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Informing Inclusive Practice in Post-Secondary Environments: Perspectives of Post-Secondary Instructors with Learning Disabilities

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Informing Inclusive Practice in Post-Secondary Environments: Perspectives of Post-Secondary Instructors with Learning Disabilities

Abstract
This paper offers post-secondary instructors an opportunity to think about teaching practices and strategies for meaningful inclusion of students with learning disabilities (SLD) in post-secondary environments (PSE). Utilizing the narratives of the authors and building on the principles of Universal Design for Learning (UDL), it provides recommendations for effective inclusive pedagogy for instructors to consider. These recommendations are framed by the three main UDL guidelines of multiple means of engagement, representation, and of action and expression (CAST, 2011). By approaching teaching and assessment in this way, instructors may engage learners authentically, thus reducing the potential for disengagement and subsequent underachievement. This may also facilitate an equitable environment where students can participate in meaningful ways. Finally, instructors may have more time available in class to address student questions and provide support.

Cet article offre aux instructeurs et aux instructrices d'enseignement post-secondaire une opportunité pour réfléchir aux pratiques et aux stratégies d'enseignement qui favorisent une inclusion significative des étudiants et des étudiantes ayant des difficultés d'apprentissage dans les environnements post-secondaires. Grâce aux récits des auteurs et s'appuyant sur les principes de la Conception universelle de l'apprentissage, l'article fournit des recommandations pour une pédagogie inclusive efficace que les instructeurs et les instructrices peuvent prendre en considération. Ces recommandations comprennent trois lignes directrices principales : multiples moyens d'engagement, représentation, action et expression (CAST, 2011). En abordant l'enseignement et l'évaluation de cette manière, les instructeurs et les instructrices peuvent faire participer les apprenants et les apprenantes de manière authentique, et par là réduire le risque d'absence de participation et d'échec scolaire. Ceci pourrait également faciliter un environnement équitable où les étudiants et les étudiantes peuvent participer le manières significatives. Pour finir, les instructeurs et les instructrices peuvent avoir davantage de temps disponible en classe pour répondre aux questions des étudiants et des étudiantes et leur offrir du soutien.

Keywords
inclusive education, higher education, pedagogy, teaching, post-secondary, learning disabilities; enseignement inclusif, enseignement supérieur, pédagogie, enseignement, post-secondaire, difficultés d'apprentissage

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Despite the growth of inclusive policies, pedagogy, and research agendas, students with learning disabilities (SLD) continue to experience disparate achievement and outcomes when compared to their non-disabled peers (e.g., Clarke, 2016; Statistics Canada, 2008, 2011, 2012) and face a multitude of well documented barriers throughout their education. These barriers can adversely influence development, consequently impacting overall health (e.g., Goldberg et al., 2003), education (e.g., Clarke, 2016; Statistics Canada, 2008, 2012; Greenbaum et al., 1995), and life outcomes (e.g., Blackorby & Wagner, 1996; Goldberg et al., 2003; Speckman et al., 1993; Wenerm, 1993). As such, it is important to examine the experiences of SLD in post-secondary education (PSE) in order to contribute to the existing literature to highlight effective and ineffective teaching and assessment practices to potentially improve achievement and outcomes for these exceptional learners. The current positions of both authors being a principal instructor (author one), and an assistant professor (author two) at major research universities in Canada, allows for us to offer a unique contribution to the existing research in this area.

Historically, PSE has relied heavily on the transmission of knowledge via traditional lecture formats (Butler, 2011). Teaching in this way was often the preferred modality because of large class sizes, practicality, and feasibility for the instructors. However, SLD have voiced a need for faculty to augment lectures with visual aids, and transcripts for example, in order to circumvent challenges in accessing course content (Fuller et al., 2004). Because SLD are present in PSE, it is critical to develop effective and inclusive teaching and assessment adaptations to facilitate success for these learners. As Morina (2017) noted, a post-secondary education is a powerful tool for students to transform themselves and revalidate an identity that may have been impaired in other educational stages. In addition, it is an opportunity for educators and institutions to further develop inclusive policy and classroom practices which will ultimately benefit all students. Thus, SLD may profit from their experiences in higher education. Importantly, the teaching and learning processes are enriched by having diverse students in the classrooms because it challenges the students, instructors and professors, and the institution to facilitate equitable learning environments through inclusive design, such as those outlined in the Universal Design for Learning (UDL) framework. In this sense, the presence of SLD helps to build an inclusive post-secondary environment that will benefit all students, a better university, and ideally, improve achievement and degree attainment outcomes.

The purpose of this article is to stimulate consideration of effective instruction and assessment for SLD in post-secondary environments. We begin with a brief overview of learning disabilities (LD), reflecting on the challenges these students might experience in a post-secondary environment. Next, we review the UDL guidelines that will be utilized to explore our experiences as learners with LD. Following that review, we offer our experiences as narratives to highlight what it is like to be a student with LD in postsecondary education. These narratives are explored utilizing the three main UDL guidelines of multiple means of engagement, representation, and of action and expression (CAST, 2011). Through our stories, we offer readers an opportunity to think about teaching practices and strategies for meaningful inclusion of SLD in PSE by building on principles of UDL. Lastly, we offer recommendations posited as questions for instructors at the postsecondary level to consider when developing courses.

Students with Learning Disabilities

Definitions of LD are situated contextually (Gadsden, 2020). They include legislative, committee, and medical definitions used to operationalize LD (Kavale & Forness, 2001). In the

absence of a universally agreed upon definition of LD (Gerber 2012; Kavale & Forness, 2001), we have decided to use the definition developed by the National Committee on Learning Disabilities (1990, 2016):

> Learning Disabilities refer to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the lifespan. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other conditions (for example, sensory impairment, mental retardation, social and emotional disturbance) or with environmental influences (such as cultural differences, insufficient/inappropriate instruction, psychogenic factors), it is not the result of those conditions or influences (pp. 65-66).

As described in Gadsden (2020), it is important to note that these difficulties vary in severity, persist across the lifespan, and may affect one or more areas of an individual's life, including learning, work, and social and emotional functioning (Gerber, 2012). Students with LD may share diagnoses and difficulties in academic, socioemotional, and psychological domains; however, they are a heterogeneous group comprised of individuals (Gadsden, 2020).

Barriers in Post-Secondary Environments for Students with Learning Disabilities

The barriers these particular students face in PSE are varied and have been documented in the existing literature (e.g., Denhart, 2008; Skinner, 2004). They can be organized into two key dimensions: (a) external (originating outside the individual), and (b) internal (originating within) (Gadsden, 2020). Three key themes emerge from the literature that are related to external factors relevant to the barriers of SLD in PSE. Based on frequency, breadth and depth, these are: (a) misunderstanding, (b) labelling and stigmatization, and (c) gatekeeping. Misunderstanding begins with problems with perceptions. Stigmatization and stereotyping are ways others make sense of and react to perceptions. Gatekeeping is stigmatization enacted in the world (Gadsden, 2020). Students interviewed in the literature speak to barriers that include misunderstanding by faculty and peers, reluctance to request accommodations, fear of invoking stigma and enacted forms of that stigma such as gatekeeping. Importantly, challenges with perceived ineffective instruction and assessment have also been highlighted by SLD (Denhart, 2008; Skinner, 1999, 2004).

In addition, SLD in PSE identify barriers that are intrinsic to the individual, rooted in their individual lives that impact their meaningful participation and achievement in PSE. Scholarship from the field of psychology has clearly identified and articulated the relationships between a number of primary internal factors such as self-concept, self-efficacy and self-esteem (Pajares, 1996; Schunk, 1991), the maladjustment of which has been shown to be a barrier for SLD in PSE (e.g., Getzel & Thoma, 2008; Skinner, 1999). Poor self-understanding and understanding of disability have also been identified as barriers to achievement in PSE (Troiano, 2003). Therefore, research has demonstrated that there are multiple factors that can impact the academic success of SLD in PSE (Gadsden, 2020). One research-validated approach that is useful in addressing and mitigating the impact of these barriers is UDL framework, which is used to develop equitable learning environments.

Universal Design for Learning

UDL is based upon advances in cognitive neuroscience research and offers a framework that integrates what we know about the brain to inform the design of environments that support all learners (CAST, 2018). This flexible framework guides the design of learning environments which include learning and instructional goals, assessment, and methods and materials that can be adjusted to meet the complex needs of learners (CAST, 2018). This type of framework enables educators to respond effectively to the strengths and areas of need of all students. UDL provides teachers with broad principles for planning instruction and designing learning environments for diverse groups of students (CAST, 2018). In an educational context, UDL involves critically examining courses, texts, schedules, and other aspects of teaching and learning to design an optimally inclusive environment.

The goal of UDL, as with other related strategies such as differentiated instruction (DI), focuses on the provision of a range of instructional strategies, learning tasks, resources and assessment tools to meet the strengths, areas of needs, student readiness, and learning preferences of students. The aim is thus to provide equitable access to the curriculum for students, and to assist educators in designing products and environments to make them accessible to all (CAST, 2018) via reduction of barriers in instruction, provide appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including those with disabilities (CAST, 2011). Hitchcock et al. (2002) highlight the notion that no single method is effective in meeting the needs of all learners; thus, multiple pathways to achieving goals are needed. UDL is not a technique exclusively for special education; rather "it is a technique to enhance the learning of all students" (Turnbull et al., 2002, p. 92).

In practice, this can be achieved with sensitivity and attention to the three key dimensions of UDL, which contribute to the meaningful inclusion and participation of all students, especially those with exceptionalities. These dimensions—multiple means of engagement, representation and multiple means of action and expression—are interrelated and complementary (CAST, 2018). Multiple means of engagement refers to the *why* of learning; that is, how learners are engaged and remain motivated which are affective dimensions. The affective network is thought to affect interest, effort, persistence, and self-regulation (CAST, 2018). For educators, it is critical to stimulate the interest of students in order to cultivate persistence, resilience, and motivation for learning, especially for those experiencing difficulty. Multiple means of representation refers to the *what* of learning and acknowledges the different ways in which learners perceive and comprehend information presented to them. This type of representation involves the way in which an individual gathers and categorizes information and other processing, such as word recognition. Such processing draws upon the recognition networks of the brain and is thought to affect perception, language and comprehension (CAST, 2018). Finally, multiple means of action and expression refers to the *how* of learning. Drawing upon the strategic networks of the brain, it is thought to affect physical action, planning and performance of tasks, expression, communication, and executive function (CAST, 2018).

Walking the Talk: Our Stories

The UDL framework thus provides a useful filter through which one can analyze both learning experiences and teaching practices. The following are stories from the authors, two post-secondary instructors who reflect on our experiences as undergraduate students with LD and how

we utilized those experiences to inform our teaching practices. Based on these insights, we offer recommendations for other educators. We present both our experiences and our recommendations from the perspective of the UDL framework.

Multiple Means of Engagement

The construct of multiple means of engagement encourages us to think about why students want to learn, why they are motivated, and why are they interested in the content we are trying to teach them. Dr. David Rose, one of the co-founders of CAST, comments that when it comes to these guidelines, engagement is perhaps the most important. He notes that "if we don't engage students in learning, don't make it important to them, then none of the other forms of representation or expression will be that important" (CAST, 2010, p. 24). Below are the reflections of both authors regarding how their postsecondary experiences incorporated, or did not incorporate, the principle of multiple means of engagement.

> Author One: During my undergraduate studies, I found a great deal of content of little relevance and value to my interests and goals. Often, I felt like a passive vessel meant to learn by osmosis, rather than an active participant, explorer and experimenter. Assessment appeared to be misaligned with the objectives of coursework. For example, during an education course, a key task was to research and write about various philosophies of education in a class meant to focus on special and inclusive education. A more valuable task would have been meaningful outside the confines of the course, such as writing an IPP – a key skill required to support learners in classrooms. The content and assessment was of little practical utility for professional practice and I found it difficult to remain engaged. Consequently, I found that this type of coursework was limited in utility outside of the confines of the classroom and that it adversely affected my motivation to learn.
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> One of the most important ways I elicit and maintain student interest, investment and motivation is to highlight the utility and relevance of learning content and to demonstrate that relevance through authentic, meaningful activities. It is important to note that not all learners value the same activities and information because of their varied goals. Thus, I provide options that acknowledge this so that students are engaged, information and assessments are personalized, and situated in the heterogeneous learner's lives, culturally sensitive and responsive and developmentally appropriate (CAST, 2018).

> Author Two: When I took courses, I appreciated when my instructors provided me with choice and control over my learning. During my undergraduate years, this was often done with paper topics. Having the choice to pick a topic I cared about and was interested in learning more about was more interesting than being assigned a topic and told to write a paper. Nevertheless, writing papers can be challenging, and I also valued when instructors highlighted the goals and objectives for an assignment, or a class lecture. This allowed me to sustain my effort. It can be challenging to figure out what the "take-away" is and the mind can start to wander; therefore, having that clearly laid out helped me regulate that I was getting the necessary information, and helped me to see where I might need some extra support in my understanding.
>
> From my experiences in undergraduate studies, I always try to give my students choices and some control over their learning. I also try to give them hands-on activities to

try and make the material more authentic and interesting. I also start my lectures with a quick outline of what I hope they will "take-away" from my lecture, that students can use as a guide to gauge their learning and understanding. Also, when it comes to assignments, I give them as much notice as I can so they can manage the weeks leading up to the due date in a way that works best for them. I try my best to check-in with my students as to how they are doing and give them time to reflect on their learning. I always offer that they can contact me with any challenges related to the course and together we can make a plan to set them up for success and hopefully the strategies they use in my class they can take with them to other settings.

Multiple Means of Representation

Focusing on multiple means of representation allows educators to approach content in ways that are sensitive to the heterogeneity of learners' perception and comprehension of information. This is because "learning, and transfer of learning, occurs when multiple representations are used, because it allows students to make connections within, as well as between concepts" (CAST, 2011). As individual learners, we each brought unique needs and preferences to the classroom. These had a profound impact on our participation and achievement, and consequently they have influenced how we have taught our own students.

Author One: As an undergraduate fine arts student, I struggled with the way content was presented both inside and outside class. Lectures contained slides rife with a great deal of text, often over top of images of artwork. Processing the text and images simultaneously was overwhelming, stressful and frustrating. Adding to this frustration, professors often spoke about the artwork providing details beyond what was written on the slides. Consequently, I struggled to process the auditory information and had to rely on recording lectures, which enabled me to focus on one mode of representation at a time. Outside of class, I spent numerous painstaking hours transcribing lectures to ensure I captured the key components. In addition, it was expected that students read hundreds of pages of text in preparation for each lecture. I struggled and often failed not only to read the materials, but to retain much of the information, because I was too busy trying to decode the text. This limited my ability to engage with and make meaning from it.

As an instructor, I am sensitive to the ways in which I present material to students, because learners differ in how they process, perceive and comprehend information, and as such, require different ways of approaching content. I do so in a multimodal fashion because, when multiple representations are used, students are able to make connections within as well as between concepts and their world (CAST, 2018). Multimodal representation is optimal for all learners and is thus essential for an inclusive environment. If I use text in my slides, they contain minimal notations, and are often written in point form and on plain backgrounds to minimize visual noise. Key information is highlighted for students using text features. In addition, I present this information both in text and in other formats such as infographics, images, and video. I also present materials that are carefully organized for emphasis and coherence and am sensitive to pacing. Each slide has a specific focus and is differentiated. I carefully plan the amount of information presented, and importantly, how this is presented. Students are provided access to my lecture slides

prior to class so they may focus on what is said, instead of frantically attempting to read and process the visual and auditory information simultaneously.

Author Two: In the early years of my undergraduate studies, I struggled a lot with the presentation of materials in my lectures. The challenges would begin with how the information was displayed. While professors attempted to make their slides visually appealing with a variety of colours and fonts, this made the slides incredibly hard to read. Some instructors selected colours that made it hard to see the contrast between their text and backgrounds. As a professor now, I always make sure that my slides have a white background with black font. When trying to emphasize information I bold or use another dark colour to ensure all my students can see the content. Challenges with the display of information continued with the size of text, the amount of text, and the font style selected. I remember one class where the font was incredibly small and there was so much text that it was impossible for me to read the whole slide before the next one appeared. Not to mention no time left to take away any information that was presented orally. When I prepare my slides, I try and keep them as simple as possible, and make efforts to ensure that my slides supplement my lecture rather than competing for the student's attention. I even at times read from my slides. I feel that this is important to highlight important information, to ensure that the students are presented with this information in multiple modalities, and to ensure their attention is not unnecessarily divided. If I'm taking the time to read it, it also cues them that this is important to know. These cues help keep students on track with their notes. I provide my students with PDF and PPT versions of my slides so that they can pick the format that works best for their learning needs. Overall, I believe it is really important to display the information in a way that is accessible to all students and ensure that the accompanying lecture does the same.

I also remember courses where instructors would use new terms and not properly define them for the class. In one course I had there were over 200 definitions we were told to memorize. This was almost impossible for me and I struggled with the vocabulary that was used. In my lectures now, I always make sure I am defining key terms for the group so that vocabulary is not a hindrance to their learning. When I lecture, I also try to assist in their comprehension by linking new information to the content taught previously, to general background information they would have, or to metaphors and examples. I try to represent the information in multiple ways and recap at the beginning of the next class to try and maximize their understanding.

Multiple Means of Action and Expression

Multiple means of action and expression is sensitive to the different ways learners both "navigate a learning environment and express what they know" (CAST, 2018). In our experience, there were few opportunities for multiple modalities of expression and assessment was often monomodal, thus limiting our ability to actively participate and achieve. As instructors, we advocate for multimodal expression, clear, detailed assessment, and the use of exemplars.

Author One: As an undergraduate, I often found it challenging to demonstrate my knowledge because the ways in which I was assessed were monomodal and often magnified the adverse impact of my LD rather than allowing me to capitalize on my

strengths. In addition, the presence or absence of multiple means of action and expression also influenced the courses I took. For example, I avoided any courses that assessed learning using multiple choice examinations due to the impact of my LD.

As an instructor, I appreciate that learners differ in how they both navigate a learning environment and express what they know. I therefore employ various strategies to ensure equitable participation, assessment, and evaluation. For example, I use varied forms of assessment that require different skill sets and abilities such as a presentation, a research paper and opportunities for cooperative and collaborative discussions. These provide equitable opportunity for achievement because students can both capitalize on their areas of strength as well as develop areas of need. For example, some students may write exceptionally well and enjoy research papers, while others may struggle with writing but excel in presentations and facilitating discussions.

Author Two: In my undergraduate studies especially, there were always classes that only had multiple choice exams. This did not leave much room for those who had challenges applying their knowledge on multiple choice tests. I struggled in those classes and tried to avoid them. Therefore, I always looked for classes that had a paper as well as I felt I was better able to show what I had learned in those classes. When I teach now, I try to provide my students with multiple ways that they can demonstrate what they have learned. Some of the different things I do are have quizzes with different types of questions, have group discussions or group work, and written assignments where they can reflect on what they have learned or apply what they have learned to an example. In my lectures, I sometimes include multiple choice questions for students to answer anonymously as a way for me to monitor their progress and understanding of the material but also as a check in for them to see their growth over time, or for them to be able to acknowledge where they might need more assistance. When it comes to written assignments, where possible, I try to give examples of what I am looking for so that it is clear to students and helps them stay on track. I often provide them with a template to complete to help organize their learning and help scaffold their learning. This helps them to focus on expressing their ideas rather than worrying about formatting the content. I also like to give students checklists of what to include or how to complete assignments to assist with their planning and completion of their assignments. I try to ensure that my marking rubric is detailed and well laid out so that there are no surprises when students receive their marks, and students know exactly what the expectations are.

Tying it All Together

As our stories reveal, navigating the increasingly diverse context in which SLD learn is a challenge for post-secondary educators, many of whom have not had the benefit of developing strategies for SDL while working in academic positions (Muller, 2006). Educators contribute crucially to an inclusive learning environment, the components of which work in tandem via accommodations and supports, family involvement, administrative support, professional development, vision and attitude, relationship building, and most pertinent to this discussion, effective instructional strategies (Kraglund-Gauthier et al., 2014). To provide some guidance for post-secondary educators, we use key elements of the UDL framework and repurpose them as questions they may use to develop sensitive and inclusive classroom practices. These questions,

which we present in dialogue with the experiences shared above, are intended to stimulate thinking about how post-secondary educators may employ the principles of UDL in their classrooms.

Enhancing Engagement

To maximize the potential for engagement of SLD, post-secondary educators may ask themselves a series of questions based on the three key dimensions of UDL. In seeking to facilitate multiple means of engagement, first, they may consider the following: (a) How can I make it interesting? (b) How can I sustain student effort and engagement? and (c) How can I help students to self-regulate?

Making it Interesting. Research validated frameworks such as UDL (CAST, 2011) suggest that instructors can elicit student interest by optimizing relevance and value for students by being sensitive to their cultural and linguistic backgrounds as well as their interests and needs both inside and outside of the classroom (in contrast to Author One's experiences above). To address this, instructors can ask themselves what the practical relevance of a lesson or activity is for students; in an inclusive education course, this might involve determining the value of having students memorize the anatomy of the brain versus using an understanding of brain networks to effectively develop lesson planning skills. It is also important to provide students choices and opportunities to exercise autonomy and develop self-regulatory skills.

Sustaining Engagement. In order to sustain effort from students, it is important, as our experiences show, to clearly articulate goals and objectives and make them available for students to review from the outset. Instructors can also actively involve students as co-constructors of success criteria to that achieve curricular goals and objectives to maximize their investment. For example, in an inclusive pedagogy course, a goal for students may be to complete an individual program plan (IPP). Actively involving students in developing the criteria that will be used to determine various levels of achievement will make students more accountable and responsible for their work.

It is also important to break down large tasks into manageable pieces with ongoing due dates to help sustain effort from students so that they can visualize the bigger picture. Students then become sensitive to the importance of organization and use of time as well as developing key skills such as time management. This sensitivity may translate into increased accountability and responsibility for their achievement. This is an especially important part for SLD because they often have comorbid challenges in learning such as Attention-Deficit Hyper Activity Disorder (ADHD) which may interfere with their ability to sustain concentration and complete tasks (Dupaul et al., 2011), as well as increased levels of anxiety (Schatz & Rostain, 2006). Lastly, educators can sustain effort and engagement of their students by providing timely and meaningful feedback to students; whether it involves comments on student assignments or brief conferences between instructor and student. The principles of UDL purport mastery- oriented feedback which refers to meaningful and authentic, specific feedback that will help learners to grow and develop (CAST, 2011).

Helping Students to Self-regulate. When compared to their non-disabled peers, SLD are more likely to struggle with self-regulation (Harris et al., 2004). This has been shown to impact their social, emotional, and psychological development and well-being, consequently impacting their academic participation and achievement (Goldberg et al., 2003; Raskind, 1999). Research has highlighted the importance of the internalization of effort and persistence, and academic self-efficacy. This is important to multiple means of engagement because students need to develop

their own ways to sustain effort and self-regulate to achieve goals they may not find interesting. As a post-secondary student, Author Two valued clearly articulated goals and objectives, without which students may disengage. To help develop self-regulatory skills and behaviours, therefore, it is critical to engage learners in authentic, meaningful activities focused on practical utility.

It is important to note, however, that the skills and strategies used by students, especially SLD, are highly individualized, and students should therefore be provided multiple opportunities to try out various strategies that will support developing this important skill. We encourage educators to provide such opportunities for students to both practice and reflect on strategies and their own learning. This can be achieved through opportunities for students to self-reflect and self-assess which will facilitate metacognition, or the development of self-regulatory behaviours. In practice, self-regulation can be developed independently, and also effectively in various group formats. Collaborative and cooperative learning opportunities such as small and large group discussions and tasks can foster cooperation, collaboration, and a sense of community.

Representing Content Successfully

As previously noted, learners differ in the ways they both perceive and comprehend information that is presented to them (CAST, 2018). The diversity of PSE requires a sensitivity to ensuring educators differentiate the ways in which content is approached. This is important because students learn best when multiple representations are used; these allow students to make connections within and between concepts (CAST, 2018). To enact such sensitivity practically, educators may ask themselves three key questions: (a) How should I present information to students? (b) Do my students know what I am talking about? and (c) Do my students understand me?

Presenting Information Effectively. The UDL guidelines reveal that learning is not possible if information is unapparent to the learner and is difficult when material is presented in formats that require exceptional effort from students or significant assistance (CAST, 2018). Therefore, it is important to ensure that information is equally accessible to all learners via multiple modalities and flexible formats such as video, discussions, and infographics. According to Rose et al. (2006), the flexible means of content presentation has the potential to mitigate the impact of physical, perceptual, and cognitive barriers that can interfere with learning. Monomodal instruction is not an equitable practice because material is not equally accessible to all learners and is especially inaccessible for learners with disabilities, learners who need increased processing time or for learners who have memory difficulties (CAST, 2011). Thus, effective instruction is multimodal instruction.

To ensure that all learners have equal access to information, it is essential to provide it in variety of formats. Alternative formats may include discussion, which is useful for clarifying abstract concepts, diagrams that offer critical concise information, infographics that offer a visual narrative, audio such as lecture to appeal to those with auditory strengths, video or animations that may help students with executive functioning or memory challenges review information, and opportunities for active, experiential learning such as problem-based or inquiry-based activities. In addition, meaningful use of technologies may be employed by students because they have the potential to provide a flexible format that allow students to manipulate, highlight, make in-text notations, and copy information (Ofiesh et al., 2002). Importantly, SLD surveyed by Fitchen et al. (2001), indicated strong support for having course materials available in multiple formats,

especially electronically because there are many potential benefits for SLD, as it allows for customized modification and are compatible with assistive technologies such as text readers.

Working Effectively with Language. As noted in the UDL framework, students vary in their facility with different forms of representation (CAST, 2018). Therefore, it is important to ask oneself, *do my students know what I'm talking about*? Educators must be sensitive that linguistic and non-linguistic understanding is mediated by social, cultural, familial, and educational backgrounds. Shared understanding of language amongst learners and vocabulary, for example, is unlikely. As a result, inequalities may arise; educators must thus clarify vocabulary and symbols, syntax and structure, facilitate opportunities for decoding of text and symbols, and illustrate language and symbols through multiple media (CAST, 2018). Specifically, instructors must ensure students share an understanding of language that is specific to the current milieu. It is essential when illustrating meaning, that this is done multimodally and grounded in meaningful references to the lives of students. Instructionally, an educator may aim to ensure that alternative representations are provided not only for accessibility, but for clarity and comprehensibility across all learners (CAST, 2011).

Educators may ensure shared understanding by employing a variety of strategies. For example, they can ensure accessibility for all students by linking key vocabulary and symbols via alternative representations of their meaning such as a visual dictionary, graphic equivalents and charts. More explicitly, instructors can pre-teach vocabulary and symbols and embed support for vocabulary and symbols within text such as a hyperlink or footnotes. They often find that syntax and structure is not necessarily familiar to all learners and thus, comprehension is impacted. This issue can be addressed by making patterns and properties of systems such as grammar explicit by highlighting structural relations and making relationships between elements clear.

Students in PSE vary in their ability to decode text and symbols. Lack of fluency or automaticity increases the cognitive load of decoding while reading, thereby reducing the capacity for comprehension and timely processing (CAST, 2011). To increase equitable access to information, it is important to provide options that reduce barriers. These could include the use of text-to-speech software and read-aloud software. SLD, especially those with dyslexia, have significant challenges with decoding and notation (Lyon et al., 2003). Thus, it is also important to support the decoding of text notations and symbols to ensure these do not adversely impact the achievement of learning goals (CAST, 2018).

Activating Student Understanding. Students differ greatly in their ability to process information and to access prior knowledge through which they can assimilate new information (CAST, 2018). Effective design and presentation of information is the responsibility of instructors; it can be achieved by utilizing an inclusive pedagogy and by being sensitive to how students make sense of what is being presented. According to the UDL framework (2019), educators can achieve this by building connections to prior understandings and experiences, highlighting key information and relationships to learning goals, and supporting the process of meaning making and the application of learning to new contexts.

Building connections to prior knowledge can be achieved by using advanced organizers such as Know, Want to Know and Learned (KWL) charts and concept maps, and by using culturally, linguistically and temporally relevant analogies and metaphors rooted in the lives of students. This is especially important for SLD who often have difficulty with abstract concepts and identification relationships (Lerner et al., 1997). Another effective strategy in ensuring students can make sense of what is being communicated is to provide explicit cues or prompts that help students identify features that matter most. The narratives of both authors highlight this as an

important consideration in the presentation of information. Both authors refer to the importance of using text features to emphasize key elements in text, graphics, diagrams, and formulas. Educators may also use various cues and prompts to draw attention to critical features, emphasize key ideas and relationships as well as critical features.

In order to guide information processing and visualization, which is critical to comprehension, well-designed materials such as models, scaffolds and timely and meaningful feedback will support learners with strategies to process information. Educators can aid students in developing these skills by modelling a variety of strategies for organization and provide multiple entry points to a lesson and optional pathways through content. As illustrated in the authors' narratives, another effective strategy is to remove unnecessary distractions unless essential to the instructional goal (CAST, 2018). Lastly, comprehension can be increased by maximizing generalizability of new learning to a variety of student-centered contexts.

Optimizing Action and Expression

To optimize the potential for student action and expression, post-secondary educators may once again ask themselves a series of questions based on the three key dimensions of UDL. To address multiple means of action and expression they may consider the following: (a) Can my students do what I want them to do? (b) Can my students show me what they know? and (c) Can my students set goals and be strategic?

Physical Participation. It is critical to consider how one's students will navigate, manipulate, and interact within the physical learning environment. Inevitably, navigation and interaction may raise barriers for some learners. For example, SLD with Dysgraphia may not be able to equitably participate in various activities that require fine motor control and speed such as using a keyboard thus rendering some educational and assistive technologies ineffective. Therefore, it is important to provide materials with which all learners can interact. Properly designed curricular materials will provide a vehicle through which individuals can navigate and express what they know—to allow navigation and interaction (CAST, 2011). This can be achieved by varying the methods for response and navigation and, selection of equitable and accessibly tools and assistive technologies (CAST, 2018). Because learners differ in their capacity to navigate the physical environment, reducing barriers is key. To provide equitable opportunities with learning experiences, instructors must ensure there are multiple means of navigation such as provision of multiple modes of instructional materials, manipulatives and technologies. Importantly, instructional materials and technologies must not impose inadvertent barriers to the use of assistive technologies.

Expression and Communication. There is no medium of expression that is suitable for all learners. Universal design behooves instructors to provide equitable opportunities for learners to share what they know. Monomodal response opportunities do not acknowledge the rich diversity of learners and do not facilitate opportunities for learners to capitalize on their strengths, or opportunities to develop skills that require remediation. It is well documented that SLD often experience underachievement (Denhart, 2008; Hudson, 2013), failure and higher rates of drop-out than their non-learning disabled (NLD) peers (e.g., McGreggor et al., 2016; Murray et al., 2000). It is also clear that SLD, not unlike their NLD peers, need to experience achievement and fulfillment to buttress the emotionally taxing and often frustrating experience of school. Thus, it is important to provide multi-modal response opportunities, so all students are able to participate equitably and experience success while developing skills in areas of need. For example, a student

with dyslexia may excel when doing a presentation but may do quite poorly in a written task. Reflecting on their own experiences, the authors identified that multimodal response opportunities are an effective way to ensure post-secondary students can experience success. Other equitable expression and communication practices would include the use of multiple tools for construction and composition and scaffolding to facilitate independent learning.

Planning and Organizing Participation. Executive functions allow learners to take advantage of their environment (CAST, 2018). These functions include inhibition ability (suppression of dominant action tendencies in favor of more goal-appropriate behavior), shifting ability (disengagement of an irrelevant task or strategy and the subsequent activation of a more appropriate one), and updating (encoding and evaluation of incoming information for relevance to the task at hand and subsequent revision of the information held in memory) (Bull et al., 2008). It is important to help develop the skills requisite to enable students to set goals and develop strategic thinking skills and abilities.

The UDL framework aims to develop executive capacity. In practice, this firstly involves opportunities for students to practice setting challenging and authentic goals. Students need to develop these skills and such opportunities should involve a gradual release of scaffolding. Secondly, students would benefit from opportunities to formulate reasonable plans and strategies for achieving stated goals. It is well documented that SLD struggle with executive functions, such as goal setting, organization, time management, planning and strategy development, and implementation (Gerber, 2012). As such, it is important at the post-secondary level to not assume students have honed these skills and it is necessary to model and employ planning and a number of strategies as well as provide opportunities for students to use them. Instructors can support planning and strategy development by providing exemplars, timelines and schedules and chunk task due dates.

This is closely related to the third strategy to help develop executive functions. Often, it is difficult for SLD to retain information in the working memory which is necessary for comprehension and problem solving. As a result, students may have trouble with organization, appear forgetful and be unprepared. An effective instructor using the UDL framework, may benefit from a variety of internal and external organizational aids to help students retain, organize, and prioritize information such as graphic organizers and templates, and prompts and exemplars to aid in organization and the provision of notes and checklists.

Finally, it is critical to provide metacognitive opportunities for learners to analyze growth over time and how to build from it. This ultimately refers to the capacity for monitoring progress and developing self-regulation and self-awareness. Learning cannot occur without feedback; therefore, learners need a clear understanding of their progress. Good practice involves formative and summative feedback that is explicit, timely, informative and meaningful, specific to each student and accessible. In practice, this may involve a metacognitive journal or opportunities to reflect on learning and process, multiple modalities of progress representation such as graphs, written feedback or voicethreads, prompts for learners to identify areas of need and resources to support that endeavour, use of a variety of assessments such as checklists, rubrics, and work samples, and lastly, provide important models of self-assessment such as peer feedback and role-playing. This type of feedback contributes to learner motivation and achievement because it provides opportunities for learners to monitor their own progress effectively and to use that information to guide their own effort and learning (CAST, 2011).

Final Thoughts

The facilitation of a universally designed inclusive environment is the shared responsibility of students, educators, and post-secondary institutions. Most importantly, it begins with the educator who proactively addresses the heterogeneity of students to design an equitable environment where *all* students can experience success. By thinking with the UDL framework and employing the strategies laid out in this paper, educators can fully support students whose experiences mirror those of the authors.

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