

Shaping Inclusive Learning: A Comparative Study Of Udl Engagement Pre- And Post-Pandemic In One Ontario College

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The universal design for learning framework aims to remove barriers from the learning environment so that as many students as possible can fully participate in it. The COVID-19 pandemic has brought about additional challenges in higher education, but in many cases, it has also provided a unique opportunity to examine change. This study investigated students' and faculty's perceptions of how frequently various elements of universal design for learning were used in the classroom as well as how useful these elements were perceived to be for student learning. Different groups of students and faculty responded to an online survey pre-pandemic and then again approximately one year into the pandemic. The findings indicated consistently robust correlations between the pre-pandemic and pandemic periods. However, the pandemic initiated certain shifts, notably an uptick in faculty incorporating specific UDL elements, such as recording lectures. Additionally, students perceive a greater number of UDL elements as advantageous for their learning compared to the faculty perspective.

Universal design for learning (UDL) aims to remove barriers from learning in order to increase student success (CAST, 2018). It includes three components: multiple means of representation (the “what” or content of learning), multiple means of action and expression (the “how” or expression of learning), and multiple means of engagement (the “why” or motivational aspect of learning), which, together, form the framework of UDL (CAST, 2018). The concept of multiple means of representation pertains to diversifying how students encounter content, encompassing various formats such as written material, videos, and graphs. It also involves activating prior knowledge, enhancing comprehension and retention. Multiple means of engagement focus on sustaining student interest throughout the course, utilizing methods such as collaboration as well as ensuring a safe learning environment. Lastly, multiple means of action

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and expression empower students to showcase their understanding in diverse formats, emphasizing flexibility in how they demonstrate their learning (CAST, 2018; Rose & Strangman, 2007). These principles are based on the neuroscience of learning and are purported to lead to better student outcomes (e.g., Kolb et al., 2000; Zull, 2002; Zull, 2004). For a historical and current perspective on UDL in the Canadian context, readers may refer to Vukovic et al., (2023).

Before the pandemic was declared, we had completed our data collection for a project where we wanted to examine students' and faculty's perceptions of various UDL elements (e.g., closed captioning videos, providing choice for assignments, etc.), including their perceived frequency that they were used in the classroom and how useful each was to learning. In the 2021-2022 academic year, we decided to recruit from the same populations of students and faculty to collect the same data again and see whether the picture had changed as a result of the pandemic. Before the pandemic, the majority of classes at our institution took place face-to-face. In March 2020, all classes began taking place online, leading to increases in stress for both students and faculty as a result of this new format and we wondered whether faculty or students views on UDL might have changed because of this. The present study is the combined analysis of these two sets of data. Of interest, the student population under study is Ontario college students, which, compared to university students, are under-studied, and so we know much less about this population of learners. Ontario college programs are usually 1-3 years in length and focus on vocational applications, like nursing or welding, whereas Ontario university students are typically enrolled in 3-4 year programs with a more traditional academic focus.

Method

Participants

Both students and faculty were recruited from general education courses at Durham College (Ontario), and in both studies, a convenience sample of students and faculty were invited to participate in a voluntary, anonymous online survey. Pre-pandemic we had 36 students respond and 24 during the pandemic; although each sample was comprised of distinct students with little to no overlap, they were recruited from the same population of students enrolled in General Education courses. For faculty, we had 19 respond pre-pandemic and 9 during the pandemic, but we cannot identify whether the same faculty elected to respond to the survey at both timepoints.

Materials and Procedures

Our initial data collection was in late 2019. In the 2020-2021 academic year, we conducted the same study to compare perceptions of UDL at the two time periods. We wanted to know whether students' and faculty's perceptions of UDL elements had changed from before the pandemic. To this end, we used an anonymous online survey (developed by Kennette & Wilson, 2019) to ask samples of students and faculty which elements of UDL they perceived to be the most frequently used (i.e., most frequently experienced by students and identified as most used by faculty in their own classes). We also asked them which elements they perceived to be the

most useful for student learning. The survey contained 35 different examples of UDL elements which mapped onto each of the 3 principles (e.g., offering an electronic version of the textbook or alternatives to auditory or visual information). For each item, participants were asked to respond using a Likert-type scale which ranged from (1) *not at all*, to (4) *a lot*; they also had an option to indicate *not sure*. So first, participants rated the perceived frequency of use of each element in their classroom and then in a second section, those same elements were rated for how useful each group believed them to be for student learning.

We were particularly interested in exploring whether the patterns of responses would be the same between students and faculty at each timepoint and whether they would change from the pre-pandemic self-reported perceptions to those during the pandemic.

Results and Discussion

At each of the timepoints (pre-pandemic and during the pandemic), correlations showed that faculty and students did mostly agree that the items that were the most used were also the most useful: students pre-pandemic ($n = 36$, $r_s = 0.69$, $p < 001$) and during pandemic ($n = 24$, $r_s = 0.78$, $p < 001$); faculty pre-pandemic ($n = 19$, $r_s = 0.69$, $p < 001$) and during the pandemic ($n = 9$, $r_s = 0.78$, $p < 001$). So, typically, the elements rated by faculty or students as the most used were also perceived to be the most useful to student learning. Perceptions were also consistent pre-pandemic and during the pandemic for students' perceived use ($r_s = 0.85$, $p < 001$), and usefulness ($r_s = 0.71$, $p < 001$) as well as faculty's use ($r_s = 0.80$, $p < 001$) and usefulness ($r_s = 0.71$, $p < 001$) of UDL elements. This consistency from pre-pandemic perceptions is perhaps surprising given the amount of change that the pandemic necessarily brought about.

Despite these consistent patterns, the pandemic did bring about some major changes in perceptions of the elements of UDL presented in the survey. Comparing both timepoints, students reported experiencing less group work and given less time to complete tests, as evidenced by their difference in the ranks of these elements, but also received more encouragement from faculty during the pandemic than they had prior to it (again, based on differences in ranks pre-pandemic and during the pandemic). By comparing the rank of these elements, we were also able to see that students also perceived some UDL elements as more useful after experiencing a year in a pandemic, such as the instructor capturing their lecture for later viewing and receiving interesting assignments. These changes could have been expected, especially considering the amount of scheduling disruptions and additional responsibilities (e.g., childcare) that were demanded of everyone, additionally making interesting assignments all the more important in order to stay engaged and motivated.

Overall, students considered more UDL elements to be beneficial to their learning during the pandemic than did faculty, as they selected more of the UDL elements in the pandemic survey compared to the pre-pandemic survey when asked which they found to be useful. The pandemic also increased the perceived value of technology both for faculty and for students, as it ranked higher in both groups post-pandemic than it had pre-pandemic. Some elements such as recorded lectures, electronic handouts, and e-textbooks were used more by necessity during the

pandemic because we had to pivot online and could no longer use paper-based materials, and as such, students experienced more learning through technology, which aligned with some of the elements of UDL in the survey. By virtue of using them during the pandemic, students and faculty both increased their perceptions of the value and usefulness of those elements, more so than pre-pandemic. This will hopefully encourage faculty to increase their use of UDL elements within their teaching which will better support students in their learning.

Finally, the data collected during the pandemic showed that students had a greater appreciation for the flexibility that was allowed by faculty, which relates to when they received course content, how they received it, as well as how they demonstrate their learning of that content, so essentially UDL more globally. In this way, it seems that aspects of UDL increased during the pandemic, which may have benefitted students' learning, or at least the perceptions of the benefits of including these elements in courses.

Of key importance to our study and its findings is the contribution to better understanding 2-year college students, compared to previous studies which examined 4-year universities (e.g., Basham et al., 2020; Hills et al., 2022; Pearson, 2015; Schelly et al., 2011; Schreffler et al., 2019). The college population has been the subject of investigation much less frequently, and because the focus is more on hands-on learning, they offer a new angle for examining the elements of UDL from the student perspective. We feel that further research involving this population may be fruitful not only in its own context, but in relation to 4-year institutions and learners in other contexts as well.

There are inherent limitations in the methodology of this study. The adoption of a between-subjects design was not ideal due to the sudden onset of the pandemic, however the data collected are valuable nonetheless. Additionally, the absence of information regarding students' program years and the varying program lengths offered by the college may influence perceptions of UDL. Future research should explore these factors longitudinally. With faculty, variations in comfort and experience with online delivery may have influenced pre-pandemic and pandemic comparisons as well. Another limitation concerns the course delivery format, with pre-pandemic data sourced from mixed-format courses and pandemic data exclusively from fully online courses. As such, the small sample size restricts the ability to generalize the results; while the correlational analyses are sufficiently powered (Hulley et al., 2007; Lachin, 1981; May & Looney, 2020), a larger sample would enhance confidence in the rankings and overall generalizability. Finally, the survey used lacks psychometric validation and relies on an incomplete list of UDL items, suggesting the need for a more comprehensive and psychometrically valid survey in future studies.

Future Directions

It would be important to examine the accuracy of these self-reported perceptions. For example, emotions can make certain memories more salient, resulting in an availability bias so that something is perceived to be more frequent (Kensinger, 2007; Tversky & Kahneman, 1973). Similarly, identifying which (if any) of the UDL elements translate into better learning and/or

higher grades might help faculty to focus on incorporating those which are most impactful. It may also be worth considering how various sub-groups of students (e.g., departments/majors) may perceive UDL differently and may benefit from different aspects of UDL. Finally, once the pandemic is completely behind us, this project could be re-initiated in order to look at the new, post-pandemic trends in universal design for learning.

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