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Résumé de l'article

Les mesures de distanciation sociale ont contraint de nombreuses universités à proposer des cours en ligne. Les évaluations basées sur les performances, conçues à l'origine pour l'apprentissage en personne, peuvent ne pas fonctionner correctement dans les environnements en ligne. Cette étude s'est intéressée à la perception qu'ont les étudiants des évaluations basées sur les performances et des ressources associées, dans le cadre d'un cours dispensé à la fois en présentiel et en ligne. Les résultats obtenus auprès de 312 étudiants en éducation de premier cycle (n = 248 en personne et n = 64 en ligne) indiquent que toutes les ressources pour l'une des deux évaluations ont été évaluées de manière statistiquement significative plus élevée par les étudiants qui ont suivi le cours en personne. Cela indique que les étudiants qui ont suivi le cours en personne ont eu une interaction plus forte avec les ressources d'évaluation et qu'ils ont évalué les compétences cognitives et affectives nécessaires pour effectuer une tâche d'évaluation similaire dans leurs futures salles de classe. Les étudiants en ligne ont indiqué que certaines ressources, telles que les instructions d'évaluation et les grilles de notation, devraient être mieux expliquées pendant le cours pour que les attentes soient plus claires.

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Student Perceptions of Performance-Based Assessments for In-Person and Online Courses

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*COVID-19 social distancing measures forced many university courses to be offered online. The performance-based assessments originally designed for in-person learning may not work well in online environments. This study investigated students' perceptions of performance-based assessments, and their associated resources, during a course that was offered both in-person and online. The results from 312 undergraduate education students (*n = *248 in-person and* n = *64 online) indicated all the resources for one of the two assessments were rated statistically significantly higher by students who attended the course in-person. This indicated students who completed the course in-person had a stronger interaction with the assessment resources and rating having higher cognitive and affective skills needed to perform a similar assessment task in their future classrooms. Online students indicated some resources, such as assessment instructions and scoring rubrics, should be better explained during the course for more clarity regarding expectations.*

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COVID-19 restrictions forced most post-secondary institutions to offer the majority of their courses online. A Statistics Canada (2020) survey that asked post-secondary students about the impacts of COVID-19 on their post-secondary education indicated that 92% of the 100,000 respondents reported having some (17%) or all (75%) of their courses moved online. Of the 8% of respondents who reported not having their courses moved online, 6% were not taking courses

because they were writing their thesis or working at a job placement. This means only 2% of the respondents did not have their courses moved online due to the COVID-19 restrictions (Statistics Canada, 2020). Even after many of the initial COVID-19 restrictions were lifted, many students continued reporting taking online courses. The National Center for Education Statistics (2023), which tracks educational statistics in the United States, indicated 61% of undergraduate students reported taking at least one online course in 2021. This value was lower than the 75% of undergraduate students who reported taking at least one online course in 2020, but still higher than the 36% of undergraduate students who reported taking at least one online course in 2019, before COVID-19 restrictions were implemented (National Center for Education Statistics, 2023). Needless to say, COVID-19 restrictions had a great impact on many post-secondary students' learning experiences.

Impacts of COVID-19 Restrictions on Post-Secondary Courses

In North America, most of the COVID-19 lockdown restrictions were announced in March 2020. These announcements interrupted many post-secondary institutions halfway through their Winter 2020 semesters. To ensure continuous course delivery, many institutions asked instructors to quickly transition their in-person courses to an online environment; in some cases, the transition occurred within a few days (e.g., over a weekend). This lack of time, resources (e.g., teaching assistance and technical support), training, experience, and understanding of online course theories for both instructors and students made the transition very difficult for students and instructors because most courses transitioned with minimal thoughtful online course redesign. Best practices for distance and online learning is that both instructors and students receive prior guidance about how to interact in the online environment to enhance their learning experience (Shearer, 2009). This led to many assessments being cancelled or altered to meet the restrictions of online learning during COVID-19 restrictions (Jimenez, 2020). For example, some end-of-course in-person multiple-choice exams were cancelled because many institutions did not have a secure system set up in time for instructors to administer closed-book exams remotely. Many of the instructors who decided to retain end-of-course assessments had to quickly change the format (e.g., essay-style final paper) to fit the online learning platform. Many news outlets reported students and instructors both did not enjoy learning online, and cited decreased engagement and effectiveness when students learn with this format (Newton, 2021). The experience was so bad for some post-secondary students they filed class-action lawsuits to recuperate a portion of their tuition money (Chase, 2021).

Although some students dislike the online experience, others flourished in this learning environment because of its flexibility for learning anywhere. In fact, many institutions and businesses are having difficulty enticing educators and employees to return to in-person classes, meetings, and work spaces. With most COVID-19 restrictions lifted, many post-secondary institutions continue to offer courses online to students who now have an additional modality for learning. This presents an opportunity for institutions and instructors to investigate different online course designs that could be used to improve online student experiences (Hodges et al., 2020). With so many resources already invested into developing infrastructures for online learning, the spotlight is now on using these resources with decades of online course design research to improve student experiences in these learning environments (Newton, 2021).

Post-Secondary Learning Environments

In-person learning has traditionally been the main format for course delivery in most post-secondary institutions. However, online courses are not a new phenomenon in these institutions. Over the past few decades, many post-secondary institutions have been offering a variety of distance learning formats, such as fully online and hybrid courses. Some researchers have argued that online distance learning courses are an important part of a university's future and survival (Daniel & Mackintosh, 2003). The ability to step away from the confines of a conventional brick-and-mortar campus towards a global knowledge society may allow universities to offer courses to new groups of students previously inaccessible (Daniel & Mackintosh, 2003). More recently, massive open online courses (often referred to as MOOCs) have been offered by several post-secondary institutions as a way to offer free online courses using an affordable and flexible format for people to learn new knowledge and skills (edX, 2021). With so many new course formats being offered to students, many researchers have designed and conducted studies to investigate the different aspects (e.g., efficacy, affect, and academic performance) of these courses (Castro & Tumibay, 2021; Lack, 2013). These studies are often split into two types of research. First, they look at the differences between in-person and online course delivery formats, and second, they investigate different ways to design online learning environments to enhance student experiences (Castro & Tumibay, 2021).

In-Person and Online Learning Environments

Many studies that have investigated in-person or online course delivery formats tend to focus on whether one is better in terms of student satisfaction, engagement, learner outcomes, academic achievement, and perceived competence (Castro & Tumibay, 2021; Ferguson & Tryjankowski, 2009; Neuhauser, 2002; Stack, 2015; Tichavsky et al., 2015; Zhang & Kenny, 2010). These types of studies mistakenly lead to a divided view of these two delivery formats as being in competition with each other; an argument that began in the 1980s (Clark, 1994; Kozma, 1994). This argument, and the many research studies that it has inspired, indicate the medium of instruction alone (i.e., in-person and online learning) is often not the only aspect that affects student learning; careful course design is important in maximizing student learning (Clark, 1994; Kozma, 1994). A direct comparison of the two formats is dangerous because so many variables (e.g., students' course experiences and types of students each format attracts) are involved even when it seems like the main manipulated variable is the course modality. However, a benefit of these comparison studies is that they often indicate a difference between in-person and online learning environments. As such, it is important to investigate different aspects of course designs to better understand how to enhance student experiences in both modalities. One approach may be to view these two formats as being in a mutualistic relationship in which lessons learned from one format may be used to enhance student experiences in the other format. For example, the use of video lectures from the online version of a course may be helpful to a student who was absent for the in-person lecture from the same course.

Enhancement of Online Learning Environments

The many definitions of online distance learning environments highlight the importance of course design. Keegan's review of distance education definitions had common overlapping concepts that

pointed to the importance of strong course design (e.g., organization of learning materials and maximizing communication; Keegan, 1980; Simonson et al., 2019). The many authors who investigated course designs of online learning environments almost unanimously agreed "structured online discussions with clear guidelines and expectations, well-designed courses with interactive content and flexible deadlines, and continuous educator involvement that includes the provision of personalized, timely, and formative feedback" are elements required for a positive online learning environment (Castro & Tumibay, 2021, p. 1381). These many features of online course designs point to the idea of improving *Transactional Distance* (Moore, 1997; Shearer, 2009). The theory of Transactional Distance describes a pedagogical and psychological aspect of online learning so that the structure, dialog, and autonomy of the learner may be built into a course to maximize learning (Moore, 1997; Shearer, 2009). The idea is to design an online course so the structure of the course itself allows for dialog that results in "aha" moments when concepts become clear for students (Moore, 1997). These moments are key to developing student autonomy in which a sense of responsibility and ownership for learning is developed by the learner (Moore, 1997).

Further to the Transactional Distance, Moore described three essential forms of interactions: interactions between students and teachers, interactions among students, and interactions between students and content (Anderson, 2003; Moore, 1989). Newer research has suggested a fourth form of interaction: interactions between the learner and technologies used to deliver instruction (Hillman et al., 1994). These interactions work together to improve student learning, but one interaction that is particularly interesting is the interaction between students and content. When COVID-19 restrictions forced a quick transition to online learning environments, many course instructors simply moved their in-person course content (e.g., learning materials and assessments) to an online platform. However, the many research studies that have been presented in this section have highlighted the difference between the two course modalities. Hence, there is a need to investigate the design and administration of course content such as learning materials and performance-based assessments for online courses.

Performance-Based Assessments in Online Courses

Although some instructors opt to use software that would allow them to administer multiple-choice exams remotely, others have decided to administer more performance-based assessments (e.g., projects and essays). Studies that investigated students' perceptions of online assessments mainly focused on multiple-choice exams (Hussain et al., 2020; Özden et al., 2004). Results of these studies indicated the effectiveness of online assessment systems and the importance of maintaining accurate and fair assessment solutions in an online learning environment (Hussain et al., 2020; Özden et al., 2004). Although these studies focused on assessments that used a multiple-choice item format, many online courses use performance-based assessments, such as projects and essays, to measure students' achievement.

Performance-based assessments tend to be designed and developed for in-person courses and then used for online learning environments without much change. The logic behind this trend is that the assessments are designed to meet the same learning outcomes and to be administered to the same students. Additionally, the assessments need to be fair across all formats of the same course; hence, the assessments administered to both formats should be the same. However, in-person and online learning environments are very different (Castro & Tumibay, 2021). As such, it is important to investigate students' perceptions of performance-based assessments in both in-

person and online learning environments to better understand how these assessments may be administered and/or whether additional resources should be presented to students enrolled in one or both format(s) to maximize student learning.

Purpose

The purpose of this study is to investigate students' perceptions of performance-based assessments, and the resources used to support students during their completion of these assessments, used in a mandatory undergraduate education course that is delivered simultaneously in a large-lecture in-person lecture and small-class online format. Specifically, the aim of this study was to better understand students' perspectives of the assessments and their associated resources so they may be improved to better suit the needs of both in-person and online students. The use of students in both the in-person and online formats helped researchers better understand the differences between the needs of the two groups of students. This study furthers previous studies by focusing on ways to improve both in-person and online performance-based assessments and their associated resources instead of simply comparing the assessments between the two formats (Hussain et al., 2020).

Method

A quantitative method approach was used to guide this study despite both quantitative (i.e., 28 Likert-scale survey items) and qualitative (i.e., four open-ended response items) data being collected. Although the term *mixed method* is often used to describe studies that use both these types of data, this study focused on the quantitative results and used the qualitative results as an enhancement to enrich the findings (Caruth, 2013; Creswell & Guetterman, 2019).

Ethics and Sampling Procedure

The research ethics board from the post-secondary institution approved the study before researchers invited students to participate in this study. Since all the students sampled for this project were enrolled in a mandatory first year undergraduate course in which the authors are instructors, extra precautions were taken to protect students' identities. For example, a researcher assistant (RA) not associated with the course was the main contact throughout the data collection, only anonymous survey data was collected from participants, and the RA held onto the data until student grades for the course were finalized and approved by the University before sharing the anonymous data with the rest of the research team.

During the first lecture of the course, all students were introduced to the study by the RA. The RA indicated that participation in the study would have no effect on their course grade and that only anonymous data would be collected from participants. The anonymity of the data ensured members of both the teaching and research teams would not know whether a student participated in the study. Students provided consent to participate in the study by checking off a box on the consent form at the start of the survey to indicate their consent. Only students who indicated they consented to being a participant of the research were asked to complete the survey; non-consenting students were directed to not complete the survey.

Context of Study

This study was conducted during a nine-week undergraduate course designed to teach the theories of individual learning and practices such as differentiated instruction and inclusive education. This course is a mandatory requirement for all first-year undergraduate teacher education students; students must have a passing grade at the end of this course in order to enroll in second year courses, resulting in large enrollment rates. To accommodate the schedules and needs of the students in the program, this course is offered both in-person and online.

The in-person students are expected to attend two 110-minute lectures and one 50-minute laboratory each week. The lectures are designed to cover theoretical content while the laboratories provide students with applied tasks to practice the content covered during that week's lecture. The online students are expected to attend four synchronous seminars, watch weekly video posts, and complete weekly discussion posts. The seminars and video posts cover the same content as in-person lectures while the discussion posts mimic the laboratories by guiding students through applications of course content. Students from both sections were expected to complete two performance-based assessments: developing an Individualized Program Plan (IPP) and explaining a Universal Design for Learning (UDL) lesson plan.

Individualized Program Plan (IPP) Development

This assessment provided students with an opportunity to write an IPP. One of the primary purposes of an IPP is to ensure that students with learning challenges are provided with appropriate educational resources and guidance to be successful (Individuals with Disabilities Education Act, 2004). IPPs start with an assessment of students' current level of academic and functional performance to identify areas of need that are used to create annual goals (target for the year) and objectives (components of the annual goal). IPPs also document how progress toward the goals will be monitored, what services the student will receive, and the extent to which students will receive instruction in general or through special education (Blackwell & Rossetti, 2014).

Students were provided with two case studies and asked to develop an IPP for one of the cases. They also had access to various resources that teachers would typically have access to in most classrooms to develop their IPP. Additionally, students were provided with two examples of IPPs. One was deemed the bad example because it was designed to include common errors observed by instructors from the students who completed the IPP assessment during the previous administration of the course; each of the errors is explained using a comment bubble in the document. The second was considered a good example because the students who wrote this IPP received a high score during the previous administration of the assessment.

Universal Design for Learning (UDL) Lesson Plan Explanation

This assessment provided students with the opportunity to consider applying various individualized and differentiated learning theories to teach students in a realistic classroom environment. Students were presented with descriptions of Kindergarten through Grade 12 (K–12) students (e.g., English language learners and students with autism) that are reflective of the learning, behavioral, and emotional challenges they may encounter in their future classrooms. Using the descriptions of K–12 students in each classroom scenario, students explained how their

lesson plan addressed the needs of each K–12 student in the class or could be modified to accommodate each K–12 student in the class. The lesson plan itself was not assessed in this course because the skill of developing a lesson plan was assessed by another course; instead, this course assessed the explanation students provided. This assessment drew on key concepts taught throughout the course to consider how students would design or modify a lesson to follow the ideas underlying the UDL principles.

All the resources related to the two performance-based assessments (i.e., readings, instructions, rubrics, and supplementary resources) were identical for students enrolled in both delivery formats.

Sample Size and Participants

A total of 312 undergraduate education students (n = 248 in-person and n = 64 online) participated in this study. Although the in-person and online groups are unbalanced, this is a good representation of students enrolled in the course because there were 10 sections of the in-person format, and only three sections of the online format. Most participants indicated they were between the ages of 20 to 24 years (n = 148; 47.4%) and White/Caucasian (n = 213; 68.3%). The majority of the participants also indicated they were enrolled in the elementary/early childhood (n = 206; 66.0%) stream and enrolled in the after-degree program (n = 212; 67.9%).

Measures and Covariates

The 32-item survey was developed by the researchers for the purposes of this study. Three of the Likert-scale items (i.e., Video posts were engaging; Watching the Video Posts were useful towards developing my IPP; and Watching the Video Posts were useful towards developing my IPP) were administered to only the online students and one open-ended response item (i.e., If you took the online version of this course, what resources would be useful?) was administered to only the in-person students. The Cronbach alpha of the 25 Likert-scale items that were administered to all students is 0.950, which indicates excellent internal reliability (Gravetter & Wallnau, 2017). Each of the three subscales also indicate strong internal reliabilities: overall course delivery (α=0.779), IPP assignment (α=0.942), and UDL assignment (α=0.917). There were also four open-ended response items at the end of the survey to understand which resources used during the course were useful and what new resources could be developed to improve students' experiences. The survey items and internal reliability are shown in the Appendix.

Data Collection

In-person students were provided 20 minutes of laboratory class time to complete the survey either digitally or on paper. Paper surveys were available for students who did not bring a digital device to class or preferred to complete the anonymous survey on paper. Online students were provided with a link during their final lecture to complete the survey digitally.

Results

This section will first present the quantitative results followed by the qualitative results.

Likert-Scale Items

The descriptive and independent sample t-test results from the in-person and online students' perspectives survey are shown in the Appendix. Since the 25 items were each designed to investigate a specific element of the course, 25 separate t-tests were conducted. As such, a Bonferroni correction was conducted and a p-value of .005 (i.e., .05/11 = .005) was used to test for statistical significance. This Bonferroni correction was chosen using the largest number of items in one of the three sub-scales (i.e., overall course delivery = 5 items; IPP assignment = 11 items; and UDL assignment = 9 items) which was 11 items. This Bonferroni correction is adequately conservative without being excessively harsh (Glass & Hopkins, 2008). Using this Bonferroni correction, 14 items were statistically significantly different between the two groups. Interestingly, only one item was rated higher by online students than students who attended the course in person. All the IPP assignment items (i.e., 11 items) were rated significantly higher by the students who attended the in-person format of the course than their online peers. This indicates students who attended the in-person format believed they understood the assignment resources better and have the knowledge and skills needed to write an IPP for their future students when compared to their online students. The effect size of the statistically significant items all showed moderate to large effects (Glass & Hopkins, 2008). Although the effect size should only be interpreted for statistically significant items, effect sizes for all items are included in the Appendix for completeness.

Open-Ended Response Items

The survey also included four open-ended response items, one of which was only administered to online students. The student responses from these items were analysed using thematic analysis. The most common themes that emerged from each item are presented, but the large number of respondents (i.e., 312 participants) resulted in some contradictory responses. The contradictory responses are also presented and discussed.

What Was the Most Useful Resource in this Course?

Many students from both the course formats indicated that the lectures and video posts/synchronous Adobe Connect sessions were useful during the course. Related to the lectures, students who attended the course in person commented on the usefulness of having access to the notes and PowerPoint slides prior to each lecture. The online students specifically highlighted the usefulness of the one-on-one virtual sessions they had with their instructors.

The students who attended the in-person format of the course also indicated both assignments were useful towards their development as a teacher with statements such as "the assignments were applicable to real school situations (IPP & UDL)." A group of the students who attended the course in person also mentioned the IPP assignment as being a particularly useful resource because "I thought it was a great way to learn how to write an IPP." Interestingly, when students mentioned the UDL assignments it was to highlight the usefulness of the UDL resources, such as "the CAST [Center for Applied Special Technology; an educational research and development organization that created the UDL framework and guidelines] website was very useful" instead of indicating the actual assignment itself being useful (Center for Applied Special Technology, 2021).

Two resources that were only mentioned by students who attended the in-person format as

being useful were laboratories/laboratory instructors who had weekly sessions to guide students through application of lecture contents and specialist guest lecturers who discussed various topics relevant to teachers. Students indicated the "lab was very useful for me to succeed in this course." The students explained, "[the laboratories] broke down some of the information in lecture and I found them very useful and engaging."

Many students also mentioned the usefulness of the guest speakers who were invited by the instructor to discuss important topics that students may face in their future classrooms. They left comments such as "the guest lectures were extremely insightful and helpful!" and "the psychologist guest speakers. … loved them." In addition to specialists from local school districts, such as school psychologists and behaviour consultants, the instructor also invited local organizations to discuss the realities of today's classrooms. For example, the instructor invited speakers from the Child and Youth Advocacy Centre (CYAC) to discuss childhood trauma so that students may better understand their role in reporting suspected cases of child abuse that they may encounter in their future classrooms. The CYAC is a registered charity who partners with the Alberta Ministry of Children's Services, Alberta Health Services, the Calgary Police Service, the RCMP, and the Alberta Ministry of Justice and Solicitor General to focus on child abuse intervention and prevention (Luna, 2024). The CYAC sent their educators and psychologists to the lectures to teach students about the impact childhood trauma has on children's developing brains. They also sent their educators and police officers to the laboratories to guide students through various potential child abuse case study scenarios that the CYAC frequently encounter in schools.

The online students mentioned two resources that they found particularly useful: the community group-discussion posts and readings. Although these students did not elaborate on how these resources are useful, both of these resources were mentioned by several online students.

What Was the Least Useful Resource in This Course?

Students from both formats of the course indicated the readings were the least useful resources. Specifically, many of them indicated there were too many assigned readings and the readings were too lengthy. Some of the students who attended the in-person format of the course indicated "the readings were overwhelming. There were too many to be expected to read them all, and all the way through" and "although they were useful, there was a lot of them, and some were very long." These sentiments were echoed by some of their online peers with comments such as "readings—so much that it was impossible to complete." The online students' indication that readings were the least useful resource was a contradiction of their results from the previous item that said readings were one of the most useful resources. However, further analysis of their responses indicated that while online students highlighted the usefulness of the readings in the previous item, they also explained the quantity and length of readings assigned during the course was too much for them to complete meaningfully. Hence, the content of the readings was deemed useful, but the magnitude of them was not.

The students who attended the in-person version of the course mentioned the laboratories were not useful. This is also a contradiction from their previous indication that laboratories/laboratory instructors were useful. Students explained that laboratories were not useful because the 50-minute laboratories were too short in duration for meaningful learning to take place. Many students provided comments such as "lab was too short to get anything done."

Hence, students indicated laboratories/laboratory instructors were useful, but the duration of each laboratory session was too short, which limited its usefulness.

The online students indicated the IPP resources were least useful. Although most students did not elaborate on which of the IPP resources were least useful, a few students specifically indicated the rubric and IPP bad and good examples were a few of the resources that they found to be least useful. The rubric was "not detailed enough to direct learning." students indicated the IPP bad example "would have been much more useful to have exemplars to look [at and] know what was expected of us instead of trying to figure it out by ourselves based on poor IPPs." Similarly, for the good example, students indicated they would have preferred to be provided with exemplars because "we did not know they weren't 100% good exemplars." It seems that some students used the IPP good example to help guide their work, but were disappointed when they did not receive 100% on their IPP assignment.

What Resources Could We Add to Enhance Your Course Experience?

Student responses to this item were similar between students from the two formats and aligned with their responses from the previous question, which asked them about the least useful resource. Responses to the previous item indicated both groups of students thought there were too many lengthy assigned readings. In connection, for this item many students suggested "condensing [readings] would have increased readership" and recommended providing "Coles notes [sic] for the readings."

Another similarity between students from the two formats were their suggestions to provide more clear expectations of the IPP assignment. Although many students indicated wanting more clear expectations of the assignment, they elaborated on this suggestion by explaining the rubric was confusing. This was surprising for the students who attended the course in person because they did not mention any of the IPP resources as not being useful. Many of these students indicated wanting "more examples of IPPs as one was not enough to get a full understanding" and "more exemplars would be useful and assist learning." This idea of providing students with more examples, specifically an exemplar instead of an example of an IPP, was repeated by many students in the in-person course. Similarly, the online students also recommended exemplars instead of examples of IPPs.

Additionally, the online students also elaborated on the need for clarity surrounding the rubrics. Some students indicated they would like "rubrics that were more descriptive and exemplars that were considered 'A'" because they "didn't feel that the rubrics aligned with the learning tasks directly." Online students also recommended exemplars because they "would have like[d] to see a perfect IPP in addition to the examples with comments on it." This comment indicated providing students with an exemplar of the IPP assignment would enhance students' experience with this assignment.

In addition to the enhancements provided above, the in-person students also indicated longer duration of laboratories. The students who talked about a need to enhance laboratories, mainly focused their suggestions on increasing the duration of the 50-minute laboratories. They indicated a need to "make the lab longer. I also personally synthesize better in small classes with discussion as opposed to large lectures" and "more lab time was completely necessary. There was not enough time for everyone to ask all of our questions and this resulted in poor performance on IPP assignments." Since students were provided with time during their laboratories to work on their two performance-based assessments so that they would receive immediate feedback and

guidance from their laboratory instructors, having more time during the laboratory to ask questions would have enhanced their experiences with the assessments during the course.

If You Took the Online Version of This Course, What Resources Would Be Useful?

This item was only administered to students enrolled in the in-person format of the course. They indicated many features that were already a part of the online course such as discussion opportunities, virtual meetings with instructors, and videos of lectures. Weekly discussion opportunities were one of the assessments that online students had to complete as a way for students to apply their course material by discussing each topic. Online students were encouraged to have at least one one-on-one virtual meeting with their instructor to further discuss the course material. Online students were also provided with videos of the lecture material that they were expected to watch each week.

One suggestion that was not part of the online course was the integration of guest speakers into the course. This suggestion aligned with the in-person students' indication of the guest speakers being one of the most useful resources they encountered during the course.

Discussion

The in-person and online formats of the course used in this study were designed to be equivalent. However, results indicate students' perspectives of the performance-based assessments and the associated resources administered during the course were different between the two formats in three main areas: lecture/synchronous Adobe sessions, readings, and IPP assignment. This supports previous studies that indicated differences between the two course delivery formats (Castro & Tumibay, 2021; Lack, 2013). Specifically, the results indicate a need for stronger course design to help support the interaction between students and course resources, which is inline with Transactional Distance theory (Moore, 1997; Shearer, 2009), which indicates that as person-to-person interaction decreases, there is a need for more course structure.

First, items related to lecture/synchronous Adobe sessions were rated higher by students who attended the in-person format of the course to be more engaging as well as useful towards developing their IPP and UDL assignments than the online students. This could be due to the fact that there were 16 in-person lectures while the online students only had four synchronous sessions. Students who attended the in-person lectures also had more opportunities to interact with each other (e.g., before and after each class) compared to the online students who logged into the virtual classroom with their microphones muted and video turned off. When designing the online course, one of the focuses was on student-to-student interactions and collaborations during the synchronous session, but those opportunities were limited to the group discussions and breakout rooms during the four synchronous sessions. Results from this study indicate the need for instructors to consider integrating guest speakers into the online course to enhance students' experiences. Despite the lower ratings of lecture/synchronous Adobe sessions by online students, they still indicated, through their open-ended responses, the video posts/synchronous Adobe sessions were one of the most useful and helpful resources during the course.

Second, online students rated the readings higher than their peers who took the course in-person. This contradicted the open-ended responses in which both in-person and online students indicated the readers were one of the least useful resources. Specifically, the participants indicated the content of the readings was useful, but there were too many readings for students to complete

in a meaningful way.

Lastly, items related to the IPP assignment were rated higher by students who attended the course in-person than the online students. This pattern was observed for all the IPP assignment items.

Specifically, students who attended the course in-person indicated the IPP performance-based assessment was more useful than the online students. This survey finding is supported by the in-person students' open-ended responses because they indicated the assignment was one of the most useful resources provided to them during the course. This is important because students' perceptions of the usefulness of an assignment are positively correlated with their effort, which is also positively correlated with the score they achieve on the assignment (Brookhart, 1997).

When it comes to the associated resources for the IPP assessment, the students who attended the course in-person rated all the items related to the IPP assignment higher when compared to their online counterparts. In this section, one interesting finding is the students' perception of the rubric. Specifically, the low ratings of items related to the rubric by the online students. Survey items #10 and #11, which asked about the usefulness and clarity of the IPP assessment rubric, received some of their lowest ratings (i.e., m_{10}=2.84 and m_{11}=2.86) from the online students. This result aligns with the open-ended responses because the students in the online group indicated resources such as the rubric as well as the good and bad examples for the IPP assessment were the least useful resources presented to them during the course. This finding is important because it indicates the need to strengthen the student-content interaction by presenting associated assessment resources, such as rubrics and examples, to online students differently than their in-person peers so they better understand how these resources may support their assessment experiences (Anderson, 2003).

Although the introduction of the assessments was similar in the two formats, this result indicates the need for more attention to be placed in the online environment to help students better understand the assessment and associated resources developed to help maximize learning. Specific to this study, this finding extends to all the resources for the IPP assignment resources (i.e., information needed from the psychoeducational report, assignment instruction and scoring rubric, as well as lectures related to the IPP) because students who attended the in-person course format rated these higher than the online students.

In terms of student knowledge and skills gained from the performance-based assessments, students who attended the course in-person indicated they gained more in these areas than their online peers. They also indicated that they are more confident in writing an IPP for their future students compared to their online counterparts. This supports previous research that indicates that students who take courses in-person and online have different educational experiences (Castro & Tumibay, 2021; Ferguson & Tryjankowski, 2009; Neuhauser, 2002). However, these finding are problematic because it indicates students who completed the course online rated not having the knowledge, skills, confidence, and competence needed to complete these tasks, which are common duties for classroom teachers, when they become teachers. This contradicts Simonson et al.'s equivalency theory (2019) in terms of online students completing the course with a lesser instructional experience, which has implications on their ability to writing an IPP in the future.

These findings highlight a difference between the educational experiences between students who completed the course in-person and online students. Hence, there is a need for online courses to be specifically designed to better support students' knowledge and skill development using performance-based assessments.

Educational Importance of the Study

The results of this project will inform improvements to both formats of this course to benefit future cohorts of students. The enhancements made to the presentation of the performance-based assessment resources, based on the results of this study, will benefit undergraduate courses that are taught using both of these formats. With an increased emphasis in online and blended delivery models of post-secondary courses, the results of this study will inform, and hopefully improve, course design and assessment development to strengthen the student-content interaction and maximize students' learning experiences (Anderson, 2003).

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Appendix: Descriptive and Inferential Statistics of In-Person and Online Student Experience Survey

Items (α=0.950)	In-Person (*n* = 248)		Online (*n* = 64)		T-Test Analyses			
	Mean	SD	Mean	SD	T-Value	Degrees of Freedom	Significance	Cohen's d
Overall Course Delivery (α=0.779)								
1. [Lectures/Synchronous Adobe Connect sessions] were useful for my learning?	3.93	0.94	3.67	0.99	1.95	310	.052	0.27
2. [Lectures/Synchronous Adobe Connect sessions] were engaging?	3.97	0.93	3.55	0.93	3.24	310	.001*	0.46
3. [Laboratories/Discussion posts] were engaging?	3.44	1.21	3.73	0.90	-2.17	128.99	.032	-0.26
4. [Laboratories/Discussion posts] were useful for my learning?	3.48	1.28	3.63	1.03	-0.95	118.17	.343	-0.12
5. Readings were useful for your learning?	3.27	1.08	3.91	0.90	-4.85	113.75	.000*	-0.61
Individualized Program Plan (IPP) Assignment (α=0.942)								
6. The IPP assignment was useful for my learning.	4.09	1.03	3.30	1.24	4.72	86.68	.000*	0.74
7. I understood the psychoeducational reports for the IPP learning task.	4.03	0.90	3.20	1.21	5.13	81.59	.000*	0.86
8. I understood the information I needed to pull out from the psychoeducational reports for the IPP learning task.	3.88	0.99	2.67	1.18	5.13	81.59	.000*	1.16
9. The instructions handout was clear.	3.71	1.07	2.84	1.26	5.02	87.45	.000*	1.11
10. The scoring rubric was useful when guiding the development of my IPP.	3.60	1.18	2.86	1.28	4.40	310	.000*	1.20
11. The scoring rubric was clear.	3.54	1.17	2.84	1.22	4.23	310	.000*	1.18
12. Attending [lecture/synchronous Adobe Connect] were useful towards developing my IPP learning task?	3.97	0.98	3.16	1.21	4.99	85.02	.000*	1.02
13. I have the content knowledge needed to write an IPP for my future students.	3.75	0.90	2.81	1.22	5.78	81.53	.000*	0.97
14. I have the application skills needed to write an IPP for my future students.	3.70	0.90	2.88	1.19	5.20	82.34	.000*	0.96
15. I am confident in writing an IPP for my future students.	3.47	0.96	2.58	1.11	6.42	310	.000*	0.99
16. I feel competent in writing an IPP for my future students.	3.53	0.97	2.69	1.18	5.26	86.15	.000*	1.02

Items (α=0.950)	In-Person (*n* = 248)		Online (*n* = 64)		T-Test Analyses			
	Mean	SD	Mean	SD	T-Value	Degrees of Freedom	Significance	Cohen's d
Universal Design for Learning (UDL) Assignment (α=0.917)								
17. The UDL learning task was useful for my learning.	3.96	0.95	3.73	0.91	1.67	308	.097	0.95
18. I understood the classroom scenarios for my UDL learning task.	4.16	0.78	3.97	0.85	1.74	308	.082	0.79
19. The instructions handout was clear for my UDL learning task.	3.93	0.94	3.58	1.15	2.24	86.07	.028	0.99
20. The scoring rubric was clear in developing my UDL learning task.	3.77	1.04	3.41	1.26	2.15	86.97	.035	1.09
21. Attending the UDL [lecture/synchronous Adobe Connect] was useful towards developing my UDL learning task.	3.83	0.97	3.30	1.14	3.46	88.29	.001*	1.01
22. I have the content knowledge needed to provide a UDL learning environment for my future students	4.04	0.80	3.81	0.97	1.98	308	.049	0.84
23. I have the application skills needed to provide a UDL learning environment for my future students	3.95	0.83	3.86	0.89	0.74	308	.460	0.85
24. I am confident in providing a UDL learning environment for my future students.	3.86	0.87	3.70	0.89	1.30	308	.194	0.87
25. I feel competent providing a UDL learning environment for my future students.	3.91	0.83	3.77	0.92	1.18	308	.238	0.85
Open Ended Response Items								
26. What was the most useful resource in this course?								
27. What was the least useful resource in this course?								
28. What resources could we add to enhance your course experience?								

Note. Five-point Likert-scale was used for all items (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree).
*Statistical significance is based on two-tailed analyses ($p < 0.005$)
[+]One open-ended response item was administered to in-person students only: If you took the online version of this course, what resources would be useful?
[++]Three Likert-scale items were administered to online students only: Video posts were engaging; Watching the Video Posts were useful towards developing my IPP; and Watching the Video Posts were useful towards developing my IPP.