

## **Universal Design for Learning (UDL) Principles In An Online Psychology of Education Course**

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### *Abstract*

*The implementation of Universal Design for Learning (UDL) principles in post-secondary education has received much attention in the past two decades, primarily as an approach to support the learning of students with special needs. In this exploratory study, we will share the experience of implementing UDL in an online, entry-level, introductory course: Psychology of Education. We examined the feasibility and challenge of incorporating the key UDL principles – multiple means of Engagement, Representation and Action, Expression of Learning. Evidence of positive student engagement was derived from the information management system, which allowed us to track students' feedback about the accessibility, clarity and relevant of the learning activities. One of the main challenges encountered was related to the under-utilization of Discussion Board, which we will address in the 2020 revision of the course, in order to promote greater interdependence and cooperation among students.*

Universal Design for Learning (UDL) as an instructional framework provides a set of principles for meeting the pedagogical needs of diverse learners in inclusive classrooms, at the elementary and secondary levels, as well as in post-secondary settings. It is conceptualized as a student-centered, proactive way of instructional design, where the instructor begins by considering the differential needs of students within the classroom, and then come up with instructional and evaluation activities that meet the needs of the students (Capp, 2017). The philosophical underpinnings of UDL – that there are multiple and flexible pathways to represent knowledge, to increase student engagement by stimulating interests and motivation, and to allow students to demonstrate their understanding and learning – set the foundation for differentiation and student success (CAST).

In a qualitative study by Silver, Bourke, & Strehorn (1998), where faculty members of a post-secondary institution participated in focus-group discussions to share their perceptions and experience of UDL, several strategies were identified as supportive of students' learning and consistent with UDL principles. Among these were: cooperative or team learning; constructive learning, scaffolding, multi-modal instruction, peer-supported learning, and on-line learning. The authors noted that changing university culture is challenging, and providing in-service support to faculty is necessary.

Booth, Lohmann, Donnell & Hall (2018) assert that UDL could be used to ascertain accessibility and equitable opportunities for learning to all individuals, and especially to students with disabilities at the post-secondary level. They highlighted the importance of providing flexible opportunities to learning by allowing students to choose from a range of multi-modal presentation of information, using graphic organizers to plan assignments, and using technologies to accommodate areas of challenges – including text-to-voice and voice-to-text, and digital recordings for repeated access to information. As well, these authors also advocated for the provision of flexible opportunities for students to demonstrate their learning and knowledge through essays, podcasts, and videos. The use of Discussion Boards was also recommended as a way to provide weekly tutorials to strengthen content mastery, as well as reinforcing effective learning strategies, such as note-taking. Finally, flexibility should also be awarded by allowing choices of topics in assignments related to a specific concept.

In a meta-analysis, Capp (2017) examined 18 peer-reviewed research studies, and found promising outcomes with respect to the use of UDL principle of augmenting access to knowledge by using multiple ways of representing knowledge in a variety of teaching contexts. Nevertheless, there is a need for further empirical studies to determine if the implementation of UDL principles in instructional design leads to improved educational outcomes.

#### The Context of the Present Study:

The use of technologies or assistive technologies complements UDL by offering a range of modalities to represent knowledge, and this can also engage students in their learning and to empower their learning. At the Department of Education of Concordia University (Montreal, Quebec, Canada), one of the entry-level courses, *Psychology of Education*, services approximately 450 students per academic year. This course was designed with the objectives of servicing students from a wide spectrum of academic disciplines – as a compulsory course for those who are Majoring in one of our Education programs (e.g. Child Studies, Early Childhood and Elementary Education, Teaching English as a Second Language, Art Education), and as an elective course for students who are interested in the content of psychological theories applied to teaching and learning. More importantly to service students with diverse learning abilities, challenges and needs. While this course was traditionally delivered through in-class lectures, we collaborated with instructional designers at eConcordia in 2016 to develop the on-line version. When designing the learning activities for this course, we incorporated the following UDL principles:

Provide multiple means of <b>Representation</b> of information	<p><b>Variety of delivery methods:</b> 10- to 15-minute lecture recordings, voice-over PowerPoint presentations and podcasts; all content are accompanied with <b>written transcripts</b>;</p> <p><b>On-line access</b> allows students to magnify script, increase volume, pause-and-listen-again;</p> <p><b>Links to relevant audiovisual input:</b> e.g. films, videos and TEDtalks to maximize their engagement.</p>
Allow for multiple means of <b>Action and Expression</b>	<p><b>Use of clearly articulated grading rubrics</b> to communicate the criteria for assignments and learning;</p> <p><b>Flexible opportunity</b> for demonstrating learning:</p> <ul style="list-style-type: none"> <li>• Formal evaluation format includes multiple-choice questions (Remember, Understanding), short answer questions (Apply, Analyze); case-study questions (Evaluate, Create);</li> <li>• Each module begins with “Testing your prior knowledge”;</li> <li>• Each module ends with a “Post-test quiz” to “test-your- learning” that allows multiple opportunities for learning and provides immediate feedback.</li> </ul>
Encourage multiple means of <b>Engagement</b>	<p><b>Technology</b> allows for flexible, on-line access to course material;</p> <p><b>Discussion Board</b> as a forum for students to share their reflections and questions about the content, and to encourage cooperative learning among peers;</p> <p><b>Self-directed learning:</b> Pre- and post-test quizzes students have the opportunity to receive immediate feedback;</p> <p><b>Use of clearly articulated grading rubrics</b> to promote self-regulation;</p> <p><b>Adequate and timely feedback</b> from the instructor and teaching assistants to provide on-going scaffolded support for navigating the on-line activities and mastering the content.</p>

#### Methodology:

In this exploratory study, we examined the feasibility and challenge of incorporating key UDL principles in the instructional design using an on-line platform. We were interested to know if the UDL principles in the instructional design adequately provided multiple ways for representation of knowledge, allowed students to express their learning through a variety of means, and engaged them in self-directed learning. A mid-course survey was designed to elicit students’ feedback about the course design and their learning experience (Appendix 1). A total of 227 students who were enrolled in the course during the 2018-2019 academic year participated in the study.

#### Results:

While a small number of students (1.3% of the participants) clearly stated that on-line learning is not suitable to their learning styles and needs, the majority of students (86% of participants) reported that the instructional design of this on-line course is effective for learning. Eighty-two

percent (82%) of participants reported that the learning activities stimulated their engagement in learning throughout the course, and 90% of participants reported that the learning activities allowed them to reach the learning objectives. An astounding 97% of students actively relied on the pre- and post-tests, as well as instructor-led exam reviews to master different modalities of expression of their knowledge. Finally, 43.7% of students shared insights related to effective learning strategies, time planning, organizational skills, note-taking skills, and study habits that are essential for student success; more specifically, they highlighted the importance of sustained effort in reading and interacting with course material over time to achieve deeper-level understanding and mastery, as opposed to cramming-for-the-exam.

<p>Did the course provide multiple means of <b>Representation</b> of information</p>	<p>86% of participants reported that the instructional design is effective for learning</p> <p>54.4% of students' comments referred to the material being interesting, relevant, clear, and well-sequenced</p> <p>25% of students' comments highlighted the benefits of having written transcripts and activities that accommodate diverse learning styles</p> <p>11% of students' comments specified the advantage of on-line learning to learn at one's pace and allows for repeated access to the content</p>
<p>Did the course allow for multiple means of <b>Action and Expression</b></p>	<p>90% of participants reported that learning activities allowed them to reach the learning objectives</p> <p>97% of students' comments referred to the effectiveness of Pre- and Post-tests and Exam Reviews that provided different modalities of expression of their learning</p>
<p>Did the course encourage multiple means of <b>Engagement</b></p>	<p>82% of participants reported that the learning activities stimulate their engagement</p> <p>67.3% of students' comments mentioned Interesting and relatable content, with relevant example and videos</p> <p>43.7% of students' comments showed insight about their learning strategies, time planning, organizational skills, note-taking skills, and study habits</p> <p>19.6% of students' comments emphasized that the freedom to go at one's pace reinforced their engagement</p> <p>6.5% of the student's comments identified the repeated access to content as helpful in promoting engagement</p>

The results of this study also revealed important challenges, which we will address in the 2020 revision of the course, in order to promote greater interdependence and cooperation among students.

Did the course provide multiple means of <b>Representation</b> of information	4.8% of the participants experienced mechanical issues that, at times, interfered with their access to the learning activities and course materials
Did the course allow for multiple means of <b>Action and Expression</b>	4% of the participants felt that their expression of knowledge could be enhanced by having more opportunities for in-depth discussions via discussion boards or live chat sessions
Did the course encourage multiple means of <b>Engagement</b>	1.3% of participants did not favour on-line transmission of knowledge and the use of on-line textbook  3.1% of participants felt that the amount of course material and assigned reading were overwhelming and discouraging

In addition, there was a serious under-utilization of Discussion Boards by the students. Posted questions were often related to logistic and technology problems, but rarely related to content and concept mastery and high-level learning. Efforts need to be made to explicitly teach students the skills required for a successful discussion (Brank & Wylie, 2013). Boothe, Lohmann, et al. (2018) and Scott, Temple & Marshall (2017) also advocate the use of a discussion boards for interactions with the instructor for content clarifications, and a separate discussion board for students to engage in discussion regarding specific assignments or cooperative learning activities.

#### Summary and Future Directions:

This exploratory study reviewed encouraging indicators that students with diverse learning needs would benefit from on-line delivery of a content-laden course when Universal Design for Learning principles were used to guide the instructional design. Using multiple means of representing knowledge and learning activities, on-line learning can accommodate a variety of learning styles pace. Evaluation of learning that includes varied formats and on-line resources and technologies can provide the necessary testing accommodations, particularly when collaborating with the university's Students Accessibility Services. Finally, student's engagement can be maximized by carefully sequencing instructional content, supported by multi-media presentations and live interactions with the course instructor. These results are consistent with previous studies which showed promising application of UDL principles in on-line, post-secondary level classrooms with diverse student populations (Booth, Lohmann, Donnell & Hall, 2018; Capp, 2017; Silver, Bourke, & Strehorn;1998). Further empirical research could be conducted to ascertain the effects of UDL in the learning outcomes of at-risk students, as well as

those diagnosed with Specific Learning Disorders. Finally, because technical help is only available during business days/hours, rendering the technology sometimes inaccessible for students who prefer to work afterhours, it is critically important to explore ways to strengthen students' collaboration in trouble-shooting to solve technical problems or assisting each other in navigating the course site.

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