding were correct. If it wasn't, it helped to know where in the textbook I needed

to go to revisit that concept." EAQ modules were further described as offering "good connection moments."

Participant "F" negatively commented on the EAQ participation modules. This student explained:

> "I'm a good test taker, I have zero test anxiety but honestly, whenever I would get a question wrong, I would panic and then kept getting them wrong because I was panicking. I was on Zoom with my friend for emotional support because he has super bad test anxiety and he says *I'm done*, so I asked how many questions …*ten questions,* but for me, all of my quizzes were 40 or 50 questions."

Completing participation based EAQ modules offered learners an asynchronous opportunity to interact with the course textbook and material. To enhance the course design and replace a multiple-choice based examination, a synchronous group project consisting of two parts, was integrated by co-instructors.

Group Project

All seven students commented on the group project assignment that included scaffolded synchronous group work, virtual group presentation, individual group process report, and a confidential peer feedback activity by each group member of another project presentation. Five of the seven participants offered both positive and negative input about parts A and B of the assignment, but none were specific to the individual group process report required for completion of part A. One learner negatively described the project, while another comment was positive, further offering a suggestion for improvement. Two other suggestions regarding this assignment were received.

Several learners described enjoying the bonds developed with peers for Part A of the group project presentation. Respondent "G" described the "ability to interact with fellow students as a really neat opportunity, especially during this pandemic where we are unable to meet in person." The respondent further stated that it was the "only opportunity" to get to know others in the class. Positive group experiences were described as based on collaboration, interaction, and a fair distribution of work among group members. Learner "A" identified preferring "the smaller groups," used for the seminar activities and group project, and "got along really well with everyone," elaborating on the benefits of making connections with other learners in the class. Focus group participant "G" identified having a "great group" that "shared the work well." Student "A" described "having pretty bad anxiety" and getting "very overwhelmed, and "found the final project being separated by weeks" in the seminars as very helpful. "Instead of forgetting about it," there was a specific time in class to work on it, completing "a little bit every week instead of one big thing at the end." The assignment was appreciated by student "F" for supporting essential and practical skills that are required in nursing, "where teamwork is so important," to professional practice. The group project required the application of the course concepts being learned and was appreciated by a few students over completing a final exam with multiple-choice questions.

Other respondents, such as participant "F" shared negative experiences about the group work and discussed feeling frustrated having to "complete most of the work," for classmates in the group. Similarly, learner "E" stated completing, "most of the work," and found it "really frustrating," causing stress the week before the presentation was due as "no one was responding." This participant described the experience as "very stressful and

anxiety producing," negatively impacting their mental health and resulting in having "to take a few days off after the project to recover." A couple of students, including participant "A" commented negatively on the overall weighting of the group project, which was 15% of the final mark, and having "to rely so heavily on other people."

Mixed feelings were expressed by participants about Part B, or the peer feedback portion of the group assignment. Participant "D" enjoyed "marking other projects …because we usually cannot see what our peers produce and helped me to see what kind of mark my group might get on the assignment;" however, acknowledged that providing feedback is an "important skill, even though it feels uncomfortable." Respondent "B" expressed appreciating marking other projects but compared themselves "to others." Student "A" welcomed being able to see other group projects and having a choice in the selection of group to evaluate for Part B of the group work, "as you kind of knew of the person."

Respondent "C" felt bad marking other people's projects, comparing the quality of their own group presentation submitted to others, and found trying to find a flaw as "very stressful." Two suggestions were received, including the option of submitting an individual versus group project presentation. One idea from student "D" involved trying to establish a "way to format it a little easier…having it in one," template or document e.g., Google Docs as described earlier in this chapter. Further to this group project, an individual synchronous formative review of the content was offered during week nine of the semester.

Formative Review

Only two of the focus group participants offered comments about the midterm exam, or formative review; one was positive, and the other negative, with one learner

offering a suggestion for improvement. Respondent "F" believed the questions asked were vital to nursing and "what we should be learning." However, participant "A" struggled with the formative review, and experienced issues completing short answer questions stating, "my brain just stops… I was mixing up all the questions and having issues understanding them." This learner elaborated that completing short answer questions was not their strength in testing and suggested offering "different types of questions" on the formative review, instead of "all short answer." In addition to the course assessment methods used, instructor presence was described as a supportive instructional strategy by focus group participants.

From these instructional strategy classifications, learner preferences were established by counting the frequency of positive and negative comments or phrases made by each focus group participant, then entered into a table for easier comparison and establishment of trends and themes (see Appendix F). Assessment methods, instructor presence, UDL-based course design, unit activities, weekly units, EAQ software, technology use, written essay with flex time, seminar activities, group project, and formative review were the preferences identified by learners. To best compare the findings, both ITSI-S survey and focus group interview highlights were merged into Table 5 and demonstrate areas of similarity and differences noted.

Merging Results

Despite the differences between the survey tool and focus group interview questions, highlights from both are included in Table 5 to compare content and demonstrate areas of convergence and divergence within these findings. While the focus group interview questions were not based solely on inclusivity, matching qualitative data with the ITSI-S

three segments and six construct findings will help establish inclusivity of diverse learner needs through comparison. Considering the ITSI-S survey development was based on UDL principles, a connection to these will also be implied as a result.

Table 5

Comparison of ITSI-S and Focus Group Highlights: Areas of Convergence and Divergence

ITSI-S Segments & Constructs	Convergence of Focus Group Quotations	Divergence of Focus Group Quotations
Accessible Course Materials BUI (M = 4.56; SD = 0.45) EIA (M = 4.56; SD = 0.52) o use a course website o put lecture notes online for ALL students o post electronic versions of course handouts o allow students flexibility in submitting assignments	(Student E) "Most helpful in the course was the option to do the adaptive quizzing, instead of a quiz that has like ten questions, and you do it and you either get it wrong or you don't. Oftentimes, when you have quizzes like that, they don't always release answers to you either, so kind of going back to what I was saying about facilitating actual learning - I found that by having the questions and say I didn't know the answer, well I could still guess but I wouldn't be penalized for it, and then it would tell me the answer and why whatever answer was correct. I could make a learning opportunity of that and didn't really suffer in any way"	(Student G) "Finding the material was a bit challenging, especially seminars"
Inclusive Lecture Strategies BUI (M = 4.73; SD = 0.46) attitudes EIA (M = 4.41; SD = 0.69) actions o repeat the question back to the class before answering o begin each class session with an outline/agenda of topics covered o summarize key points o connect key points with larger course objectives during class sessions	(Student G) "I really enjoyed the summary at the beginning, the learning objectives, so that we knew what we need to focus on in our readings, so when you go through the readings, you can fill in the blanks" (Student A) "Seminars because not only were we working on the projects during the seminars, but before we split into our groups, we would talk about the unit for the week and how that relates to the project"	
Accommodations	(Student F) "Personally, I found that the time flexibility to be the	

ITSI-S Segments & Constructs	Convergence of Focus Group Quotations	Divergence of Focus Group Quotations
BUI (*M* = 4.59; *SD* = 0.51) attitudes EIA (*M* = 4.39; *SD* = 0.77) actions o allow students with documented disabilities to use technology to complete tests even when such technologies are not permitted for use by students without disabilities o provide copies of lecture notes or outlines to SWDD o allow flexible response options on exams for SWDD o allow SWDD to digitally record (audio or visual) class sessions o make individual accommodations for SWDD o arrange extended time on exams, due dates of assignments to accommodate the needs of SWDD	most helpful. Kind of a funny story and kind of tragic, I have diagnosed GAD and so I want to go to student accessibility services and be like hello, can I have extra time, unfortunately, I'm too anxious to do that, so I haven't done it, so the fact that - I think they did the same in my psych class - where we had extra time for things just put into it was really helpful for me personally because I knew I'm never contacting SAS. It's not going to happen, so I found that was pretty helpful"	
Inclusive Classroom BUI (*M* = 4.64; *SD* = 0.40) EIA (*M* = 4.07; *SD* = 0.40) o use technology so that course material can be available in a variety of formats o use interactive technology to facilitate class communication and participation o present course information in multiple formats o create multiple opportunities for engagement o survey the classroom in advance to	(Student B) "Actual lectures or each of the modules, I did appreciate the different styles that they had like the graphic organizers where you click on it to get the definitions and the definition of dragging stuff over, not just simply reading the definitions like oh I guess I get that now. You actually - it's more hands-on" (Student F) "There are a few peers that I have become friends with that I check in with regularly and I find that to be helpful. I found it helpful to collaborate with people in my group, but also people outside of my group"	(Student A) "…group project that I was struggling with, my group was great, but just everyone has different schedules and stuff" (Student E) "I think it's a lot different because everything is virtual, so I mostly spoke to my peers through the group project. I did not have a positive experience; it was very stressful and there was a lot of anxiety. I had to take a few days off after the project. It threw my mental health out of the window"

ITSI-S Segments & Constructs	Convergence of Focus Group Quotations	Divergence of Focus Group Quotations
anticipate any physical barriers ○ include a statement in the syllabus inviting SWDD to discuss their needs with them ○ make a verbal statement in class inviting SWDD to discuss their needs with them ○ use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities ○ supplement class sessions and reading assignments with visual aids	(Student E) “I found though that the seminars were a good way to interact with your peers, but it gets very stressful when it's marked, so when the seminars are participation-based and that is how you are interacting with your peers, I think that that is very positive and that's a good way to work on teamwork in a less stressful way. Maybe it would be different if it wasn't all online” (Student B) “I'm in a group chat with some other compressed students and in general, I found that to be very helpful. It was helpful to clarify deadlines for NARs and those kinds of things, but also a lot of them share their frustrations on there and then it consumes the group chat sometimes. It is kind of conflicting. I did connect with some peers and messaged them one-on-one, so it was helpful to have a smaller group that you are closer with”	
Inclusive Assessment BUI (M = 4.56; SD = 0.49) EIA (M = 4.18; SD =0.78) ○ allow students to demonstrate knowledge and skills in ways other than traditional tests and exams ○ allow students to express knowledge in multiple ways ○ be flexible with assignment deadlines in my course(s) for ANY student ○ allow flexible response options on exams (e.g., change from written to oral) for ANY student	(Student E) "not just being tested the whole time and being able to interact with people and just have different ways to learn actually facilitated learning much better” (Student A) “going through the modules, I thought there were lots of different ways to test our knowledge like practice questions, videos, and I also like the music videos and every week, have never had the opportunity to do that. I know that in the group project, we had the opportunity to do a website, video, podcast, slideshow - I have always been told what media to use or the way I needed to present it” (Student D) “I have never had the opportunity to do that. I know that	(Student C) “…this group's (project) was so much better than my group." I was just trying to find a flaw and it was very stressful. I did not like marking another group's project” (Student F) “Final assessment that replaced the exam, it was really frustrating because I was the one who did most of the work because that's the person I am” (Student A) “…change would be the final group project. That's because it was worth so much and so have to rely so heavily on other people” (Student C) “I didn't find the opportunity to do this” [no choices for assignments]

ITSI-S Segments & Constructs	Convergence of Focus Group Quotations	Divergence of Focus Group Quotations
	in the group project, we had the opportunity to do a website, video, podcast, slideshow - I have always been told what media to use or the way I needed to present it, so it was nice to have that flexibility" (Student E) "I also never had that opportunity in my university career. I remember back in public school; they would give you a list of ways you could present the assignment and you could pick from the list" (Student D) "… the extended deadline, I think that was really great…" (Student A) "great group, so we all shared the work well. it's a crap shoot…" (Student C) "I like the rubric - rubrics always help and it makes it a lot easier to tackle an assignment or project" (Student G) "I just really appreciate that there wasn't a final exam. I really appreciated the rubric, so we knew what to do to get marks, and working on the essay and the group project" (Student G) "I like the various learning styles, that they catered to you and that it was not synchronous. I really appreciated it being asynchronous so that I could work at my own pace like after my son goes to bed, I can do other stuff" (Student A) "I thought that it was my favourite class partially because of that. I have never been someone who tests very well, so since the format wasn't just do all these multiple-choice questions and tests and that's what makes up your grade, it was very helpful for	(Student A) "formative review had too many short answers… difficulty understanding questions"

ITSI-S Segments & Constructs	Convergence of Focus Group Quotations	Divergence of Focus Group Quotations
	me to keep my grade where I wanted it to be, especially with the online aspect of it too. I didn't like having to only rely on quizzes because I do much better on assignments"	
Course Modifications BUI (M = 3.51; SD = 0.97) EIA (M = 3.20; SD = 1.42) o allow a SWDD to complete extra credit assignments o reduce the overall course reading load for SWDD even when the instructor would not allow for another o reduce the course reading load for ANY student o allow ANY student to complete extra credit assignment	(Student C) "I really enjoyed and what I appreciated most of all was for the weekly activities, when they said there are 7 of them, but you only have to do 5. I really liked that because some of the weeks just got super busy" (Student E) Unit activities… "you didn't get to choose how to do each one, but you got to choose which ones you did and how you got the marks"	
Experience In Class (EIC) (M = 4.42, SD = 0.74) o instructor presents information in multiple formats o instructor's expectations are consistent with the learning objectives o course syllabus clearly describes the content and expectations of the course, o I can grasp the key points from instructional videos for this class o I find that course materials are accessible, clearly organized and easy to use. o Students are allowed to express their comprehension of material in ways	(Student D) "I really like how they did a presentation on themselves with a personal picture and everything. It was an introduction of their professional self, but also their personal self, hobbies and what makes them a human being. I felt like I was learning from a human being made me feel good. It made me feel like I made the right decision to come to this university" (Student D) "…feedback on our assignments, that was very thorough" (Student D) "…professor sending us exactly what was going on that week. It felt like they were really checking in and that we were a huge priority for them" (Student G) "…appreciated the rubric, so we knew what to do to get marks"	

ITSI-S Segments & Constructs	Convergence of Focus Group Quotations	Divergence of Focus Group Quotations
besides traditional tests and exams o I receive prompt and instructive feedback o I feel interested and motivated to learn o I feel challenged with meaningful assignments o instructor offers contact with students outside of class time in flexible formats o instructor explains real-world importance of the topics covered in this course o instructor creates a class climate which student diversity is respected o instructor is highly approachable and available o course supplements lecture and reading assignments with visual aids	(Student A) "…thought the optional office hours very useful. I found that some weeks, I had more trouble understanding the information and being able to have that option to go to an extra lecture with other students and talk to the professor directly to get more information was really helpful" (Student E) "They were so easy to get a hold of and always responded to my e-mails. Even on the weekend, they would respond within 24 hours, which with other professors, I was waiting over one week" (Student D) "We learned all about the characteristics of nurses and I felt that these two professors showed that to us as teachers, instead of just reading it in a textbook" (Student F) "Never attended them, but I know that there were office hours. Our professors in this course were very helpful"	

Summary

In Chapter 4, the results from the mixed secondary data set obtained were described individually prior to merging in a table format for comparison of quantitative ITSI-S survey questionnaire and qualitative focus group interview quotations to best answer the research question. The results were organized according to the ITSI-S three segments and six construct findings and followed by highlights from the qualitative focus group interview data that was grouped according to key UDL-based instructional strategies used in the course to describe the experiences of participants. The mean scores and standard deviations for each of the ITSI-S tools three segments and six constructs were included to

establish any similarities, differences, and connections to the qualitative data in addressing the research question posed. While study results are essential to obtain, this data lacks significance without further researcher analysis and interpretation.

Chapter 5 Discussion

Chapter 5 offers a discussion about the convergent mixed methods analysis that I conducted with the results of the research study and established any connection to the scholarly literature reviewed and the research question posed. Determining whether there was any convergence and divergence of this information was central to this process, further identifying any evidence that builds on previous research findings. The ITSI-S six constructs and three segment results were merged within the instructional strategy categories established for the qualitative data coding, as it best answered the research question. These results are supplemented with my journal notes of the course highlights as the co-instructor to gain a more comprehensive understanding of the case studied and instructional strategies experienced as most and least beneficial by learners. Additional themes that emerged from these principal classifications are described, identifying similar or disconfirming data from the findings and substantiated with evidence from the literature.

Discussion

The purpose of this research was to examine how learners rated and described the effectiveness of instructional strategies used in a large first-year BScN course based on UDL principles, in supporting inclusivity of diverse learning preferences and needs in an online environment. All mean scores from the quantitative findings varied between the three ITSI-S tool segments and six constructs. However, this data indicated learner ratings ranging from *neither agree* nor *disagree,* or *sometimes* to *most of the time* as the lowest and *strongly agree,* or *always* as the highest scale ratings (Gawronski et al., 2016). These quantitative results were compared within the primary qualitative instructional strategy categories identified in Chapter 4 to establish any connection to inclusivity, UDL

principles, and instructional strategies used in the course, to distill the meaning of these findings.

Instructional Strategies

Learner preferences and ratings of the UDL-based instructional strategies used in the course were essential to the analysis of the findings. Participant responses are described in descending order of preference based on the merging of quantitative survey mean score ratings and qualitative focus group comments about the instructional strategies used in the online course. These preferences included assessment methods, instructor presence, UDL-based course design elements, synchronous and asynchronous formats, unit activities, weekly units, EAQ software, technology use, written essay with flex time, seminar activities, group project, and formative review. Journal notes are integrated into these classifications to elaborate on interesting instructor notation. Within each of these instructional strategy categories, the convergence and divergence of the results are discussed, with supporting or disconfirming evidence from the literature.

Assessment Methods

Assessment methods in the course included the option of obtaining marks for active participation both individually and in smaller group activities. In addition to participation, a written essay, formative review, and group project presentation with feedback were also used as other forms of learner assessment. Areas of convergence and divergence were identified from an analysis of both quantitative ITSI-S survey and qualitative focus group research findings.

Quantitative findings from the ITSI-S inclusive assessment and accommodation constructs of both the BUI and EIA tool segments were positively rated by respondents as

being implemented *most of the time* to *always* by instructors (Gawronski et al., 2016). Questions related to inclusive assessment attempted to establish whether the co-instructors permitted all learners an opportunity to demonstrate knowledge and skills in ways other than traditional tests and offered flexibility in response options and deadlines. Quantitative results from the ITSI-S tool rated inclusive assessment mean scores as fourth for the EIA and fifth of the BUI six constructs in each segment.

The accommodations construct included questions related to whether co-instructors allowed learners to record class and use technology to complete tests (Gawronski et al., 2016). Questions about offering copies of lecture notes, outlines, PowerPoints, and extended timelines to learners as needed were also included. The mean scores of the accommodations construct of the tool were rated third highest for both EIA and BUI segments. Findings from both segments indicate that learners *agreed* to *strongly agreed* that instructors were using inclusive assessment and accommodation strategies *most of the time* to *always* in class. Qualitative interview data analyzed confirmed similar trends.

An analysis of the qualitative focus group data clearly established the variety, flexibility, multiple means of action and expression, use of smaller assignments, clarity of expectations such as rubrics, and use of extended timelines for assignments, as most helpful to learners. Offering a variety and flexibility of choices for assignments were positively rated and described by most respondents. Encouraging comments were received by participants about approaches that supported flexible and diverse options to express an understanding of the content and successful achievement of course objectives. These findings were analogous to previous studies that described student appreciation of incorporating multiple means of action and expression into the course (Boothe et al., 2020;

Celestini et al., 2021; Davis et al., 2013; Dell et al., 2015; Dickinson, 2018; Kumar & Wideman, 2014; McCarthy, & Butler, 2019; Paul & Behjat; 2021). In other research, respondents appreciated having a project or assignment, rather than a final examination (Boothe et al., 2020; Celestini et al., 2021).

Learners expressed support for the assessment strategies used in the course, particularly the variety of opportunities to achieve percentage points throughout the semester via smaller assignments. Consistent with the findings in the literature, both SWDD and SWODD appreciated an equal opportunity to learn and express themselves through multiple assignments that were not weighted as heavily in the final course grade (Black et al., 2015; Fidelak & Rodier, 2021; Fidelak & van Tol, 2021; Rao et al., 2015).

Rubrics were also highly rated by respondents as helping to support their understanding of assignment requirements. The use of rubrics for assignments were appreciated by learners to minimize stress related to guessing course and assignment expectations. Kennette and Wilson (2019) highlight the significance of developing and sharing rubrics with clear guidelines for all assignments for learners. Other research supports similar findings and the importance of providing these recommendations ahead of the due date for students (Aparicio-Ting & Kurz, 2021; Celestini et al., 2021; Din, 2021; Fidelak & van Tol, 2021; Smith-Carrier et al., 2021).

Extended time for assignment submission, or flex time as it was termed in this course, was an instructional strategy that was praised for permitting a way to accommodate diverse learner needs such as childcare or work obligations. The use of extended timelines for assignments and for testing in higher education has been extensively described in the literature as appreciated, helpful, accommodating, and supportive of diverse learner needs,

abilities, and other life responsibilities (Celestini et al., 2021; Fidelak & van Tol, 2021; Jang 2021; Kennette & Wilson, 2019; Kumar & Wideman, 2014; Paul & Behjat, 2021). Most results converged on the preference of this approach, but one learner experienced the course assessment differently.

It is interesting to note that only one student expressed contradictory perceptions of not having any choice or options related to assessment methods in the course. It may be possible that the learner did not recall having the options to choose from ten, unit activities to complete, or the selections necessary for the project focus, course concepts to apply, and format to submit the assignment.

Multiple means of action and expression that offered choice, use of smaller assignments, rubrics, and flexibility of assessment methods and timelines were positively rated and described as the preferred instructional strategies by most participants. These research study findings are consistent with the latest literature in post-secondary education (Din, 2021; Fidelak & Rodier, 2021; Fidelak & van Tol, 2021; Tobin & Behling, 2018). While the importance of diverse assessment methods is obvious, instructor presence was also a vital part of learner satisfaction.

Instructor Presence

Instructor presence is an essential aspect of UDL based instructional and quality pedagogical practices. In an in-person place-based environment, the instructor's physical presence is typically known to learners, but in an online environment, it is crucial for the instructor to establish (Bloomberg, 2021). Convergence was noted in both quantitative and qualitative findings of the research.

Positive comments about the instructor were consistently evident in both quantitative and qualitative findings. Questions specific to the instructor practices were threaded throughout the quantitative ITSI-S survey findings but are most specific to the EIA segment of the tool, which was rated the lowest of the mean scores obtained from the three tool segments (Gawronski et al., 2016). However, despite being the lowest of the three segments, participants *agreed* to *strongly agreed* that these EIA principles were being implemented in the course by co-instructors *most of the time* to *always,* the most positive end of the Likert scale. Questions within this segment sought to establish whether the instructor presented content in multiple, accessible, and organized formats that were supplemented with detailed expectations identified in the syllabus and objectives. Additionally, questions about whether the co-instructors offered varied contact formats, were approachable, available, and supported a class climate that respected learner diversity, were included in this segment. Focus group participants also confirmed qualitative similarities regarding instructor presence.

Evidence exists supporting the value of instructor presence to learner satisfaction (Celestini et al., 2021; Din, 2021; Farrell, 2021; Kumar & Wideman, 2014). Instructor presence was perceived as the second most beneficial instructional strategy as described in the qualitative findings by learners. All responses about the co-instructors were positive and related to the value of accessibility, approachability, availability, interaction, communication, follow up, and feedback with learners.

Accessibility of instructors seemed vital to support learners in understanding the processes and expectations required to meet goals throughout the course. Instructor presence is particularly important in an online setting with such a large cohort of first-year

learners, as this distant delivery method may present potential barriers for interaction and engagement (Buckley et al., 2021; DesJardine & Hughson, 2021; Fidelak & van Tol, 2021; Rao, 2021; Tobin & Behling, 2018). Within the first year of post-secondary studies, it was important for co-instructors to extend support for learner success during this transition, by fostering a sense of agency, capacity, belonging, and engagement (Buckley et al., 2021; Farrell, 2021; Hitch et al., 2019).

In several previous studies, learners expressed an appreciation of the approachability of co-instructors and availability offered to meet outside of office hours as an inclusive environment for learners (Black et al., 2015; Fovet, 2021b; Jones, 2021; McGuire & Scott, 2006). A similar study highlighted the need for a variety of instructor interaction levels to support learners in post-secondary settings (Kennette & Wilson, 2019).

Learners also identified appreciating the availability to communicate outside of the scheduled lecture time with instructors as needed. Questions and emails were answered promptly by co-instructors to facilitate an understanding of course expectations and content. In a study by Fovet et al. (2021a) respondents explained being grateful for having access to varied instructor contact options and the quick response time of co-instructors.

Other respondents appreciated having synchronous meetings as an opportunity to interact, as in person lectures were not possible because of the pandemic situation. Reassurance in the understanding of the content and expectations for success in the course were supported through frequent communication techniques and noted as helpful to learners. Findings were also reported in the literature by students who described similar instructional strategies as conducive to learning (Black et al., 2014; 2015; Farrell, 2021;

Fidelak & van Tol, 2021). Frequency in announcement postings were essential to supporting interaction at various levels.

Considering the variety and number of assignments used in the course, integrating supportive communication techniques with the class were essential to making the content and expectations more accessible for all learners. Student participants in a study conducted by Kennette and Wilson (2019) reinforced the importance of regular communication between faculty and learners in encouraging motivation of their best efforts. Students with hidden documented disabilities similarly described being motivated to learn in an environment that fostered open communication and promoted a positive instructional climate (Black et al., 2015; Bradshaw, 2020; Griful-Freixenet et al., 2017; Harris et al., 2020; Lee et al., 2021).

To build trust in an online setting, instructors must prioritize communication and a commitment to making course expectations transparent to learners (Bloomberg, 2021; Harris et al., 2020; Rogers-Shaw et al., 2018; Tobin & Behling, 2018). Reliability in following through with promises helped to establish trust in the relationship between instructors and students, while also demonstrating key qualities of professional practice, such as required of registered nurses (Jones, 2021). Co-teaching provides an opportunity to demonstrate collaboration, offer two perspectives, while supporting powerful and engaging interactions with learners (Farrell, 2021). Co-instruction also offers a means to role model expected behaviour that are required in professional practice (Aparicio-Ting & Kurz, 2021; O'Shaughnessy, 2021).

Finally, learners commented on receiving extensive assignment feedback that offered direction for future improvements of course work. One participant similarly

expressed having an improved course experience because of instruction and appreciated the frequent feedback offered by co-instructors. These findings align with other studies that identified detailed and prompt instructor feedback as being helpful to learners (Jang 2021; Kennette & Wilson, 2019; Shelley et al., 2011; Smith-Carrier et al.,2021).

No indication of any divergence in this section was identified from the data. While not all learners required the same amount of instructor support, it is assumed that all need some form of guidance or direction in a new course to help understand expectations (Bloomberg, 2021; Reyes et al., 2022; Tobin & Behling, 2018). Following the importance of instructor presence, UDL-based course design was the instructional approach described as preferred next highest by participants.

UDL-based Course Design Elements

A variety of UDL-based elements were used within the course design classification to support inclusive educational practices. UDL-based course design elements for the purposes of this research encompassed responses related to the use of multiple formats to present course content, use of various learning opportunities, and realistic application of concepts or skills. While most focus group responses were positive, not all comments converged with these findings.

Positive learner feedback in both quantitative and qualitative findings helped establish this classification of instructional strategies as the third most popular method used in the course. The quantitative ITSI-S survey indicated that participants rated accessible course material for the EIA segment highest of the six constructs, and fourth for the BUI segment (Gawronski et al., 2016). Questions from this construct focused on capturing learners' experiences with the course website. Also, instructor specific questions related to

the posting of lecture notes and electronic versions of course material online for learners were included. Inquiry into the option of submitting assignments through various media tools e.g., email or drop box features were explored.

Focus group participants also recognized and embraced certain key UDL elements, such as the use of multiple means of content representation, variety of learning activities, and realistic application of skills, as inclusive of diverse learning needs. Previous research studies support similar learner satisfaction with course flexibility and variety of instructional strategies used to represent or present the curriculum material (Bongey, 2010; Black et al., 2015; Celestini et al., 2021; Davis et al., 2013; Kumar & Wideman, 2014; Shelley et al., 2011). While most learners described and rated the UDL-based course design elements highly, not every participant agreed with this trend.

One focus group participant described preferring the format or layout of another first-year course in the program on the LMS, as it was perceived as being easier to navigate and aligning with their independent learning preferences. The course was formatted using folders with content included in a repository fashion. As described by Deegan (2021), the importance of the LMS for offering more than course material requires utilizing it in an integrated capacity to support learning. Tobin and Behling (2018) specify that merely posting material in an online media does not necessarily engage or make it accessible to all learners. Ease of navigation is essential to the accessibility of course content in an online environment, however, this may vary based on individual preference or confidence with the use of technology and related software (Dell et al., 2015; Dukes III et al., 2009; Hitch et al., 2019; Farrell, 2021; Fidelak & van Tol, 2021; Reyes et al., 2022). Therefore, these

findings emphasize the necessity to provide learners with multiple means of action and expression in a course, by varying the methods for response and navigation (CAST, 2018).

Overall, the course design was rated positively by most participants. To gather more detailed insight from the instructional strategies used within the course design, more specific categories were established such as the use of synchronous and asynchronous learning formats. Following the preference for the UDL-based course design elements, synchronous and asynchronous instructional strategies were described as next helpful to learners.

Synchronous and Asynchronous Formats

The switch from in-person to fully remote teaching presented potential barriers to learning considering the large size of this class. Despite this situation, both synchronous and asynchronous methods were utilized in the course to engage learners with the content, classmates, and co-instructors, while further offering multiple means of representation, action and expression.

Synchronous activities were possible with the use of Zoom conferencing software and offered opportunities for real-time interaction with the content, co-instructors, and classmates. An orientation session provided an opportunity for co-instructors to share personal and professional backgrounds, and course expectations with learners. Prior to the session, resources were posted for learners to use as needed. Live capturing was also used to record any synchronous session held and shared later with learners who could not attend. However, access to appropriate resources that support this interaction is necessary and establishing an optimal blend of synchronous and asynchronous activities is vital to success. Quantitative and qualitative findings primarily converged overall.

The inclusive lecture construct of the quantitative ITSI-S survey includes questions about whether the instructors began class with an outline of topics, connected key points throughout class, repeated questions back for clarity as needed, and summarized highlights in class (Gawronski et al., 2016). The mean score for the inclusive lecture construct of the BUI was rated first and second highest in the EIA segment constructs, demonstrating that respondents *agreed* to *strongly agreed* the lecture strategies offered were inclusive of diverse needs *most of the time* to *always* by instructors. Further to these positive quantitative findings, qualitative focus group data captured similar preferences.

Instead of in-person place-based lectures, prebooked weekly lecture time was used to host several informal synchronous sessions throughout the semester via Zoom, including an orientation session the first day of class. Zoom was the most frequently praised technological tool used in the course, as it offered a means to interact synchronously with the co-instructors, material, and others in the class. Evidence available suggests the benefits of video conferencing tools in providing an accessible and available real time opportunity to interact with others or just listen to different perspectives (Harris et al., 2020; Hope, 2020; Marquis, 2021; Rao, 2021). Recorded sessions can then be posted for viewing by learners who missed the synchronous meeting and used by others as a review of concepts discussed.

An initial synchronous orientation time was held as a full class during the pre-booked lecture time through Blackboard, the first week of classes. Zoom was used to hold a course orientation and instructor introduction session for those learners who wanted to attend. Activities were planned to engage the audience in this first-year class in introductions, while also permitting an opportunity for instructors to utilize Zoom and the

breakout features with a group of this size. Similar recommendations to supplement asynchronous discussion forums with a synchronous orientation for students were suggested in the literature (Marquis, 2021; Simonelli & Hinson, 2008; Tobin & Behling, 2018). Bloomberg (2021) stressed the importance of conducting this introductory meeting before beginning an online course in real time to establish a connection with learners. Course expectations were discussed after a personal and professional introduction of co-instructors was made to the class. Other studies offer evidence into the benefits of sharing personal and professional backgrounds in a synchronous orientation session with learners, as it extended insight into the human aspect of co-instructors (Dickinson & Gronseth, 2020; McGuire & Scott, 2006).

Synchronous lecture time spent with the class was captured using Zoom and shared on the LMS site with those who could not attend. Posting available lecture recordings and class notes has been shown in other research of online courses to be preferred by learners (Fidelak & van Tol, 2021; Jang, 2021; O'Shaughnessy, 2021). Live capturing was shown as extremely helpful when conflicting life responsibilities arose, increasing accessibility for all learners (Celestini et al., 2021; Fidelak & van Tol, 2021; Smith-Carrier et al., 2021; Watt et al., 2014). Evidence supports the strong preference learners have in accessing an outline, or slides prior to lecture time, which may permit learners to engage more in discussion versus taking notes of the content (Black et al., 2015; Coy, 2019; Davies et al., 2013; Kennette & Wilson, 2019).

No divergence of findings was identified related directly to the use of synchronous or asynchronous instructional approaches that were used in the course. This supports the use of multiple means of representation of the course material in the curriculum and

importance of technology, which align with UDL principles. However, accessing an appropriate internet connection, available computer, quiet learning space, while having to balance other life commitments, could have potentially caused barriers for some learners to participate in the synchronous course aspects (Reyes et al., 2022; Simonelli & Hinson, 2008; Tobin & Behling, 2018; Zhang & Zhao, 2020). Both synchronous and asynchronous instructional approaches were used in the course design to offer equitable access to learners. Finding the optimal blend or balance of instructional strategy elements to use in a course or curriculum, is essential for educators to establish (Buckley et al., 2021; Harris et al., 2020; McCaughren, 2021). Unit activities were integrated into some of the weekly course units and utilized an asynchronous approach to engage learners with the weekly content through several themed participation-based activities.

Unit Activities

To engage learners with the material within each unit of the course site, ten asynchronous unit activities that provided an opportunity to apply the content were available to complete at the end of most weekly units. These activities were worth one percentage point each and students could complete any five of the ten available. Two additional bonus points were offered to learners choosing to complete these as an option, or to make up missed seminar and group work. These options or choices promoted an increased feeling of control over learning among certain students; however, an issue with the amount of reading required in the course was identified by learners. Qualitative findings indicated a preference of this instructional strategy among students, but despite some convergence, the quantitative data diverged most significantly.

Learners enjoyed having a choice of which activities to complete based on their interests, preferences, and schedules. Offering a greater level of choice to learners using multiple means of action and expression, increases opportunities to demonstrate knowledge acquisition, while also supporting a sense of agency, or capacity to independently select (Kilpatrick et al., 2021; Nieves et al., 2019; Tobin & Behling, 2018). The choice in activities was appreciated by respondents in the focus group, as was the offering of smaller assignment points. This instructional strategy permitted an opportunity to gain points through the completion of numerous less heavily weighted assessment methods. A heightened feeling of control in the learning process was also described in one study by learners because of having increased choice integrated into the course (Kumar & Wideman, 2014). An option for choice provided increased ownership over learning, while further supporting a sense of self agency and determination (Aparicio-Ting & Kurz, 2021; Din, 2021; Farrell, 2021; Johnson & Castine, 2019; Jones, 2021). The UDL principle of multiple means of representation requires providing a variety of formats and resources of the course content for learner access. Further to these positive comments, divergence from these findings were found in the rating of course modifications in the BUI and EIA segments of the ITSI-S tool (Gawronski et al., 2016).

Course modifications is a comparable construct of the ITSI-S tool that is associated with permitting students with documented disability and those without documented disabilities to complete extra credit assignments and reduce the overall course reading load. Unlike the qualitative findings, both the BUI and EIA were rated lowest of all six-constructs in the tool, with responses ranging between 3 (*neither agree nor disagree* or *sometimes*) and 4 (*agree* or *most of the time*) of the Likert scale scores, (Gawronski et al.,

2016). None of the focus group respondents described the option of earning bonus points or need to reduce the overall reading load in the course. Yet too much choice and information can also present obstacles for some learners (Hitch et al., 2019; Reyes et al., 2022).

Evidence from my journal notes indicated that co-instructors did not receive any requests for a reduction in reading load by learners throughout the semester. Readings were kept to a maximum of 50 pages per week, and key concepts of importance were highlighted in the weekly unit format. Certain students may struggle with large volumes of assigned readings (Rao, 2019). While reading has been described as an enjoyable pastime, many learners in post-secondary studies are motivated by external factors such as testable content, not a general internal curiosity to learn (Pittaway & Malomo, 2021). It may be possible that learners thought that all readings were required (Beauchemin, 2022) whereas many were posted as a resource to supplement learning the material in the course. There were two required textbooks used for this course and may have contributed to the number of reading options perceived by participants who answered the survey. Providing additional guidance on key readings to focus on from the material posted may help minimize the amount of perceived reading load by learners (Kumar & Wideman, 2014). Further to these smaller individual participation-based activities, the weekly units of the course were also asynchronously offered to learners.

Weekly Units

Content from primarily PowerPoint based slides were adapted into twelve weekly units for the offering of this online course that learners could asynchronously access from home. Within Blackboard, a course site was used to house this information. Video

introductions from the lead instructor for each unit preceded the integration of graphic organizers, weekly objectives, resources, activities, themed music breaks, images, and resource links included for extra depth and engagement in learning. Participant responses and ratings from the quantitative and qualitative data collection methods used primarily converged about this instructional strategy.

Quantitative results identified by participants for inclusive lecture strategies mean scores of the ITSI-S tool were rated as second highest of the EIA six constructs, and believed it was most important as rated for the BUI segment construct (Gawronski et al., 2016). As described previously, survey participants rated the accessible course materials EIA as the highest of the six constructs, and fourth for the comparable BUI segment. Similar positive experiences were described by the focus group participants.

An analysis of qualitative findings uncovered learner appreciation of various learning modalities that were integrated into the course. These strategies included the organization of weekly unit content, identification of clear expectations, and use of multiple means of representation and engagement to support an understanding of the material. Content was scaffolded throughout, to guide or pace the application of the course concepts. Each unit was formatted similarly with a video introduction from the weekly lead instructor with closed captioning, followed by weekly objectives, graphic organizer, linked readings, content, resources, and activities to promote knowledge application in a risk-free environment. In relevant literature, establishing clear expectations, providing advanced organizers, and presenting information in multiple formats, were described as beneficial instructional strategies by learners in post-secondary education (Black et al., 2014; 2015; Fidelak & Rodier, 2021; Fidelak & van Tol, 2021).

The content was represented using, text, audio, and visual formats, integrating diverse practice questions throughout to support learning in a variety of ways. Ally, an accessibility tool offered learners an option to convert course content into an accessible format as necessary (https://ally.ac). None of the qualitative results identified this specific tool as helpful to learning. However, comparable to the findings of Davies et al. (2013) students appreciated having the material presented through multiple formats throughout the course. In a landmark study by Schelly et al. (2011) offering and presenting multiple formats of course material was similarly seen as important. Additionally, a need for instructors to summarize main course concepts before, during, and immediately following instruction was also expressed (Schelly et al., 2011). To contribute to varied expert perspectives and guidance, two guest lecturers recorded during the 2019 course offering were asynchronously shared with learners through the appropriate weekly unit on the Blackboard site (Dracup et al., 2016). In a case study of a large UDL-based post-secondary course, increased learner engagement was associated with the use of videos, technology, and guest speakers (Farrell, 2021).

Similar to posting lecture notes prior to an in-person class, weekly units were released in two-week blocks to offer an opportunity for some students to move ahead in the course. Consideration of this pacing was particularly important to establishing limits for other students who may fall behind and become overwhelmed throughout the semester. Releasing weekly unit content in advance, supported learners in this asynchronous environment by permitting them to move through the course content at an individualized and comfortable pace. Similar scaffolding techniques have been described as helpful and

supportive of time management skills required in online study (Bloomberg, 2021; Fidelak & van Tol, 2021; Johnson & Castine, 2019).

According to the co-instructor journal notes, some learners in the study had an experience that was contrary to the expected benefits of the strategy. No lecture slides were available to share with students, as instructors reformatted this content. Yet highlights from the readings, instructor notes, and practice activities were integrated to supplement the slides typically used for lecture in the weekly content material on the Blackboard course site. Interestingly enough, one learner requested a PowerPoint version of the content, despite a more detailed and engaging format used each week. It may be possible that the learner wanted a condensed version of the content typically offered via slides. Unfortunately considering the significant changes that had been made to the content format, there were no accurate or new full set of slides to share. This request aligned with the findings of other research in the literature that described students as preferring PowerPoint and less learner centered approaches to instruction (Baker & Wolfer, 2006; Dean et al., 2017). In addition to these weekly units, the course also required completion of other asynchronous participation-based activities, such as the EAQ publisher software. This software provided an alternative method for learners to interact with the content from the course textbook.

EAQ Software

EAQ software purchased from the publisher aligned with the primary textbook used in the course to offer real-time feedback. The purpose of this software was to support practice with adaptive multiple-choice questions among learners in a nonthreatening environment that supported actively learning the content through participation. Questions

were adaptive in nature and aligned with the professional practice exam for licensure that must be taken after successful program completion. Quantitative and qualitative findings primarily aligned, supporting the EAQ software as the next preferred instructional strategy identified from an analysis of the results.

Quantitative ITSI-S survey findings offered evidence of learner appreciation of this instructional strategy. Participants rated the inclusive classroom BUI mean score as second and fifth highest of the six constructs of the EIA tool segments (Gawronski et al., 2016). As discussed previously, the quantitative inclusive assessment mean scores were rated as the fourth highest for the EIA and fifth of the BUI six constructs in each respective segment. Despite the inclusive classroom and assessment constructs not being rated highest in both EIA and BUI segments by participants; all mean scores fell between the most positive range of Likert scale ratings, supporting the EAQ software as an effective instructional strategy. Focus group data provided related insight into learner preferences.

An analysis of the qualitative data offered understanding into the learner's experiences with the EAQ adaptive quizzing. Several respondents commented on appreciating this form of assessment in permitting a more flexible and less stressful way of interacting with the textbook and course related material. The software offered a real-time response to question answers and included a rationale with source of the correct response to check for additional information as needed in the textbook. As described by Tobin and Behling (2018) publisher generated software supports multiple ways of interacting with the textbook material. It offered a risk-free learning space for learners versus having similar multiple-choice questions in a timed examination. Research with the use of online practice questions or tasks was described by students to build skills and minimize associated fears

of test-taking (Baker & Wolfer, 2006; Coy, 2019; Fidelak & van Tol, 2021; Morch & Fovet, 2021). However, not everyone appreciated this participation-based type of learning.

Only one learner expressed disliking this instructional approach and preferred testing for points in real time. Nevertheless, it is interesting to note that the same participant described completing the quizzes together with a friend to support them morally. Completing the EAQs with another individual who was performing better may have instigated a competitive response or brought about an embarrassment that motivated this distaste for this participation-based portion of the assessments. Unlike the preference expressed by learners for this EAQ software, Dean et al. (2017) described the value of instructor created course content, e.g., PowerPoint lecture notes, over third-party software, among students. While the benefits of this type of asynchronous activity were obvious for many learners, software options are not possible without the use of other forms of technology.

Technology Use

In a fully remote learning environment, the use of technology offers so many options and opportunities for a diverse group of learner needs. The option to interact with the course material in either real or asynchronous time permits multiple means of engagement and a means to connect with classmates. Although, these benefits do not come without their share of potential user and accessibility issues, particularly with the number of resources available and ease of navigation between different software. Various forms of technology were used to offer both asynchronous and synchronous activities throughout the course. Quantitative and qualitative findings both converged, identifying the use of technology as the subsequent instructional strategy preference described by learners.

The quantitative ITSI-S inclusive classroom construct was rated fifth of the EIA and believed to be the second most important of the six construct mean scores for the BUI tool segment (Gawronski et al., 2016). These findings remain in the most positive range of the Likert scores as previously identified.

Blackboard was used to develop a course shell and provide users with access to other technology in the course such as with Zoom. Zoom software was used to deliver synchronous seminar activities, group work, and permitted meetings with co-instructors and classmates both individually or as a group. From the qualitative analysis, this conferencing tool was seen as extremely helpful to learning, collaborating, and interacting with peers and co-instructors throughout the semester (Morch & Fovet, 2021). It also helped foster the development of important connections between learners in this first-year nursing cohort. The use of video technology greatly increased engagement, depth of learning, and offered a means for reluctant students to share their thoughts and ask questions in smaller groups prior to larger discussions (Buckley et al., 2021; Farrell, 2021; Fidelak & van Tol, 2021). While most respondents established that technology use improved the course experience, not all learners agreed.

One student specifically identified an issue with the use of different software in other courses within the program, which made navigation a challenge. This concern was not specific to this course but to all in the first year of this program, further stressing the importance for defining the term universal across programs. The capabilities of the LMS to offer opportunities to link other compatible software is limited to the resources available for educators and learners in an organization (Bloomberg, 2021; Zhang & Zhao, 2020).

A couple respondents suggested offering user resources for Zoom; something that was provided for students on the course site and by Information Technology at the organization. It has been suggested in the literature to increase the number of resources for learners specific to the use of any new software (Farrell, 2021; Schneider, 2021). The support resources for Zoom and other new technology used in the course were provided in a folder on Blackboard for learners. During the initial weeks of learning transition, students may have been overwhelmed with this move to an online, and post-secondary setting and may have missed the information despite repeated course announcements detailing the availability of these resources. The use of technology was invaluable to the success of the course, moreover, the use of a traditional written essay following an interview with a registered nurse, offered an opportunity for learners to critically reflect on the experience. Extended timelines, or flex time, were included as part of this assignment and offered to all learners without the need to request this additional time.

Written Essay With Flex Time

The written essay with flex time, or extended timelines, correlated with both assessment and flexibility principles. It was appreciated by participants who noted it as one of many supportive UDL-based instructional strategies used in the course. In addition to appreciating the assignment focus, the extended or flex time was consistently described as supporting learners needs and minimizing associated stress. Quantitative and qualitative findings converged related to this instructional strategy.

Quantitative results from the ITSI-S tool rated inclusive assessment mean scores as the fourth highest construct for the EIA and fifth of the BUI six constructs in each segment (Gawronski et al., 2016). While neither were rated as highest of the six constructs, both

mean scores were rated positively by participants who *agreed* to *strongly agreed* that course assessment was inclusive of diverse learner needs *most of the time* to *always* in the course. From the qualitative findings, the flex time or extended due dates were appreciated in addition to guidelines and rubrics for this assignment. As discussed earlier, several other studies offered evidence supporting the use of extended due dates that are inclusive of diverse learner needs (Aparicio-Ting & Kurz, 2021; Celestini et al., 2021; Din, 2021; Fidelak & van Tol, 2021; Jang 2021; Kennette & Wilson, 2019; Kumar & Wideman, 2014; Smith-Carrier et al., 2021). No divergence in the study findings was noted for this instructional strategy.

There were no negative comments about having to complete a written paper or with the flex time. However, problems arose initially when learners had trouble understanding the concept of this extra time, as many emailed the co-instructors to verify there were no repercussions for submitting after the due date by the flex time. Following the written essay assignment, the synchronous seminar activities were described by participants as being the next preferred instructional strategy used in the course.

Seminar Activities

Participants described an appreciation of seminar activities and learning the practical application of skills in a supportive environment with the instructor present for feedback. These smaller group settings offered an opportunity to synchronously interact with classmates, course material, and instructor, in a less threatening nonevaluative environment. Active participation activities integrated into the course delivery model are valuable to learning in post-secondary studies (Harris et al., 2020). Engagement with the course material, peers, and instructors are essential to consider in the overall course design

to help support a community of learners. The importance of navigation in accessing course material was highlighted as the primary problem related to this synchronous instructional strategy. Quantitative and qualitative findings converged overall supporting these activities as the next most desirable method used in the course.

The inclusive classroom construct of the quantitative ITSI-S survey is a similar classification of instructional strategies that was rated fifth of the EIA and second most important of the six construct mean scores for the BUI segment (Gawronski et al., 2016). Questions focused on determining whether the instructor offered and presented course content through a variety of formats, while further facilitating interaction and participation, using technology and other forms of engagement. Other questions sought to explore if instructors supported a variety of learner needs by reaching out in the syllabus and announcements. While the learners' experiences of the inclusive classroom construct for the EIA segment was rated second lowest of the six constructs, the mean still remained in the most positive range of the Likert scale. Seminar time held during weeks six to eleven, offered the only means for learners to meet during the lockdown restrictions that had been in place at the time.

Synchronous seminar activities offered a forum for actively involving learners in a community of learning that provided a risk-free environment to practice new skills, role play, ask questions, share experiences, and learn from other perspectives. In similar studies, hands-on activities such as role playing and group discussions were identified by learners as more beneficial to learning over the use of computer-based approaches (Baker & Wolfer, 2006; Black et al., 2015; Zhong, 2012). In previous research by Black et al. (2014) SWDD identified the integration of interactive activities such as small group

discussions, as permitting an opportunity to build a community of learners. This subsequently helped to increase motivation and decrease insecurities held from certain disabilities. Participants expressed consistently enjoying these sessions with smaller groups, but there was one divergent theme identified clearly from the research results.

The most significant and consistently identified issue established through the qualitative analysis, was the difficulty experienced by learners in navigating the content on Blackboard, specifically the seminar material. As one of several super course build initiatives from the online learning department at the hosting university, a representative from information technology supported the development of the twelve weekly units in the course shell on Blackboard. The resulting site was excellent, however, considering the huge change in delivery format and inclusion of multiple means of representation to support learning, the design caused some initial barriers for learners when locating the seminar content. One participant described being able to overcome this navigational issue after gaining familiarity with the course layout. Reformatting this feature for future course offerings will help in continually building on the UDL-based practices already integrated into the design. Comparable issues were identified in a study by Dracup et al., (2016) whereas part of a UDL-based course design, respondents reported the number of resources offered in the course as being overwhelming. A need to develop a better balance between activities and coping with large amounts of information during the first year of post-secondary education was highlighted.

Presenting course content in a simple yet consistent format supplements ease of navigation and should be a priority for any online course (Dell et al., 2015; Dukes III et al., 2009; Fidelak & van Tol, 2021). Navigation is essential to accessing course material, thus

maintaining consistency and clarity in the organization of the content, which also promotes self-regulation skills among learners are particularly necessary (Gronseth, 2018; Harris et al., 2020). Consideration of course website organization has been recommended in the literature as a first step towards making the material more accessible to all learners (Gronseth, 2018). Following these seminar activities, the group project was preferred next by study participants.

Group Project

The final multiple-choice exam was replaced with a group project that involved completion of two parts that unfolded over a six-week period. Part A required collaborative group completion of a health promotion plan and presentation based on a realistic and relevant case study by using course concepts and the nursing process. Following plan development, an individual reflection on the group process experienced was required. Groups had a choice in the behaviour to focus on for the plan and option to select the most appropriate course concepts to integrate. Once completed, learners could present their work in a format of their choosing and post in a virtual presentation forum set up for each seminar section. Part B of the group project required each learner to visit and provide feedback on one other group project using the same rubrics provided for this assignment. It was anticipated that these smaller work groups would offer an increased depth of learning and engagement (Aparicio-Ting & Kurz, 2021; Farrell, 2021), particularly in an online environment (Jang, 2021).

Quantitative and qualitative data converged and diverged most significantly for the group project, which was anticipated given the potential problems that could arise with this

type of assignment. Thus, this instructional strategy was identified as one of the least preferred among learners despite the many associated benefits it offered.

Part A Group Project and Virtual Presentation

From the quantitative ITSI-S survey findings, participants rated the inclusive assessment mean scores as fourth for the EIA and fifth of the BUI six constructs (Gawronski et al., 2016). This construct was not rated the highest of the six for either of these ITSI-S tool segments but remains in the most positive Likert scale range rating.

The qualitative results indicated that many learners appreciated meeting classmates and working collaboratively on the project weekly with the support of a community of learners and receiving the multistage feedback of instructors. A better quality of work was identified by learners as there was time in class to work on and revise the project following feedback. Further to this, collaboration and interaction helped forge new friendships among students. Findings in the literature confirmed the benefits of group activities for studying and offering an opportunity for effective learning when together (Aparicio-Ting & Kurz, 2021; Jang, 202l; Zhong, 2012). Research specific to students with and without a documented disability, identified class and small group discussions as encouraging learning and motivation through the development of a community of learners (Black et al., 2015; Morch & Fovet, 2021; O'Shaughnessy, 2021).

An increase in the quality of work was described by one learner, as there was scheduled time in seminar with the support of the instructor to complete the work over the latter part of the semester. The layered level of engagement that occurred over a six-week period for the group project was seen in a similar study as a successful instructional approach that supported multistage, on the spot feedback from instructors throughout the

development of the project (Farrell, 2021). The nature of this assignment also helped increase overall engagement in the course. The process of scaffolding the group project was noted by Pletnyova (2021) as enabling a means for learners to stay on track with expectations, offering an opportunity for instructor feedback, and a chance to improve the group project as necessary. It also offered a means to get to know learners and interact more individually in an online class of this size. Learners had an opportunity to revise their project weekly following instructor feedback in a risk-free environment, which has been described as beneficial to learning in the literature (Fidelak & van Tol, 2021; Jones, 2021; McCarthy & Butler, 2019).

Encouraging collaboration among peers through a group project as described above, offered an additional opportunity for the development of relationships outside of course time (Fidelak & van Tol, 2021). Integration of diverse interactive activities through the creation of a community of learners via small group work, fosters learning and enhances motivation (Morch & Fovet, 2021; O'Shaughnessy, 2021). Fovet (2019) offered instructors insight into the benefits of breaking assignments down into more manageable pieces that are less intimidating to learners. After completion of the group project presentation, learners were required to individually complete a reflection on their group processes and support the content using appropriate scholarly evidence.

Group Process Reflection. After the final group meeting, learners were required to each complete a group process report, to individually and confidentially reflect on the processes used throughout their own group work experience. Relevant points from learner group experiences were supported with evidence and principles related to group work concepts being learned in the course. Reflection has been described as offering insight,

awareness, and a deeper learning experience for students, while facilitating learner agency and providing the basis for inclusive education (Super et al., 2020). Reflective opportunities are noted to provide the space and time for students to consider their learning process, while also developing metacognition skills (Bloomberg, 2021; Harris et al., 2020; Schneider, 2021; Super et al., 2020). No positive or negative responses were received from the focus group participants specific to this aspect of the project. The group project was appreciated by most learners for the level of engagement and application it offered, with the added benefit of developing new connections with others in the class. However, obstacles from implementing this instructional strategy also were anticipated.

The group project created challenges for some participants related to pacing and timing of completion, perceived workload contributions of each member, and heavy weighting of this part of the assignment. Despite an attempt to support group participation by the instructor using the drop in feature of the breakout rooms in Zoom, it remained difficult to monitor the engagement level of five to six groups at a time. Pacing and timing with completion of the group project was a problem identified by one respondent who felt that their group could have better utilized the time offered in weekly seminars for group work versus leaving some of it until the end to complete.

The perceived distribution of group workload also seemed to cause the most significant conflict among respondents. The group project integrated a process for reporting group member concerns to the seminar instructor through the facilitator role, and weekly progress submissions. Specific language was also included in the syllabus to adjust grades as necessary, based on each individual group members level of contribution. Research identifies using similar measures to support effective group work and discussion

(Bloomberg, 2021; Harris et al., 2020). The emotional stress experienced by some group members during the process of project development has been extensively described in the literature (Aparicio-Ting & Kurz, 2021; Harris et al., 2020; Pletnyova, 2021).

A couple of learners also expressed concern about the perceived heavy grade weighting of the group presentation portion of the assignment. One recommendation was made to adjust the assignment weighting, so that an increased percentage was within an individuals' control to earn. The preference of a group project versus a multiple-choice based final exam was also identified by respondents. Multiple-choice questions often only test recognition, recall, and memorization of the content. When used as the primary means of high stakes summative assessment, it does not permit all students an opportunity to demonstrate their learning (Morch & Fovet, 2021). The benefits of multiple-choice questions identified in the literature are based on instructor needs to minimize grading time required, not on how to best support the learner (Morch & Fovet, 2021; Tobin & Behling, 2018).

One learner commented on not being able to meet with group members, as schedules were different, which was not consistent with the assignment format and other learner opinions. Offering opportunities for groups to work on their projects during class time has been described as effectively minimizing any scheduling conflicts among learners (Aparicio-Ting & Kurz, 2021; Pletnyova, 2021). However, the concern expressed by this participant may have been in reference to the week following the final seminar when there were no required sessions to attend. An extra week prior to the due date was purposefully left available to offer an opportunity for groups to finish up their projects if needed. It may

be possible that learners made other plans in anticipation of having this seminar week off as indicated in the syllabus, to study for final examinations in other courses.

As evidenced in an article by Din (2021), learners were randomly assigned to working groups for the project. Considering the online learning environment and first-year nature of the course, learners were not offered an option to select groups. Permitting a choice of groups may have supplemented this assignment. Offering an individual completion option for the group presentation may also have influenced participant perceptions. Detailed group project guidelines and rubrics were provided to students for direction, however, group choices related to the health issue, course concepts to integrate, and final format of the group health promotion plan were required. The less prescriptive nature of the assignment may have caused some stress among learners who were not comfortable with the approach, which aligns with other research in the literature (Farrell, 2021; Fovet, 2021b; McCarthy & Butler, 2019; Morch & Fovet, 2021). Following the completion of Part A, the second part of the group project involved offering confidential peer feedback about one other groups project in the virtual presentation forum during the final week of the course.

Part B Peer Feedback

Part B of the final group project required learners to virtually visit one different group presentation and evaluate this submission using the same rubric criteria being used by educators to assess these projects. Peer feedback was seen as a necessary but uncomfortable process that can result from comparison to another project submission. Both positive and negative participant feedback were obtained about this aspect of the group project.

Quantitative ITSI-S survey data indicated that the inclusive assessment mean scores were fourth for the EIA and fifth of the BUI six constructs in each respective segment (Gawronski et al., 2016). Thus, despite this construct's lower ranking, the mean scores for both segments remain in the most positive range of the Likert scale ratings.

Peer feedback was described as an uncomfortable but necessary skill that was recognized by a couple of learners in the analysis of the qualitative findings. Offering peer feedback has been described as beneficial for tertiary students across a wide range of subjects and education levels (McCarthy & Butler, 2019; Peschi & Peschi, 2021). Completing the feedback offered learners an opportunity to see what other groups had submitted, something that is typically not done in other courses. It also was appreciated by one participant, as it offered a window into determining what grade might be achieved by comparison to other groups. However, certain evidence in the literature highlighted the threat this comparison may have on an individual's identity (Johnson & Castine, 2019). Not all participants shared an appreciation for learning this skill required for nursing practice.

Some learners found comparison of their project to others in the class as stressful and difficult to perform. Considering this is a first-year course, it is likely many did not have experience evaluating the work of others. This is supported by Morch and Fovet (2021) who observed that over time students would progressively learn to embrace less formal assessment methods in the course. In addition to the synchronous group project, the formative review offered another means of learner assessment.

Formative Review

The midterm exam, or formative review, was revised from an in person multiple-choice format, to a primarily short answer, application-based type assessment that was offered through Blackboard synchronously to learners during the scheduled course lecture time. Extra time for completion of each question was built into the examination by co-instructors after consulting with a knowledgeable SAS representative. Findings from quantitative and qualitative data collection primarily converged for this instructional strategy, however, it was one of the least preferred methods used in the course.

As one of the main assessment approaches used in the course, quantitative findings related to the formative review are best represented by the ITSI-S inclusive assessment construct (Gawronski et al., 2016). The mean scores for this construct were rated as fourth for the EIA and fifth of the BUI six constructs.

A couple of the qualitative focus group participants appreciated the practical nature of this form of testing and connection to authentic application to professional practice. Open-ended questions on this midterm were seen as an appropriate method of examination considering the scope of the content being learned. A similar study by Black et al., (2015) identified a preference for hands-on learning activities by SWDD and SWODD. Unlike the benefits described by Kumar and Wideman (2014), extra time that was incorporated into the formative review questions for all learners was not specifically identified by any respondent. No requests were received by the co-instructors for additional time to complete this online offering of the formative review.

It is understandable that not everyone prefers short answer questions as a means of testing. One focus group respondent particularly struggled with this approach, most

specifically with the short answer questions, as these were most predominant in the formative review. The questions were found to be limiting for those learners who are not best able to answer these types of questions. An open-ended format was used for testing to capture the nature of responses required for the course content being learned but may not be preferred by all learners (Arcellana-Panillo, 2021; Dell et al., 2015; Tobin & Behling, 2018). Only one learner was identified to have requested an accommodation that was outside of the typical requests received, which required the formative review be split and held over a two-day period. The online nature of this assessment permitted the flexibility to easily adapt one version of the test to be held over two days and accommodate this learning need. An analysis of the quantitative and qualitative findings helped to identify areas of convergence and divergence of the data, to determine the most popular instructional strategy ratings and preferences described by learners for each method. From this analysis of instructional strategies used in the course, insight into related themes that were extracted from the data were explored.

Extracted Themes

Following the rating and description of the individual instructional strategies, a synthesis of findings extracted, offered insight into some of the themes identified in this study. Themes related to the learning environment, impact on learning, and course appraisal in an online setting were highlighted after an iterative process of the key findings were analyzed.

Learning Environment

Forced change to an online learning environment from the pandemic resulted in leaving many learners and instructors vulnerable to challenges with the use of software, or

lack of access to a reliable internet connection or computer (Bloomberg, 2021; Marquis, 2021). The online learning space in higher education also differs from that of K-12 settings, particularly compared to cohort size and stage of increasing independence for many first-year learners. In post-secondary education, UDL has been explored most prominently in a lecture hall setting (Schreffler et al., 2019). The online learning environment for this course was described in the analysis of data as both emotionally supportive and challenging for learners. The importance of this environment to supporting engagement and collaboration in the course was also clearly evident in the research findings.

Emotionally Supportive

Quantitative and qualitative findings identified supportive online learning environments as including multiple opportunities to engage with classmates, course material, and the co-instructors. Instructional strategies that involved choice, a risk-free learning environment, application of authentic skills, collaboration, scaffolding techniques, extended timelines, and rubrics detailing assessment expectations were preferred by learners.

The variety of assessment strategies were evidently valued by students in extending choice and flexibility in learning, while also promoting an overall sense of fairness and self-agency among learners. Research supports similar trends (Marquis, 2021; McCaughren, 2021). Many participants from the qualitative data expressed a preference in the ability to exercise some form of choice in the course assignments and assessments. Research findings align with this preference of choice among learners (Celestini et al., 2021; Davies et al., 2013; Dickinson, 2018; Kumar & Wideman, 2014; Pletnyova, 2021).

One respondent praised having an element of choice in selecting which of the ten available weekly unit activities to complete in minimizing stress during busy weeks of the semester. This finding aligns with similar evidence of having this preference in choice for this activity (Bradshaw, 2020; Nieves et al, 2019). An appropriate use of technology in an online environment can offer additional choices for diverse learner needs, further promoting desired self-determination and agency skills (Johnson, & Castine, 2019). The importance of facilitating choice is obvious (Aparicio-Ting & Kurz, 2021).

Safe learning spaces such as those provided by the EAQ and Zoom technology software offered opportunities to obtain real time feedback, which supplement learners' confidence in their abilities and understanding of the material (Coy, 2019; Din, 2021; Dickinson & Gronseth, 2020; Lee et al., 2021). Most respondents preferred the EAQ modules as a participation-based activity versus a graded and timed multiple-choice alternative, as it minimized risk taking and decreased any stress. Findings similar to this appreciation for participation-based assignments were identified in the literature (Coy, 2019; Morch & Fovet, 2021; Tobin & Behling, 2018). However, the possibility of this preference may stem from the lack of ability of textbooks solely to actively engage students (Zhong, 2012).

A preference of application based versus rote learning methods was evident from the focus group transcript analysis. A review of the literature highlights learner preference for more application and hands-on learning (Celestini et al., 2021; Davies et al., 2013; Shelley et al.,2011; Zhong, 2012). The theme identified from the findings included utilizing several course strategies that were beneficial in supporting learning application-based skills that are realistic to practice in the nursing profession. For example, the final

group project was positively described by many of the focus group participants as it was perceived as offering an opportunity to apply the course concepts required for professional practice, which aligns with evidence in the literature (Bradshaw, 2021; Marquis, 2021; Morch & Fovet, 2021). Learner engagement through authentic assignments that connect the content to real life have been identified as an important instructional strategy that integrates affective elements into the class climate (CAST, 2011a; Fovet, 2019; Griful-Freixenet, 2017; Lavicky-Townley, 2021; McGuire & Scott, 2006).

Peer interaction and collaboration offered an opportunity to meet classmates and develop important relationships in the nursing program, particularly during this uncertain pandemic circumstance. Other research supports the importance of engagement with classmates to the development of essential relationships that went beyond the class setting (Fidelak & van Tol, 2021; Harris et al.,2020; Marquis, 2021; Rao et al., 2015). The group project was also rated highly by focus group participants as it offered an option to complete the assignment a bit each week, minimizing any negative impact in leaving completion until the last minute, as often done when cramming for final examinations. Similar scaffolding techniques were described in the literature as beneficial to supporting the learner throughout project development (Farrell, 2021; Fidelak, & Rodier, 2021; Fidelak & van Tol, 2021; Jones, 2021; Marquis, 2021; Pletnyova, 2021). This strategy was also praised by respondents as a practical approach to learning teamwork in a less stressful manner with the instructor available for support. An option to submit the project in any desired format chosen by the group was also appreciated by some respondents.

Extended timelines and inclusion of detailed assignment rubrics were both consistently rated positively by respondents. Participants described the use of flex time, or

extended assignment deadlines as reliably helpful to learning and minimizing stress, particularly if responsibilities arose such as with childcare needs or work demands. Focus group participants who identified as having documented disabilities, described appreciating the inclusion of extended deadlines into the assignments in supporting learning needs without having to risk exposing their needs to others, minimizing any associated anxieties of having to ask for assistance. Flexible due dates and timelines have been identified in previous research as a beneficial course feature that helped reduce stress and anxiety by some learners (Celestini et al., 2021; Jang, 2021; Kumar & Wideman, 2014). Inclusion of rubrics and guidelines for assignments were praised by respondents as these provided direction in understanding expectations clearly. Current research has described the advantages of rubrics for all learners and educators in establishing clear expectations (Bloomberg, 2021; Din 2021; Fovet, 2019; Smith-Carrier et al., 2021; Super et al., 2020). The significance of an emotionally supportive learning environment cannot be underestimated. As part of a helpful learning atmosphere, an appropriate level of engagement and collaboration are required.

Engagement and Collaboration

The importance of engagement and collaboration to learning was a theme evident from an analysis of the findings. UDL-based instructional strategies used in the course offered multiple alternatives for learners to engage with classmates, the instructor, and material by providing opportunities to utilize important skills such as interpersonal communication, and teamwork, two key elements of professional practice (Morch & Fovet, 2021). Engagement also supported the development of essential relationships between learners. Faculty presence similarly modelled teamwork and collaborative processes

necessary in nursing professional practice, in addition to developing a desirable future employment skill (Marquis, 2021; O'Shaughnessy, 2021).

The interaction with the instructor, and other students throughout the smaller synchronous seminar activities and group project sessions were extremely welcomed by many participants, a trend which is also evident in current research (Aparicio-Ting, & Kurz, 2021; Din, 2021; Fidelak & van Tol, 2021; Smith-Carrier et al., 2021). Qualitative findings highlighted the importance of interacting synchronously with other classmates and instructor, particularly in an online environment. Consistently studies in research recognize engagement as one of the most prominent factors that impacts academic performance in online education by enhancing motivation and persistence (Bloomberg, 2021; Tobin & Behling, 2018). The online synchronous seminar activities and group work helped forge several new friendships among this cohort of first-year nursing students, many of whom have never met in person and some having never attended higher education. Learners described having developed relationships beyond the smaller groups that were helpful in collaborating or just checking in on others throughout the semester, which parallels discussions in the literature (Harris et al., 2020; Marquis, 2021). Evidence points to a lack of learner engagement as a source of undermining skill development and human connection particularly necessary when taking remote courses (Bloomberg, 2021; Tobin & Behling, 2018). Thus, it has been suggested that an instructor's role should be primarily focused on facilitating this engagement to help support learner success and impact learning. While there are many positive influences of UDL-based instructional strategies on learning, some participants described certain approaches as emotionally challenging experiences.

Emotionally Challenging

In addition to the benefits acquired in this emotionally supportive learning environment, a couple of challenges arose for some learners with the group project and during course navigation. The group project seemed to generate the greatest impact on increasing or decreasing stress among learners. Increased stress seemed primarily associated with the frustrations of having to complete another group member's portion of the project. An imbalance of work or participation within group projects has been described in the literature as creating stress among members (Aparicio-Ting & Kurz, 2021; Harris et al., 2020; Pletnyova, 2021). Learners were required to submit a different section of the care plan weekly, and rotate facilitators in an attempt to minimize any issues with a lack of contribution by any individual member. However, it may be possible that these particular comments were received from participants who tended to dominate the group or were too hesitant to say anything. The physical absence of instructor presence in the online environment may also have contributed to this lack of engagement by certain group members. Relying on other people in the group project also invoked anxiety among some learners as the weighting of the group project was seen by some respondents as too much towards their final grade. Similar evidence from the literature supports a potential of this concern among learners (Bloomberg, 2021; Fovet, 2019; Morch & Fovet, 2021). Evaluating peer projects through the Part B feedback portion of the group project also prompted self-reflection by comparison to other groups in the seminar, raising anxiety among some learners. While some evaluation guidance was integrated into the course for students, additional preparation using evaluative skills activities could have supported more positive experiences.

Most prominently learners in this study initially identified having difficulty in navigating the course content, specifically the seminar and group work tabs, despite the inclusion of numerous resources integrated for reference. In one study, UDL was negatively experienced by students who reported the number of resources offered in the unit as being overwhelming; requiring a better balance between activities and challenges in coping with large amounts of information during their first year of study (Dracup et al., 2016). Like this case study, other courses have used recorded guidance within the LMS to offer learners signposts for direction in the course material (Farrell, 2021). The intentional selection of essential resources by educators has also been recommended when integrating multiple means of representation of the content into an online course to supplement ease of navigation (Harris et al., 2020). Further to the themes associated with the learning environment, the impact on learning was explored.

Impact on Learning

The use of UDL-based instructional strategies positively impacted learning in many ways. Learners expressed an appreciation for learning versus memorizing content, which was supported through the application of practical skills in a safe environment to minimize any risks associated with making mistakes while learning. Scaffolded content and multistage instructor feedback supported connection moments for learners with the content.

A consistent theme emerged from the qualitative results that described participants as preferring an ability to really learn versus memorize the course content. Evidence in the literature supports the importance of deep over superficial learning (Farrell, 2021). This was supplemented through the variety of instructional approaches used including

synchronous and asynchronous activities in a fully remote setting. The synchronous environment offered learners a safe forum for these first-year nursing students to apply some of these essential course concepts such as teamwork, which is a desirable trait in the workforce (Coy, 2019; Din, 2021). Further to this, valuable learning can occur through the direct and indirect feedback offered by listening to the responses of others in a group discussion (Marquis, 2021). One participant felt the quality of their work was better by completing the health promotion plan for the group project that unfolded over a set period, using scaffolded content processes that were supported by instructors throughout the development. Research consistently validates the value and benefit of scaffolding material, concepts, assignments, processes, and support for learners (Marquis, 2021). Asynchronous learning activities such as the EAQ modules, unit activities, and weekly units, offered learners an opportunity to engage with the course material at their own pace and in a risk-free setting that focused on participation and practice versus the penalization of mistakes. Research in the literature described similar learner preferences (Baker & Wolfer, 2006; Coy, 2019; Fidelak & van Tol, 2021; Morch & Fovet, 2021). Participation resulted in providing connection moments with the material in the course and provided an opportunity for learners to review work completed with instructors in a safe environment, which has been identified as beneficial to learning (Fidelak & van Tol, 2021; Jones, 2021; Marquis, 2021; McCarthy & Butler, 2019) The impact on learners should be a priority to establish, however, a general course appraisal supplements confirmation of overall success.

Course Appraisal

Overall, an analysis of both quantitative and qualitative data provided evidence of successfully delivering a supportive environment for learners that was inclusive of diverse

learning needs by integrating multiple means of engagement, representation, action and expression. Many participants described the course as their most favourite and as enjoying the semester, explaining the UDL format as very helpful and the instructors as genuinely caring about supporting learner success. Participant "G" offered a suggestion that seemed to capture the overall theme of this UDL-based instructionally designed course, "I think this course was a great example of best practice." Current literature supports this learner preference for UDL-based instructional strategies used in higher education over traditional one-size fits all pedagogical approaches (Celestini et al., 2021; Cumming & Rose, 2021; Fovet, 2021b; Jang 2021; Pletnyova, 2021).

Other Courses

Several participants compared this first-year course with others taken in the past and concurrently in the program. Detailed assignment guidelines and rubrics were consistently praised by respondents in establishing clear assignment expectations, versus being vague and left guessing as experienced in other courses. Learners described this lack of clarity as creating an atmosphere of anxiety about uncertain assignment expectations. A study by Gawronski et al., (2016) described similar favourable attitudes towards inclusive UDL-based strategies but believed that these practices were not typically carried out in post-secondary settings by faculty. Other research offers evidence that UDL is not typically used by most educators in post secondary education (Hitch et al., 2019; Moore, 2019). Conducting this research offered me an opportunity to describe and develop a deeper understanding of the case study more fully.

Summary

In Chapter 5, a discussion about the results from conducting the convergent mixed methods analysis of the data were described, linking main points with related available literature. A connection of the findings to the research question posed was established, after identifying areas of convergence and divergence of the data, further building on any previous research available. Quantitative ITSI-S survey findings were merged within the instructional strategy categories established for the qualitative data coding, as it best answered the research question. My journal notes from course highlights as one of the co-instructors were integrated into this discussion to supplement understanding about the instructional strategies preferred by learners in the course. Chapter 6, as the final dissertation section, highlights some practical implications and recommendations related to the course curriculum, educator practice, and supporting diverse learners in online nursing education. The limitations encountered and considerations for future research are described before a conclusion of the descriptive case study is presented.

Chapter 6: Conclusions

Chapter 6 summarizes the implications and recommendations for online course curriculum design, educator practice, and diverse learners. Limitations of the study are also described and a discussion of areas for future research are included, with consideration of any contributions to the field of online post-secondary nursing education. Finally, conclusions are established in relation to the research question posed.

Implications and Recommendations

Practical implications and recommendations can be drawn from the study related to the use of UDL-based instructional strategies in post-secondary nursing education for online course curriculum design, educator practice, and diverse learner support. A significant implication of the research is the contribution it makes to the existing lack of empirical studies conducted in online post-secondary nursing education that explores undergraduate learner perspectives in large classes.

Online Course Curriculum Design

From the data analyzed, the integration of UDL-based principles into the design and delivery of online post-secondary nursing course curriculum was rated and described as inclusive of diverse learner needs. Instructional strategies that integrated multiple means of engagement, representation, action and expression, offered flexibility, variety, and choice in the curriculum and online learning environment were preferred. Given the change to an online format; engagement, collaboration, and instructor presence are still possible using a combination of asynchronous and synchronous UDL-based instructional strategies. It is also evident that offering material in multiple formats to users is beneficial to some but may pose navigational issues for other learners if not organized appropriately

in the LMS. While having variety is essential to UDL practice, managing this content by simplifying navigation of this information is necessary for educators to consider when designing the course.

Educator Practice

Teaching in an online setting, requires educators to address diverse learning needs and challenges, using a different set of skills to motivate and engage learners with the content. UDL-based strategies offered opportunities to maximize learning for all students in this setting by providing multiple means of engagement, representation, action and expression in the course. Considering this stressful pandemic time, and the first-year transition difficulties typically experienced, a supportive instructional climate was essential to institute. Despite the large class size, it is noteworthy to mention the importance of instructor and peer presence remains essential to learning and aligned with satisfaction among diverse post-secondary learners.

Given the relative ease of implementing UDL practices into coursework, these supportive methods should be readily integrated into post-secondary education by nursing faculty in one form or another. Implementation requires a purposeful delivery approach and proactive design by educators. While the initial set up of an entire course based on UDL principles requires additional resources, using an incremental process that builds on diverse instructional strategies over time can be just as effective and a more efficient or feasible use of an educator's schedule. It is suggested to begin with small changes such as providing a detailed course syllabus, integrating multiple means of representation, closed-captioning videos, or offering choices on assignment submission formats, or other forms of assessments. Ultimately, it would be ideal to design a course with UDL-based principles in

mind from its inception, nonetheless integrating these tenets into an existing curriculum is more manageable for instructors and still extremely valuable to learners.

Even though there are an increasing number of students that have access to online learning, many remain on the margins with challenges due to location, resources or other abilities. Online success requires learners to be autonomous, manage time, and maintain motivation throughout the course. Some learners in a first-year class may still be learning how to best navigate this transition and increased independence. Other learners have competing life demands and diverse struggles that may conflict with attending traditional in person studies, such as taking care of family and working. Instructors should strive to offer support and guidance to all learners towards achieving course outcomes or objectives. It is important to remain available and responsive throughout the experience to enable dialogue and communication in an online environment.

The importance and preference of variety, flexibility, and choice of instructional strategies were commonly occurring themes noted by participants in this study; however, facilitation of these by educators in other courses are typically not occurring. Instructors are encouraged to consider UDL when developing course curriculum, as these principles are relatively easy to incorporate and implementation has been shown to benefit diverse learner needs, reducing the necessity to make academic accommodations. Further to the benefits for post-secondary online study, UDL-based instructional strategies offer the learner support to overcome any learning barriers encountered in the curriculum.

Diverse Learners

UDL principles were rated and described by first-year nursing students as benefiting those with and without documented disabilities including learners with other

accommodation needs such as work or childcare demands. Learners described preferences for instructional strategies that offered choice, variety, interaction and engagement with instructors, the course content, and each other. Learning by applying and demonstrating the understanding of the material in a variety of ways was preferred by participants, versus regurgitating memorized content that is quickly forgotten. Moreover, this varied among learners and instructional strategies, based on individual preferences and needs. Learners rated the actions and attitudes of co-instructors as being highly inclusive of diverse learner needs. Satisfaction by respondents was expressed about the course format and described it as fostering a deep learning of skills that are essential to future professional practice as a nurse. Therefore, it is recommended educators use a combination of UDL-based instructional strategies to offer learners a more flexible and less traditional pedagogical approach, which minimizes the need to utilize accommodations. Advantages are then extended to students who are hesitant to access services, or do not qualify for learning support. An analysis of the findings from the research conducted offered hopeful insight into the benefits and challenges of UDL-based instructional strategies used in the course for learners, however, limitations of the study must also be considered.

Limitations

Several limitations may have impacted the findings obtained from analyzing this mixed secondary data set, potentially limiting the degree of generalizability (Cohen et al., 2018). The study was conducted in one class, at one institution, during a single semester of the BScN program, and thus minimized the ability to generalize the findings to other settings or populations.

Considering my roles as course co-instructor, designer, and researcher; preserving participant anonymity remained essential to maintaining the integrity of the data collected. Reflexivity requires a researcher to consider the entire context of the research, further contemplating any positions and subjectivities that may reflect on any influence it may have on the study and results (von Unger, 2021). To minimize bias from these responsibilities and my UDL advocacy position, it was also essential to use reflexivity to consider any personal biases these roles brought to the study process and analysis, so the results accurately represented the voices of participants.

The non-experimental convergent mixed methods descriptive case study design originally used for the research at the hosting university did not use a control group to compare variables. Davies et al. (2013) is one of the first and only studies that used a randomized control approach to conduct a study of learner perspectives in post-secondary education. A critique of the UDL research literature reemphasized the need for more experimental studies (Boysen, 2021; Murphy, 2020).

Participant confidentiality was maintained by using a hired research assistant to collect and transcribe raw focus group data; both limiting the ability to infer any causality in findings and course successor achievement. Considering I was not involved in the focus group interview and could not listen to the recording, my analysis was limited to the twenty-page transcript I received, which was devoid of any expressions other than comments voiced by participants. Establishing the accuracy of this initial transcription by the research assistant may also have influenced the study results (Azevedo, et al., 2017).

The ITSI-S is a self-report survey and may have facilitated an opportunity for bias or dishonest responses (Garwonski et al., 2016). The online survey sample size of (n=40)

participants, a response rate of 17%, was small considering the class size of 230 students. The ITSI-S survey used included 80 questions and may have impacted participation and completion. Comparison of qualitative and quantitative data was limited considering the focus of the questions asked were based on similar UDL principles but diverse for each collection tool that was used. Unequal sample sizes obtained from each data source, which likely involved different groups of participants may have provided an inaccurate representation of the overall distribution of subunits in this case.

Coexisting learning conditions such as the change from an in-person to online course delivery format with a large cohort, may also have limited the findings. The pandemic situation occurring during course delivery and data collection period in the fall 2020 semester, may have also influenced the results as students took multiple online courses concurrently, many for the first time. This could potentially have impacted their understanding of the course and involvement as participants in the study. The influence of the infectious outbreak of COVID-19 on students entering an unfamiliar and uncertain time in health care, may have further influenced the learning and experiences of certain learners in this particular cohort.

While there were some limitations that may have impacted the study findings, the advantages of UDL for learners in this study were evident. Future research is needed to further understand learner perspectives, experiences, and preferences of instructional strategies used in online post-secondary nursing courses. Additional research is required to move beyond this descriptive need for study towards investigating and establishing correlation to learner success.

Future Research

Conducting this study provided much needed empirical research into the perspectives of undergraduate nursing students. However, the limit of the case study scope requires that additional research continue to be conducted in online post-secondary nursing settings with learners. Evidence about learner perspectives regarding inclusive nursing education remains scarce in the literature, particularly related to large online courses. The importance of offering UDL-based instructional strategies is evident in post-secondary nursing education. Several research efforts are gaining ground in identifying learner perceptions of the effectiveness of UDL-based instructional strategies, but these are overwhelmingly focused on post-secondary students in teaching-based programs. Additional empirical study with larger groups of students should be conducted, building on the currently limited knowledge of learner preferences associated with instructional strategies. Insight into differences in findings from senior level undergraduate learners, such as fourth year students would be beneficial to explore.

Research is required to move beyond the perceptions garnered from the descriptive case study findings towards establishing any correlational relationship with learner success. A correlation to successful course completion, grades, and specific instructional strategies still needs to be explored more fully. Longitudinal studies would also be helpful in determining whether different course co-instructors would influence the experiences of learners, as instructor presence is essential to success. The use of control groups in future studies may permit a different level of evidence that is so desperately needed in establishing correlations between specific instructional approaches, potentially helping to establish a balance of supportive course elements. The integration of learner feedback into

future course offerings would also contribute to continuously refining the course to best support diverse learner needs.

Future research should explore and compare the impact of UDL in a variety of diverse course delivery formats to establish whether there is any effect on the learner's perspective of inclusivity, preferred instructional strategies used, and success. Determining the best balance of instructional approaches to use will help educators in supporting inclusion of an increasingly diverse post-secondary learner enrolment.

In Closing

This research offered insight into preferred and less desired instructional strategies rated and described by learners in the online offering of this large first-year course. Survey respondents rated the EIA segment constructs of accessible course material, inclusive lecture strategies, accommodations, inclusive assessment and classroom constructs of the tool most highly in the course. The BUI, and EIC segments of the ITSI-S tool modelled similar findings.

While multiple UDL-based instructional strategies are possible, an appreciation of the assessment methods used, instructor presence, and UDL-based course design elements were described as the most helpful to learners. Participants explained preferring the flexibility, variety, smaller assignments, rubrics, and flex time of assessment methods used in the course curriculum. Instructor presence was essential to learner satisfaction with some learners comforted to know support was available if needed. Engagement and collaboration with the content, instructors, and peers were seen by most participants as an important aspect of future nursing practice, despite some of the emotional challenges it presented for some groups and individuals. From an analysis of the findings and related

literature, it is evident that the benefits of implementing these instructional strategies far outweighed any challenges that arose for learners. However, integrating UDL-based instructional approaches into post-secondary online nursing education must be approached by educators as an evolving proactive process, not an end point for course design. A necessity for using online delivery methods required rethinking the role of the instructor and importance of presence and human connection to learner satisfaction and learner motivation in this environment. Educators need to move beyond traditional lecture-based approaches that may present curricular barriers for learners, towards new opportunities for emotionally supportive, flexible, engaging, and collaborative learning experiences. UDL can be used to advance multiple means of content representation, engagement, action and expression of knowledge understanding for diverse learner preferences and needs in online post-secondary nursing course curriculum.

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Appendix A: Research Ethics Board Approval Hosting University Fall 2020

REB - Confirmation of Approval jmuckle@trentu.ca <jmuckle@trentu.ca>
Wed 23/09/2020 2:13 PM
To: Ann Mary Celestini <annmarycelestini@trentu.ca>
Cc: Jamie Muckle <jmuckle@trentu.ca>

September 23, 2020
File #: 26368
Title: A Universal Design for Online Success: A Mixed Methods Case Study of a First-year BScN Course

Dear Miss. Celestini,

The Research Ethics Board (REB) has given approval to your proposal entitled "A Universal Design for Online Success: A Mixed Methods Case Study of a First-year BScN Course".

When a project is approved by the REB, it is an Institutional approval. It is not to be used in place of any other ethics process. To maintain its compliance with this approval, the REB must receive via ROMEO: An Annual Update for each calendar year research is active;

A Study Renewal should the research extend beyond its approved end date of August 31, 2021;
A Study Closure Form at the end of active research.

This project has the following reporting milestones set: Renewal Due-2021/08/31

To complete these milestones, click the Events tab in your ROMEO protocol to locate and submit the relevant form. If an amendments to the protocol is required, you must submit an Amendment Form, available in the Events tab in your ROMEO protocol, for approval by the REB prior to implementation.

Any questions regarding the submission of reports or Event forms in ROMEO can be directed to Jamie Muckle, Certifications and Compliance Officer, at jmuckle@trentu.ca

On behalf of the Trent Research Ethics Board, I wish you success with your research.

Best Wishes,
Dr. Michele Janet McIntosh
REB Chair

Phone: (705) 748-1011 ext.
7507 Email:
michelejmcintosh@trentu.ca

c.c.: Jamie Muckle
Certifications and Regulatory Compliance Officer

Research Project Amendment Application Decision
jmuckle@trentu.ca <jmuckle@trentu.ca>
Mon 16/11/2020 1:54 PM
To: Ann Mary Celestini <annmarycelestini@trentu.ca>
Cc: Jamie Muckle <jmuckle@trentu.ca>

November 16, 2020
File #: 26368
Title: A Universal Design for Online Success: A Mixed Methods Case Study of a First-year BScN Course

Dear Miss. Celestini,

Your application to amend "A Universal Design for Online Success: A Mixed Methods Case Study of a First-year BScN Course," has been approved.

If further amendments to the protocol are required, you must submit an Amendment Form, available in the Events tab in your ROMEO protocol, for approval prior to implementation.

This project has the following reporting milestones set:
Renewal Due-2021/08/31

To complete these milestones, click the Events tab in your ROMEO protocol to locate and submit the relevant form.

Any questions regarding the submission of reports or Event forms in ROMEO can be directed to Jamie Muckle, Certifications and Compliance Officer, at jmuckle@trentu.ca

Best Regards,
Jamie Muckle
Certifications and Regulatory Compliance Officer
Office of Research and Innova on

Suite 344, Gzowski College
Trent University

REB - Annual Progress Report Approved
jmuckle@trentu.ca <jmuckle@trentu.ca>
Fri 12/3/2021 9:48 AM
To: Ann Mary Celestini <annmarycelestini@trentu.ca>
Cc: Jamie Muckle <jmuckle@trentu.ca>

December 03, 2021
File #: 26368
Title: A Universal Design for Online Success: Changing the Delivery of a First-year BScN course

Dear Miss. Celestini
Your annual progress report for "A Universal Design for Online Success: Changing the Delivery of a First-year BScN course," has been approved.
If any further amendments to the protocol are required, please submit an Amendment Form, available in the Events tab in your ROMEO protocol, for approval prior to implementation.

This project has the following reporting milestones set:
Annual progress report-2021/12/31 Renewal Due-2022/08/31
To complete these milestones, click the Events tab in your ROMEO protocol to locate and submit the relevant form.

Any questions regarding the submission of reports or Event forms in ROMEO can be directed to Jamie Muckle, Coordinator, Research Conduct and Reporting, at jmuckle@trentu.ca

Best Regards,
Jamie Muckle
Coordinator, Research Conduct and Reporting
Office of Research and Innova on
Suite 344, Gzowski College
Trent University

Appendix B: Athabasca Research Ethics Board Approval

Athabasca University
RESEARCH CENTRE

CERTIFICATION OF ETHICAL APPROVAL

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

Ethics File No.: **24470**

Principal Investigator:
Miss. Ann Celestini, Graduate Student
Faculty of Humanities & Social Sciences\Doctor of Education (EdD) in Distance Education

Supervisor:
Dr. Agnieszka Palalas (Co-Supervisor)

Project Title:
A Universal Design for Online Learner Success in Nursing Education

Effective Date: September 23, 2021 **Expiry Date**: September 22, 2022

Restrictions:

Any modification or amendment to the approved research must be submitted to the AUREB for approval.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

A Project Completion (Final) Report must be submitted when the research is complete *(i.e., all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable))* or the research is terminated.

Approved by: **Date: September 23, 2021**

Carolyn Greene, Chair
Athabasca University Research Ethics Board

Athabasca University Research Ethics Board
University Research Services, Research Centre
1 University Drive, Athabasca AB Canada T9S 3A3
E-mail rebsec@athabascau.ca
Telephone: 780.213.2033

Appendix C: ITSI-S Consent Form and Survey

TITLE OF RESEARCH:

A Universal Design for Online Success: A Mixed Methods Case Study of a First Year BScN Course

RESEARCHERS:

Principal Investigator:

Professor Ann Celestini, Lecturer

Trent/Fleming School of Nursing

705-748-1011 ext. 6046

email: annmarycelestini@trentu.ca

RESEARCH ASSISTANT:

Sarah Capaz

BACKGROUND:

There are many different kinds of learners and learning styles. Despite this, teachers tend to use educational approaches that work best for the average or typical student. This presents a problem for learners who are not average or typical. Some people learn best by reading words, some people learn best by listening, and some people learn best by watching a demonstration and repeating the activity. There are many other ways that people learn, and many ways for people to show what they have learned.

The purpose of this study is to describe the impact of using principles of Universal Design for Learning (UDL) in NURS 1000, on student experience of an inclusive online learning environment that extends access to knowledge for diverse learners. UDL means that course instructors have used flexible approaches to presenting course content and encouraging learner engagement. UDL means that students have different ways to show that they have met course objectives. UDL is a way to help all learners excel, not just the average or typical learner. This approach is not meant to replace registration for accommodation with Student Accessibility Services (SAS).

This online survey is one way of assessing the impact of UDL in NURS1000. There will be other ways for you to be involved in this study as a NURS1000 student. These include participating in a focus group and/or giving permission for your assignment and final grades to be included in study data. In this consent form, you are only being asked to participate in the survey only.

BENEFITS:

You will not directly benefit by participating in this study and completing this survey. Your feedback, when analyzed with feedback given by others, has the potential to build knowledge about inclusive teaching practices in nursing education. You may gain satisfaction from this.

RISKS:

There are minimal risks to you in completing the survey. You may be concerned that your instructor will penalize you in some way if you decide not to take the survey. You may worry that your grades will be affected. I assure you that I will make every effort to maintain your anonymity. For example, the email that invited you to participate in this survey is not linked to your IP address. Your decision to take the survey is not linked to your IP address. Your survey answers cannot be traced to your IP address. Both your responses and your identity as a participant are anonymous. Further, as your instructor, I will not look at survey data until after your official grades for NURS1000 have been posted. You may find that completing the survey makes you think about in-course experiences in a different way. You may find some of these thoughts surprising or uncomfortable. The survey asks you about your course experiences in ways similar to a standard course or instructor evaluation. In general, the risks of completing the survey are no greater than risks you would encounter in your everyday life as a student.

PARTICIPATION

I invite you to take the time to share your opinions, but your participation is completely voluntary. You may decide not to begin the survey. If you start the survey and change your mind, you may withdraw from the survey and the study by simply closing the browser. Your survey responses will not be retained. If you do not want to answer a particular question, simply skip the question. Once you have completed the survey, however, it will not be possible for you to withdraw your information, as your survey is anonymous. There will be no consequences for students who do not wish to participate in the study. Participating or not will have no effect on your evaluation in the course, specifically your grades. Most people will take approximately 15 minutes to complete this survey. Some people may take a little more time, and some people will take a little less time.

CONFIDENTIALITY:

You have already clicked on the survey link, which has brought you to this consent form and the Qualtrics survey tool. After you complete the survey, your responses will be stored in a password protected electronic encrypted file on the Trent University server. The online host (Qualtrics) will not collect identifying information such as your email or IP addresses. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. I will report results in summary form and in no case will it be possible to link your responses to your identity. I will retain the survey data for a period of five years. Data will be stored in password protected encrypted electronic files. After completion of the survey, you will

have an opportunity to enter your name into a draw for twenty-five dollars Canadian which will be credited towards your Trent U card as a token of appreciation for your time.

CONFLICT OF INTEREST

I do not have any commercial interest in the results of this study.

HOW DATA WILL BE USED

After all of the data is analyzed, I will write a report. I will present the findings of the study to the School of Nursing and other departments in the University. I will write at least one article to be submitted to a scholarly journal and will present the findings at conferences. This anonymous data will also be used for secondary analysis for academic purposes in the future for my doctoral dissertation. I may also choose other ways to share the results of the study, such as making a video. There is no commercial potential in these study findings.

If you have any questions, please feel free to contact me:

annmarycelestini@trentu.ca, phone 705-748-1011 ext. 6046

STATEMENT OF CONSENT

By clicking on "PROCEED TO SURVEY" (below), I agree that:

- I have been fully informed about this survey
- I give my free consent to participate in this survey
- I understand that my responses cannot be linked to my identity
- I understand that I can stop the survey at any time, and close the survey, and my responses will not be recorded
- I understand that this project has been approved by the Trent University Research Ethics Board
- I understand that if I have any questions about your rights as a research participant or the administration of this survey, I can contact Jamie Muckle, Certification and Regulatory Compliance Officer jmuckle@trentu.ca (phone 705-748-1011 ext. 7896)
- If I wish, I can download a copy of this consent form for my record

PROCEED TO SURVEY (see following for survey details)

Inclusive Teaching Strategies Inventory- Student Survey (ITSI-S)

This survey is titled: Inclusive Teaching Strategies Inventory-Students (ITSI-S). This online survey is part of the study *A Universal Design for Online Success: Changing Delivery of a First-year BScN Course*

The purpose of this survey is to give you the opportunity to describe your experiences with Universal Design for Learning (UDL) in the online offering of NURS 1000. UDL is a set of principles for curriculum development that gives all individuals equal opportunities to learn.

We appreciate and value your participation. The survey should take you approximately 15 minutes to complete. This survey is anonymous. We are not asking for your name or any other identifiable data. Neither Professor Celestini nor the research assistant associated with this study will be able to connect you with your survey responses.

If you do not wish to answer a particular question, you can simply skip the question. You may stop doing the survey at anytime. If you decide not to complete the survey and withdraw from the study, simply close the browser and your survey data will be deleted.

Please answer the following questions about your background.

1. With which gender identity do you most identify?
   - o Female
   - o Male
   - o Transgender female
   - o Transgender male
   - o Gender variant/or non -conforming
   - o Not listed_____
   - o Prefer not to answer

2. Please indicate your ethnic background:
   - o African descent
   - o Asian/South Asian
   - o Caucasian (non-Hispanic)
   - o First Nations/Inuit/Métis
   - o Hispanic/Latino
   - o Multi-ethnic
   - o Other, please specify_____
   - o I prefer not to answer

3. My age is _____

The Accessibility for Ontarians with Disabilities Act (https://www.ontario.ca/laws/statute/05a11) **describes the term "disability" as covering a broad range and degree of conditions. A disability may have been present at birth, caused by an accident, or developed over time. Section 10 of the *Code* defines "disability" as:**

> **Any degree of physical disability, infirmity, malformation or disfigurement that is caused by bodily injury, birth defect or illness and, without limiting the generality of the foregoing, includes diabetes mellitus, epilepsy, a brain injury, any degree of paralysis, amputation, lack of physical co-ordination, blindness or visual**

impediment, deafness or hearing impediment, muteness or speech impediment, or physical reliance on a guide dog or other animal or on a wheelchair or other remedial appliance or device:

1. **a condition of mental impairment or a developmental disability,**
2. **a learning disability, or a dysfunction in one or more of the processes involved in understanding or using symbols or spoken language,**
3. **a mental disorder, or**
4. **an injury or disability for which benefits were claimed or received under the insurance plan established under the *Workplace Safety and Insurance Act, 1997*.**

4. I am a student with a disability (Yes/No)

5. (If "yes") indicate whether you have contacted the Office of Student Accessibility Services (SAS) to request services/accommodations and submitted the appropriate documentation

- Yes, I have contacted the OAS and submitted the appropriate documentation
- Yes, I have contacted the OAS but have not submitted the appropriate documentation
- No, I have not contacted the OAS

Inclusivity in teaching and learning is defined as creating a maximally accessible learning environment for diverse student populations (Sapp, 2009).
Please rate the following statements about your beliefs about universal design for learning (UDL) and inclusivity.

(1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree)

I believe it's important for my instructor to:

1. Allow students with documented disabilities to use technology (e.g. laptop, calculator, spell checker) to complete tests even when such technologies are not permitted for use by students without disabilities

1 2 3 4 5

2. Provide copies of lecture notes or outlines to students with documented disabilities

1 2 3 4 5

3. Provide copies of PowerPoint presentations or lecture notes to students with documented disabilities

1 2 3 4 5

4. Allow flexible response options on assignments (e.g. change from written to oral) for students with documented disabilities

1 2 3 4 5

5. Allow students with documented disabilities to digitally record (audio or visual) class sessions

1 2 3 4 5

6. Make individual accommodations for students who have disclosed a disability to the instructor

1 2 3 4 5

7. Arrange extended time on assignments for students who have documented disabilities

1 2 3 4 5

8. Extend the due dates of assignments to accommodate the needs of students with documented disabilities

1 2 3 4 5

9. Use a course website (e.g. Blackboard)

1 2 3 4 5

10. Put lecture notes online for ALL students (on Blackboard)

1 2 3 4 5

11. Post electronic versions of course materials or provide a hyperlink

1 2 3 4 5

12. Allow ALL students flexibility in determining assignment submission format

1 2 3 4 5

13. Allow a student with documented disability to complete extra credit assignments

1 2 3 4 5

14. Reduce the overall course reading load for a student with a documented disability even when the instructor would not allow a reduced reading load for another student

1 2 3 4 5

15. Reduce the course reading load for ANY student who expresses a need

1 2 3 4 5

16. Allow ANY student to complete extra credit assignments

1 2 3 4 5

17. Repeat a question back to the class before answering when a question is asked during a class session

1 2 3 4 5

18. Begin each class session with an outline or overview of the topics that will be covered

1 2 3 4 5

19. Summarize key points throughout each class session

1 2 3 4 5

20. Connect key points with larger course objectives during class sessions

1 2 3 4 5

21. Use technology so that course material can be available in a variety of formats (e.g. podcast of lecture available for download)

1 2 3 4 5

22. Use interactive technology to facilitate class communication and participation (e.g. email, adaptive quizzing, iClickers)

1 2 3 4 5

23. Present course information in multiple formats (e.g. lecture, text, graphics, audio, video, hands-on exercises)

1 2 3 4 5

24. Create multiple opportunities for engagement

1 2 3 4 5

25. Survey the classroom in advance to anticipate any physical barriers

1 2 3 4 5

26. Include a statement in the syllabus inviting students with disabilities to discuss their needs with them

1 2 3 4 5

27. Make a verbal statement in class inviting students with disabilities to discuss their needs with them

1 2 3 4 5

28. Use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities

1 2 3 4 5

29. Supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations)

1 2 3 4 5

30. Allow students to demonstrate their knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)

1 2 3 4 5

31. Allow students to express knowledge in multiple ways

1 2 3 4 5

32. Be flexible with assignment deadlines in my course(s) for ANY student who expresses a need

1 2 3 4 5

33. Allow flexible response options on assignments (e.g., change from written to oral) for ANY student who expresses a need

1 2 3 4 5

Please rate the following statements about instructor actions in the NURS1000 classroom

(1 = I don't know; 2 = Never; 3 = Sometimes; 4 = Most of the time; 5 = Always)

My instructor:

34. Allows students with documented disabilities to use technology (e.g. laptop, calculator, spell checker) to complete course work even when such technologies are not permitted for use by students without disabilities.

1 2 3 4 5

35. Provides copies of lecture notes or outlines to students with documented disabilities.

1 2 3 4 5

36. Provides copies of PowerPoint presentations to students with documented disabilities.

1 2 3 4 5

37. Allows flexible response options on assignments (e.g. change from written to oral) for students with documented disabilities.

1 2 3 4 5

38. Allow students with documented disabilities to digitally record (audio or visual) class sessions.

1 2 3 4 5

39. Makes individual accommodations for students who have disclosed their disability.

1 2 3 4 5

40. Arranges extended time on course assessments for students who have documented disabilities.

1 2 3 4 5

41. Extends the due dates of assignments to accommodate the needs of students with documented disabilities.

1 2 3 4 5

42. Uses a course website (e.g. Blackboard)

1 2 3 4 5

43. Puts lecture notes online for ALL students (on Blackboard)

1 2 3 4 5

44. Posts electronic versions of course materials or hyperlinks

1 2 3 4 5

45. Allows ALL students flexibility in determining assignment submission format

1 2 3 4 5

46. Allows a student with documented disability to complete extra credit assignments

1 2 3 4 5

47. Reduces the overall course reading load for a student with a documented disability even when they would not allow a reduced reading load for another student

1 2 3 4 5

48. Reduces the course reading load for ANY student who expresses a need

1 2 3 4 5

49. Allows ANY student to complete extra credit assignments

1 2 3 4 5

50. Repeats the question back to the class before answering when a question is asked during a class session

1 2 3 4 5

51. Begins each class session with an outline or overview of the topics that will be covered

1 2 3 4 5

52. Summarizes key points throughout each class session

1 2 3 4 5

53. Connects key points with larger course objectives during class sessions

1 2 3 4 5

54. Uses technology so that course material can be available in a variety of formats (e.g. podcast of lecture available for download)

1 2 3 4 5

55. Uses interactive technology to facilitate class communication and participation (e.g. adaptive testing)

1 2 3 4 5

56. Presents course information in multiple formats (e.g. lecture, text, graphics, audio, video, hands-on exercises)

1 2 3 4 5

57. Creates multiple opportunities for engagement

1 2 3 4 5

58. Surveys classroom in advance to anticipate any physical barriers

1 2 3 4 5

59. Includes a statement in the syllabus inviting students with disabilities to discuss their needs with them

1 2 3 4 5

60. Makes a verbal statement in class inviting students with disabilities to discuss their needs with them

1 2 3 4 5

61. Uses a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities

1 2 3 4 5

62. Supplements class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations)

1 2 3 4 5

63. Allows students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals)

1 2 3 4 5

64. Allows students to express knowledge in multiple ways

1 2 3 4 5

65. Is flexible with assignment deadlines in the course(s) for ANY student who expresses a need

1 2 3 4 5

66. Allows flexible response options on assignments (e.g., change from written to oral) for ANY student who expresses a need

1 2 3 4 5

Please rate the following statements about your experience in the NURS1000 classroom

(1 = I don't know; 2 = Never; 3 = Sometimes; 4 = Most of the time; 5 = Always)

67. The instructor presents information in multiple formats (e.g. lecture, text, graphics, audio, video)

12345

68. The instructor's expectations are consistent with the learning objectives stated on the course syllabus or study guides

12345

69. The course syllabus clearly describes the content and expectations of the course, specifically or in broad terms

12345

70. I am able to grasp the key points from instructional videos for this class

12345

71. I find that course materials are accessible, clearly organized and easy to use.

12345

72. Students in this course are allowed to express their comprehension of material in ways besides traditional tests and exams (e.g. written essays, projects)

12345

73. I receive prompt and instructive feedback on all assignments

12345

74. In this course I feel interested and motivated to learn

12345

75. I feel challenged with meaningful assignments

12345

76. The instructor offers contact with students outside of class time in flexible formats (e.g. face-to-face, email, online chat, telephone)

12345

77. The instructor explains real-world importance of the topics covered in this course

12345

78. The instructor creates a class climate in which student diversity is respected

12345

79. The instructor is highly approachable and available to students

12345

80. The course supplements lecture and reading assignments with visual aids

12345

Appendix D: Focus Group Consent Form

TITLE OF RESEARCH:

A Universal Design for Online Success: A Mixed Methods Case Study of a First Year BScN Course

RESEARCHERS:

Principal Investigator:

Professor Ann Celestini, Lecturer

Trent/Fleming School of Nursing

705-748-1011 ext. 6046

email: annmarycelestini@trentu.ca

RESEARCH ASSISTANT:

Sarah Capaz

BACKGROUND:

There are many different kinds of learners and learning styles. Despite this, teachers tend to use educational approaches that work best for the average or typical student. This presents a problem for learners who are not average or typical. Some people learn best by reading words, some people learn best by listening, and some people learn best by watching a demonstration and repeating the activity. There are many other ways that people learn, and many ways for people to show what they have learned.

The purpose of this study is to describe the impact of using principles of Universal Design for Learning (UDL) in NURS 1000, on student experience of an inclusive online learning environment that extends access to knowledge for diverse learners. UDL means that course instructors have used flexible approaches to presenting course content and encouraging learner engagement. UDL means that students have different ways to show that they have met course objectives. UDL is a way to help all learners excel, not just the average or typical learner. This approach is not meant to replace registration for accommodation with Student Accessibility Services (SAS).

This focus group is one way of assessing the impact of UDL in NURS1000. There are other ways for you to be involved in this study as a NURS1000 student. These include completing an online survey and/or giving permission for your assignment and final grades to be included in study data. In this consent form, you are only being asked to participate in a focus group.

BENEFITS:

You will not directly benefit by participating in this study and being a member of a focus group. Your feedback, when analyzed with feedback given by others, has the potential to build knowledge about inclusive teaching practices in nursing education. You may gain satisfaction from this.

RISKS:

There are minimal risks to you in participating in a focus group. You may be concerned that we will penalize you in some way if you decide not to take part. You may worry that your grades will be affected. In order to minimize this risk,

1. I will hold the focus group *after* NURS1000 is finished
2. I will keep your participation confidential. How?
    a. A focus group will be facilitated by our Research Assistant (RA). The RA will meet with you, explain the study, and ask you to sign the consent form. The RA will ask the questions.
    b. The RA will retain the signed consent forms on a password encrypted site on the Blackboard LMS.
    c. I am asking for permission to record the discussion. You may be worried that I can listen to the recording and identify your voice. I will not be listening to the recording. The RA will listen to the recording and transcribe your words, removing anything that could identify you.
    d. After transcripts have been verified, the recordings will be destroyed.
    e. I will analyze the transcripts only after official grades for NURS1000 have been posted

PARTICIPATION

All students who are registered in NURS1000 Fall 2020 are eligible to participate in a focus group. I invite you to take the time to share your opinions, but your participation in a focus group is completely voluntary. The RA will ask you questions about your experiences in NURS1000 that relate to UDL strategies. Your participation in a focus group will take approximately 1 hour of your time. Ten-dollars Canadian will be credited to your Trent U card as a token of appreciation for your time.

You are free to withdraw from the study at any time. If you wish to withdraw after the focus group is completed, you may do so. If so, contact (Sarah Capaz (RA) that you would like your information removed from the transcript. The RA will erase and/or not transcribe your words.

Once official grades are posted, and data analysis begins, it will not be possible for you to withdraw your participation and your data will be retained.

CONFIDENTIALITY:

I will report results in summary form and in no case will your words be linked to your name. I will do all of the things described in the "Risks" section above. We will make sure that your participation in a focus group is kept as confidential as possible. It is not possible to ensure complete anonymity, however. You be one of a group of NURS1000 students, so you may know who is in the virtual Zoom room with you, and they may know you. I will retain transcripts for a period of five years. Data will be stored in password protected encrypted electronic files.

CONFLICT OF INTEREST

I do not have any commercial interest in the results of this study.

HOW DATA WILL BE USED

After all of the data is analyzed, I will write a report. I will present the findings of the study to the School of Nursing and other departments in the University. I will write at least one article to be submitted to a scholarly journal and will present the findings at conferences. This anonymous data will also be used for secondary analysis for academic purposes in the future for my doctoral dissertation. I may also choose other ways to share the results of the study, such as making a video. There is no commercial potential in these study findings.

If you have any questions, please feel free to contact me:

STATEMENT OF CONSENT

I agree that

- I have been fully informed about this focus group
- I give my free consent to participate in this focus group
- I understand that this project has been approved by the Trent University Research Ethics Board
- I understand that if I have any questions about my rights as a research participant or the administration of this survey, I can contact Jamie Muckle, Certification and Regulatory Compliance Officer jmuckle@trentu.ca (phone 705-748-1011 ext. 7896)
- If I wish, I can retain a copy of this consent form for my records

Appendix E: ITSI-S Results Fall 2020

ITSI-S Segments and Constructs	Mean	Standard Deviation
Accommodations	**4.59**	**0.51**
Accessible Course Material	**4.56**	**0.45**
Course Modifications	**3.51**	**0.97**
Inclusive Lecture Strategies	**4.73**	**0.46**
Inclusive Classroom	**4.64**	**0.40**
Inclusive Assessment	**4.56**	**0.49**
A) BELIEF ABOUT UDL AND INCLUSIVITY	**4.43**	**0.39**
Accommodations	**4.39**	**0.77**
Accessible Course Material	**4.56**	**0.52**
Course Modifications	**3.20**	**1.42**
Inclusive Lecture Strategy	**4.41**	**0.69**
Inclusive Classroom	**4.07**	**0.78**
Inclusive Assessment	**4.18**	**0.78**
B) EXPERIENCE OF INSTRUCTOR ACTIONS IN THE CLASSROOM	**4.13**	**0.61**
C) EXPERIENCE IN THE CLASSROOM	**4.42**	**0.74**

Appendix F: Qualitative Instructional Strategies and Themes Summary

Student	Assessment Methods	Instructor Support	Course Format	Synchronous/ Asynchronous	In Class Activities	Weekly Units	EAQ	Technology	Paper With Flex time	Seminar Activities (SEM)	Group Project (GP/GP-B)	Formative Review (FR)	*Stress*	*Collaboration*	*Group project versus final*	*Other*
A	P S	P		P						P	P N S	N S	GP GPB FR GP			variety, smaller assign, application, scaffold, quality, availability, feedback, formative review, group project weighting
B	P					P N	P	N		N	P N		GP	P		rubric, variety, hands on, scaffold, learn vs memorize navigate, multiple platforms, navigate, requirements, schedule, platforms, pacing
C	P N				P						N		GP-B			rubrics, choice, no choice, group project part B-compare
D	P	P	P	P	P	P	P	P S	P	P N	P S			P	P	smaller assess, learn vs memorize, flexible, choice, RN skills, application, important skill, human, communication, navigate
E	P	P	P		P	P	P			P	P N S		EAQ SEM GP-B	P		learn vs memorize, flexible, choice, workload, compared part B
F		P	P N				N	P	P		P N	P	FT GP EAQ	P		skills vital to RN, important skills, communication, workload, EAQ, other chats group
G	P		P S	P		P		P S		N	P N		GP	P	P	rubric, scaffolding, good model, navigate, weighting

P = positive, N=negative, S =suggestion

Appendix G: Codebook Quantitative and Qualitative Classifications

Quantitative Inclusive Teaching Strategies Survey- Student Version (ITSI-S) Survey Classifications (Gawronski et al., 2016)

Segments:
Beliefs about UDL and inclusivity (BUI) (Attitudes: I believe its important for my instructor to..)
(1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree)

Experiences of instructor's actions in the classroom (EIA) (Actions: My instructor…)
(1 = I don't know; 2 = Never; 3 = Sometimes; 4 = Most of the time; 5 = Always)

Six Constructs:
Inclusive Assessment (4 questions)

- allow students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g., written essays, portfolios, journals)
- allow students to express knowledge in multiple ways
- be flexible with assignment deadlines in my course(s) for ANY student who expresses a need
- allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need

Inclusive Classroom (9 questions)

- use technology so that course material can be available in a variety of formats (e.g., podcast of lecture available for download, course readings available as mp3 files)
- use interactive technology to facilitate class communication and participation (e.g., Discussion Board)
- present course information in multiple formats (e.g., lecture, text, graphics, audio, video, hands-on exercises)
- create multiple opportunities for engagement
- survey the classroom in advance to anticipate any physical barriers
- include a statement in the syllabus inviting students with disabilities to discuss their needs with them
- make a verbal statement in class inviting students with disabilities to discuss their needs with them
- use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands-on activities
- supplement class sessions and reading assignments with visual aids (e.g., photographs, videos, diagrams, interactive simulations)

Inclusive Lecture Strategies (4 questions)

- repeat the question back to the class before answering when a question is asked during a class session
- begin each class session with an outline/agenda of the topics that will be covered
- summarize key points throughout each class session
- connect key points with larger course objectives during class sessions

Accommodations (8 questions)

- allow students with documented disabilities to use technology (e.g., laptop, calculator, spell checker) to complete tests even when such technologies are not permitted for use by students without disabilities
- provide copies of lecture notes or outlines to students with documented disabilities
- provide copies of overhead and/or PowerPoint presentations to students with documented disabilities
- allow flexible response options on exams (e.g., change from written to oral) for students with documented disabilities
- allow students with documented disabilities to digitally record (audio or visual) class sessions
- make individual accommodations for students who have disclosed their disability to the instructor
- arrange extended time on exams for students who have documented disabilities
- extend the due dates of assignments to accommodate the needs of students with documented disabilities

Course Modifications (4 questions)

- allow a student with documented disability to complete extra credit assignments
- reduce the overall course reading load for a student with a documented disability even when the instructor would not allow a reduced reading load for another student
- reduce the course reading load for ANY student who expresses a need
- allow ANY student to complete extra credit assignment

Accessible Course Material (4 questions)

- use a course website (e.g., Angel, Blackboard or faculty web page)
- put lecture notes online for ALL students (on Angel, Blackboard or another website)
- post electronic versions of course handouts
- allow students flexibility in submitting assignments electronically (e.g., mail attachment, digital drop box

Segment:

Experiences in the Classroom (14 questions)
Please rate the following statements about your experience in the classroom
(1 = I don't know; 2 = Never; 3 = Sometimes; 4 = Most of the time; 5 = Always)

- The instructor presents information in multiple formats (e.g., lecture, text, graphics, audio, video)
- The instructor's expectations are consistent with the learning objectives stated on the course syllabus or study guides
- The course syllabus clearly describes the content and expectations of the course, specifically or in broad terms
- I am able to grasp the key points from instructional videos for this class
- I find that course materials are accessible, clearly organized and easy to use.
- Students in this course are allowed to express their comprehension of material in ways besides traditional tests and exams (e.g., written essays, projects)
- I receive prompt and instructive feedback on all assignments
- In this course I feel interested and motivated to learn
- I feel challenged with meaningful assignments
- The instructor offers contact with students outside of class time in flexible formats (e.g., face-to-face, email, online chat, telephone)
- The instructor explains real-world importance of the topics covered in this course
- The instructor creates a class climate in which student diversity is respected
- The instructor is highly approachable and available to students
- The course supplements lecture and reading assignments with visual aids

Qualitative Classifications of Instructional Strategies

The classifications of instructional strategies were necessary to establish the parameters of each and maintain consistence in coding data. Specific aspects included in each are:

Assessment Methods
- variety, flexibility, options, guidelines, rubrics, and extended timelines

Instructor Presence
- availability, level of engagement with students,

UDL-Based Course Design Format
- UDL, choice, flexibility, variety, multiple means of engagement, representation, action and expression, scaffolding,

Synchronous and Asynchronous
- specifically identified synchronous and asynchronous elements in responses, orientation session

Unit Activities
- choice, application, bonus points

Weekly Units
- formatted similarly, included variety of activities to practice, multiple means of representation,

Elsevier Adaptive Quizzing (EAQ)
- specific to EAQ software

Technology Use
- any technology or software used in the course, except EAQ

Written Essay with Flex Time
- interview with a nurse, extended timelines or flex time

Seminar Activities
- practice risk free environment with instructor, meet others, apply skills, consolidate knowledge, interact with others, navigation issues

Group Project
- work, project, presentation, process reflection, and peer evaluation,
- scaffolding, real time, group process reflection, group work, presentation, peer feedback, instructor feedback/presence, workload balance, weighting

Formative Review
- application based- appropriate for scope of course content, not preferred by all

Other Themes Identified

Learning Environment

A. Emotionally Supportive
- engaged with classmates
- able to exercise choice
- EAQ provided a safe learning space with feedback
- sense of fairness
- well organized
- professor modelled collaboration, supportive, kind, interested, available,
- faculty "check-in moments", office hours, seminar presence

B. Emotionally Challenging
- learning to rely on other people in the group project
- anxiety-provoking (weighting group project)
- evaluation of others led students to evaluate their own work

Engagement and Collaboration
- content, instructors, and each other
- meet others, support in and out of class
- helpful in online environment

Impact on Learning/matching with learning preferences
- not being tested was helpful

- the group project helped students apply concepts from the course
- memorization replaced by application
- metacognitive skill development (reflection, peer feedback)
- content was organized and scaffolded: “When you break things down it is not so stressful”

Recognized and embraced universal design elements

- flexibility
- options
- application/hands-on learning
- advance organizers helped with navigation, application

Overall appraisal of course

- “It was my favorite”
- “Very helpful”
- “Enjoyed”