Fall 10-15-2023

Student Engagement Tracks with Success In-Person and Online in a Hybrid-Flexible Course

Zoya Adeel*
McMaster University, adeelz2@mcmaster.ca
Stefan M. Mladjenovic*
University of Toronto, stefan.mladjenovic@mail.utoronto.ca
Sara J. Smith
Mount Royal University, ssmith6@mtroyal.ca
Pulkit Sahi
McMaster University, pulkit.sahi5@gmail.com
Abhay Dhand
University of Toronto, abhay.dhand@mail.utoronto.ca
Sarah Williams-Habibi
Trent University, sarahwilliamshabibi@trentu.ca
Kate Brown
McMaster University, brownk33@mcmaster.ca
Katie Moisse
McMaster University, moissek@mcmaster.ca

Recommended Citation

Adeel, Z., Mladjenovic, S. M., Smith, S. J., Sahi, P., Dhand, A., Williams-Habibi, S., Brown, K., & Moisse, K. (2023). Student engagement tracks with success in-person and online in hybrid-flexible course. *The Canadian Journal for the Scholarship of Teaching and Learning, 14*(2). https://doi.org/10.5206/cjsotlrcacea.2023.2.14482

Student Engagement Tracks with Success In-Person and Online in a Hybrid-Flexible Course

Abstract

Some university students face barriers to learning in physical classrooms, while others are reluctant to return to in-person learning environments because of COVID-19. Hybrid-flexible (HyFlex) learning environments give students the option to participate in-person or virtually, but there are concerns about student engagement and success. In this pre-pandemic study, we conducted a program-wide survey to explore student perceptions of and experiences with a HyFlex teaching and learning platform (n=238). Our survey data revealed that 86.17% of students find features of this platform helpful when accessing, engaging with, and learning course content. This was particularly true among students who reported having a flexible learning need. We also compared engagement with the HyFlex teaching and learning platform (calculated as a score out of 100 based on attendance and participation in interactive slides) and final grades between students who chose to participate predominantly in-person or online in two HyFlex offerings during the 2019/20 academic year. We found no significant difference in engagement or final grade between in-person dominant and online dominant learners in either course. We found a moderate correlation between engagement and final grade in both courses, such that highly engaged students achieved high grades regardless of their preferred mode of attendance. Our findings suggest that giving students the option to learn in-person or virtually from class to class does not negatively affect engagement or success and may in fact support success among students with flexible learning needs. As Canadian universities emerge from the pandemic, our findings remind us to retain the flexibility that virtual teaching and learning affords to support our diverse student bodies.

Certains étudiants et certaines étudiantes universitaires se heurtent à des obstacles à l'apprentissage dans les salles de classe physiques alors que d'autres hésitent à revenir à un environnement d'apprentissage en personne à cause de la COVID-19. Les environnements hybrides-flexibles (HyFlex) donnent aux étudiants et aux étudiantes l'option de participer en personne ou virtuellement, toutefois l'engagement et la réussite des étudiants et des étudiantes posent parfois problème. Dans cette étude menée avant la pandémie, nous avons réalisé un sondage à l'échelle d'un programme pour explorer les perceptions des étudiants et leurs expériences concernant une plate-forme HyFlex d'enseignement et d'apprentissage (n=238). Nos données de sondage ont révélé que 86,17 % des étudiants et des étudiantes ont trouvé que les caractéristiques de cette plate-forme étaient utiles pour accéder au contenu du cours, s'engager et apprendre. Ceci était particulièrement vrai parmi les étudiants et les étudiantes qui avaient rapporté avoir besoin d'un environnement d'apprentissage flexible. Nous avons également comparé l'engagement des étudiants et des étudiantes avec la plate-forme d'apprentissage HyFlex (calculée comme un score sur 100 basé sur la présence et la participation avec les diapositives interactives) avec les notes finales obtenues par les étudiants et les étudiantes qui avaient choisi de participer principalement en personne ou en ligne dans deux cours HyFlex offerts durant l'année universitaire 2019-2020. Nous n'avons trouvé aucune différence significative en matière d'engagement ou de notes finales entre les apprenants et les apprenantes qui avaient suivi le cours principalement en personne et ceux qui l'avaient suivi en ligne, dans l'un ou l'autre des cours. Nous avons trouvé une corrélation modérée entre l'engagement et la note finale dans les deux cours, dans la mesure où les étudiants et les étudiantes les plus engagés avaient obtenu de meilleures notes, indépendamment de leur mode de présence préféré. Nos résultats suggèrent que le fait de donner aux étudiants et aux étudiantes l'option d'apprendre en personne ou virtuellement d'une classe à l'autre n'affecte pas négativement leur engagement ou leur réussite et pourrait en fait favoriser la réussite parmi les étudiants et les étudiantes dont les besoins sont flexibles. Alors que les universités canadiennes émergent de la pandémie, nos résultats nous rappellent l'importance de conserver la flexibilité offerte par l'enseignement et l'apprentissage virtuels dans le but de soutenir nos étudiants et nos étudiantes dont les besoins sont variés.

Keywords
HyFlex, virtual education, accessibility, information, communication technologies; HyFlex, enseignement virtuel, accessibilité, technologies de l'information et de la communication

Comparing In-person and Virtual Learning Experiences with a Hyflex Learning Platform

The COVID-19 pandemic challenged university instructors to deliver high-quality courses virtually (Thompson & Copeland, 2020; Bao, 2020). While online teaching is not new, this quick pivot necessitated strategic choices as many instructors had little time or support to modify their courses (Rapanta et al., 2020). As a result, technologies that offer a virtual replacement for the physical classroom were among the most popular strategies for switching to virtual instruction.

At McMaster University, Zoom, Microsoft Teams, and Cisco WebEx were the most widely used platforms for teaching during the acute phase of the pandemic ("Technology Resources for McMaster", n.d.). These platforms allow instructors to share slides and facilitate discussions among the whole class or smaller groups (Patel et al., 2020; WebEx, 2014; Henderson et al., 2020). But maintaining a high level of student engagement in these virtual environments is challenging (Saleh et al., 2020; OCUFA, 2020). An Ontario Federation of University Faculty Associations survey found that university students (n=502) and faculty (n=2,208) believe that the changes onset by the pandemic had an overall negative impact on the quality of their education. Most survey respondents (62% of students, 76% of faculty members) felt virtual learning contributed to their dissatisfaction with their university experience (OCUFA, 2020).

Although the rapid shift to virtual delivery was challenging for students and instructors alike (Patel et al., 2020; Armstrong-Mensah et al., 2020), some bright spots have emerged. Many students and instructors benefitted from the flexibility of working and learning remotely (Patel et al., 2020; Pichette et al., 2020). Prior to the pandemic, efforts to enhance accessibility in higher education focused on students with disabilities. Today, all students benefit from instructors understanding and complying with accessibility requirements. The demand for flexible and accessible courses is likely to persist beyond the pandemic (OCUFA, 2020; Patel et al., 2020; Pichette et al., 2020). For this reason, it is important to identify learning technologies that support the success of all students, however they choose to learn.

There are platforms designed to support teaching and learning in both physical and virtual spaces, One of which is Echo360. Instructors can use Echo360 to livestream lectures, share lecture recordings, and embed active learning activities, such as multiple choice and short answer questions, into their presentations. These active learning activities can be linked to learning management systems to award students marks for participating in activities that are known to enhance learning and retention, and to provide instructors with analytics relating to engagement (Carr et al., 2015; Knight & Wood, 2005).

At McMaster University, Echo360 has advantages over other active learning technologies. First, it is institutionally supported and therefore free for all students. Second, Echo360 is compliant with the Web Content Accessibility Guidelines 2.1 Level AA, which aligns with the Accessibility for Ontarians with Disabilities Act (AODA) ("Accessibility," n.d.; "Accessibility for Ontarians," 2005). This means Echo360 is compatible with screen readers used by individuals with visual impairments (Brogan, 2009). Echo360 also automatically generates a transcript from spoken words that can be easily applied as captions to videos for individuals who are hard of hearing (Brogan, 2009). Finally, Echo360 can be leveraged in physical and virtual classrooms to create a hybrid-flexible (HyFlex) learning environment, wherein students can flexibly choose where and when they participate in lectures, i.e., in-person or virtually, either synchronously or asynchronously.

There is growing demand from students for HyFlex learning environments (Miller et al., 2013). But there is some resistance from instructors, who worry such environments might reduce attendance and negatively affect learning (Davis et al., 2009; Williams & Fardon, 2007).

In this study, we sought to map student perceptions of Echo360 as a HyFlex teaching and learning technology. We also compared Echo360 engagement scores and final grades between students who chose to attend classes primarily in-person or primarily online in two courses offered in a modified HyFlex format during the 2019/20 academic year (pre-pandemic). We provide evidence that giving students the option to learn in-person or virtually from class-to-class does not negatively affect engagement or success and may even support success among students with flexible learning needs. We further provide evidence that students want the flexibility and accessibility features that Echo360 provides and feel that it benefits their learning.

Learning Technologies for Universal Design

Universal Design for Learning (UDL) is a framework for teaching and learning that aims to meet the needs of all learners. A growing body of evidence suggests UDL can improve the learning experience for students, and the teaching experience for instructors (Cumming & Rose, 2022). It is unclear, however, whether UDL can improve student outcomes, such as grades.

Technology has an important role in UDL, as it can remove barriers to learning in traditional spaces. Echo360 is a learning technology used on university, college, and high school campuses internationally ("Read how institutions are using Echo360", n.d.). In Canada, it is used at several institutions including the University of Western Ontario, York University, Brock University, the University of Victoria, and Canadore College (C. Huff, personal communication, 23 November, 2021). At McMaster, 91 classrooms are outfitted with Echo360 recording equipment that allow instructors to schedule synchronous livestreams of their lectures and/or capture lectures for later, asynchronous viewing ("Echo360—Lecture Capture and Student Engagement," n.d.; Watt et al., 2014). The recordings can simultaneously capture videos of the instructor and their screen, as well as audio. Echo360 automatically transcribes the instructor's microphone audio into a searchable transcript, which can be easily applied as closed captions (Watt et al., 2014). In physical classrooms that do not have Echo360 equipment, or when instructors are teaching from home or another off-campus location, lectures can be broadcasted and/or recorded from an instructor's device using an Echo360 application available for Windows and Mac (Fei et al., 2013). Instructors can upload slides into Echo360 so that students follow the presentation within the platform from a laptop or smartphone, regardless of whether they are learning in the classroom or remotely.

"Activity slides" can be embedded within Echo360 presentations. These interactive slides can contain polling questions, short answer questions, and other types of questions depending on the course content (images, equations, etc.) (Duffy et al., 2017). Instructors can share anonymized and aggregated submitted answers with the class along with the correct answer when applicable. This data can be automatically imported from Echo360 into linked Learning Management Systems, allowing instructors to track students' attendance and activity slide responses. Activity slides provide opportunities for students to apply and reflect on their learning — key components of active learning (Carr et al., 2015). Importantly, activity slides can support active learning in large undergraduate classes (Barr, 2014). This method of probing students' understanding is less stressful for students than cold calling in class and achieves the same goal (Cooper et al., 2018).

The use of activity slides is also associated with increased student participation and cognitive engagement and provides feedback to instructors on their students' level of understanding (Barr, 2014).

Students can use Echo360 to engage with their instructors, teaching assistants and peers. They can share questions, ideas and files on a discussion board that opens in the same window as the video of the instructor and tag their questions or comments to a particular presentation slide ("Echo360—Lecture Capture and Student Engagement", n.d.). They can also answer each other's questions, and instructors or teaching assistants can endorse appropriate responses. Students can anonymously raise a confusion flag, like raising their hand in a physical classroom ("Echo360—Lecture Capture and Student Engagement", n.d.). This flag alerts the instructor that students require clarification.

Importantly, Echo360 functionalities support key components of the AODA legislation and UDL principles. The platform enables instructors to design an inclusive classroom experience by uploading their slides (making them screen reader-accessible) and providing access to the lecture replays with an automatically generated transcript, which can be used to create closed captions (Watt et al., 2014). These accessibility features benefit all students, not just those who identify with and disclose having a disability.

Demand for Accessibility and Flexibility in Higher Education

The number of students who identify with and disclose having a disability is growing (Condra et al., 2015; Cumming & Rose, 2022). In particular, the proportion of students with learning disabilities, mental health issues, and chronic illnesses has increased at Canadian post-secondary institutions (NEADS, 2018). At McMaster, students with disabilities can register for accommodations through Student Accessibility Services (SAS). Since 2005, the proportion of McMaster students registered with SAS has more than doubled from 4.23% to 9.56%. During the 2019-2020 academic year, there were 3,124 McMaster students who identified with either a physical or non-physical disability (A. Drew-Hassling, personal communication, 14 July 2020). Most of these individuals (80.6%) were undergraduate students. The most common disabilities and accommodations relate to mental health (54.3%) and attention deficit hyperactivity disorder (ADHD) (12.1%).

Importantly, not all students with disabilities are registered with SAS. This could be because they are unaware of their disability, do not wish to disclose their disability, do not identify as having a disability, or are unaware of the available support. Other personal circumstances, such as food requirements, access to transportation, and caregiving or employment responsibilities can also affect students' ability to learn in traditional classroom settings (De Bie & Brown, 2017). Extreme weather, particularly during the winter months, can negatively impact attendance (Abdul, 2014; Zavarise, 2015). Attending evening classes can pose a barrier for students with caregiving responsibilities or safety concerns, particularly those who have experienced assault or harassment. Students who commute using public transportation may worry about safety, particularly if they belong to a marginalized group (De Bie & Brown, 2017).

It is important to note that online courses can also pose barriers for students who lack the necessary resources and support for virtual learning, such as a computer or tablet, a stable internet connection, and/or a safe, quiet space (Lederer et al., 2021; Pichette et al., 2020). Ideally, students can choose to learn in the classroom or virtually, synchronously or asynchronously, and base their choice on their circumstances at the time. Technologies such as Echo360 can accommodate the

increasing demand for this HyFlex model of education, in which students have some agency over when and where they learn (Beatty, 2019).

The Needs of Instructors

Instructors can also benefit from the flexibility of a HyFlex model. Results from McMaster's 2019 Employment Equity Census revealed that 4.5% of full-time McMaster employees identified with a disability in 2016. However, more than 22% of Canadians aged 15 and older identified as having a disability in 2017 (Government of Canada, 2018). Institutionally supported assistive technology may address discrimination in the hiring and promotion process and potentially increase the representation of Faculty with disabilities (Price & Kerschbaum, 2017). Many instructors also balance childcare and other personal responsibilities and also face potential barriers associated with safety, transportation issues, and inclement weather ("2019 Employment Equity Census Report", 2020).

One practical approach to proactively address the accessibility needs of instructors and work toward AODA educational requirements is through supportive teaching and learning technologies (De Bie & Brown, 2017). A HyFlex learning environment supports both current needs and future demands for digital flexibility, while also addressing the exclusions that some disabled students and educators experience (Brogan, 2009). One technology tool that addresses multiple flexibility and accessibility needs for students and instructors alike is Echo360.

Materials and Methods

We first sought to explore student perceptions of Echo360 and its features. We distributed a survey to students enrolled in the Life Sciences program, the largest undergraduate program in the Faculty of Science at McMaster University. Students enter the program in their 2nd year of study. There were 1,130 students across all years of the program in the 2019-2020 academic year. We collected 238 survey responses from October 7 to October 18, 2019. Participants could enter a draw to win one of three $100 Amazon gift cards for participating.

The survey questions are detailed in Appendix A. The questions probed students' experience with Echo360 and the appeal of various Echo360 features, such as the ability to watch lecture replays, attend lectures via livestream, participate in polls and other active learning activities, access a searchable transcript, and pose anonymous questions. We also invited students to disclose any flexible learning needs, employment commitments, commuting requirements, caregiving responsibilities, and the need for academic accommodations. Students could choose to skip any question they were not comfortable answering.

Next, we sought to compare the experiences of learners who participated in two courses offered in a modified HyFlex format. Students were given the choice to attend class virtually or in-person but were required to participate synchronously. LIFESCI 3P03: Science Communication in the Life Sciences was offered in Fall 2019. It is a skills-based course in which students practice strategies for communicating science to different audiences for different purposes. There were 149 students enrolled. LIFESCI 3Q03: Global Human Health and Disease was offered in Winter 2020. It is a content-based course in which students explore the biological and societal basis of historical and contemporary global health challenges. There were 124 students enrolled.

In each course, students were given the option to attend classes in-person in a lecture hall or virtually through an Echo360 livestream. They could change their mode of attendance from

class-to-class. Regardless of how they attended, they were asked to use Echo360 to follow the instructor's slides and participate in active learning activities during class time. Student attendance during class time on Echo360 and their participation in active learning activities in preparation for and during class contributed to an "engagement score" worth 4% of their final grade in LIFESCI 3P03 and 5% of their final grade in LIFESCI 3Q03. In LIFESCI 3P03, the engagement score was calculated as 50% attendance and 50% activity slide participation. In LIFESCI 3Q03, the engagement score was calculated as 33.3% attendance and 66.6% activity slide participation. The breakdown of these scores was based on the pedagogy of each course and made explicit to students on the first day of class. The course syllabi are included in Appendix B.

At the start of each class, an activity slide asked students to indicate if they were participating in-person or online. We extracted this data to identify two groups of students: in-person dominant learners (LIFESCI 3P03 $n=93$, LIFESCI 3Q03 $n=53$) and online dominant learners (LIFESCI 3P03 $n=50$, LIFESCI 3Q03 $n=63$). Students who attended equally in-person and online were removed from this analysis (LIFESCI 3P03 $n=6$, LIFESCI 3Q03 $n=8$). We then compared the engagement scores and adjusted final grades between the groups (final grades were adjusted to remove the contribution of the engagement score).

The survey and analyses of engagement score and grade data were approved by the McMaster Research Ethics Board. The engagement scores and adjusted final grades between the in-person dominant and online dominant groups were assessed separately (*i.e.,* courses are independent response variables) with an analysis of variance (ANOVA). The analyses comparing adjusted final grades and engagement scores were conducted in R (R Core Team, 2021).

Results
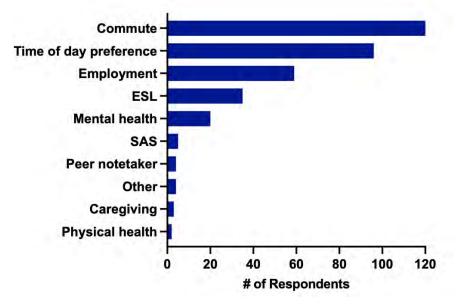
Perceptions of Echo360 and its Features

We received 238 responses to our survey probing students' perceptions of Echo360 and its features. Respondents spanned all years of the Life Sciences Program, with 69 students in year 2, 60 in year 3, 62 in year 4, 11 in year 5 or above, and 36 who did not indicate their year). Most respondents identified as women (152), while 51 identified as men, and 35 students did not indicate their gender identity.

Roughly 93% of respondents had used Echo360 in at least one course offered through the Faculty of Science (189 students out of 203 who answered the question). Most of these students (88.8%) had used Echo360 to watch lecture replays. A smaller proportion (52.4%) had used the platform to watch live-streamed lectures.

Roughly 88% of respondents identified at least one flexible learning need (209 out of 238 who answered the question).
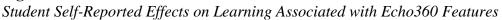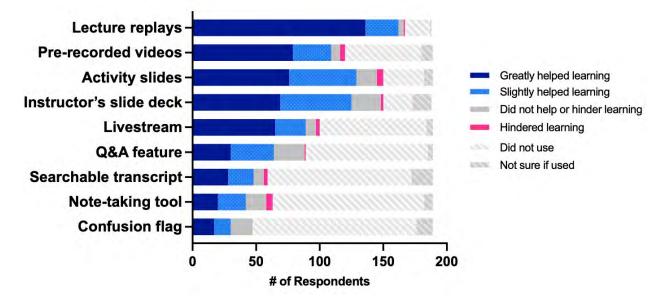
Figure 1

Self-Identified Flexible Learning Needs of Student Respondents

Note. 'Time of day preference' represents students who reported learning best at a particular time of day. 'ESL' represents students for whom English is a second language. SAS represents students registered with Student Accessibility Services. A total of 384 flexible learning needs were identified by 209 respondents.

Among the 189 students who had prior experience with Echo360, the lecture replay feature was rated the most used and most helpful feature (n=162, 86.2%). Many students also had experience with pre-recorded videos, activity slides, accessing the instructor's slide deck and watching a livestream through Echo360 and rated these features as helpful to their learning.
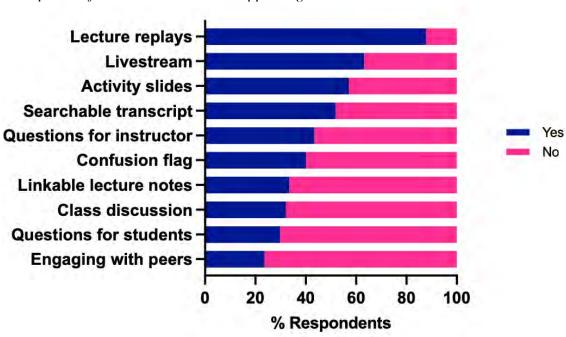
Figure 2

Student Self-Reported Effects on Learning Associated with Echo360 Features

Note. The 'hindered learning' category combines 'greatly' and 'slightly' hindered learning due to the low number of responses in each category. *n*=189 for all categories, except for 'Instructor's slide deck' with *n*=188.

We then asked all students, including those with no prior experience with Echo360, to reflect on the appeal of various Echo360 features. Lecture replays were rated the most appealing feature, followed by the ability to livestream lectures, activity slides, and then searchable transcripts.
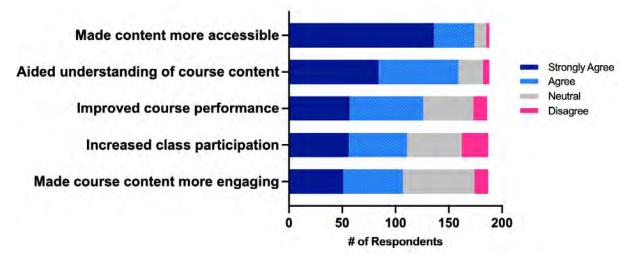
Figure 3

Perceptions of Echo360 Features as Appealing

Note. Survey respondents reported if they perceived the surveyed Echo360 features as appealing. Respondents may or may not have had prior experience with Echo360. (*n*=212)

Among the 189 students who had prior experience with Echo360, most reported some perceived learning benefits. Roughly 92% either agreed or strongly agreed that using Echo360 made course content more accessible, and 84% agreed or strongly agreed it aided in understanding course content. More than half of the respondents said using Echo360 improved their course performance, increased their participation or made course content more engaging. Of note, of the 173 students who had prior experience with Echo360 and identified at least one flexible learning need, 172 said Echo360 benefitted them in some way (99.4%).

Figure 4

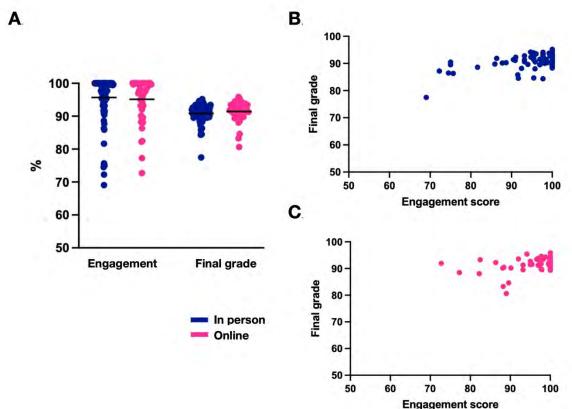*Survey Respondents Perceptions of Echo360 on their Learning and Course Engagement*

Note. Only users with prior Echo360 experience with a flexible learning need are reported. (*n*=183)

Of the 189 students with prior Echo360 experience, almost 90% reported that Echo360 was either very easy or somewhat easy to use (see Appendix C). All students, including those with no prior Echo360 experience, reported the setting in which they would prefer to attend class. More than half (54.63%) would prefer some combination of in-person and online, while roughly 30% would prefer exclusively in-person and 15% would prefer exclusively online.

Comparison of In-person Dominant and Online Dominant Learners in a HyFlex Learning Environment

LIFESCI 3P03 ran in the fall of 2019. It is a skills-based class that is highly interactive. Among the 149 students, 62% were in-person dominant learners, meaning they came to class more often than they tuned in virtually when given the choice. There were twelve lectures for which students could choose their attendance method and three lectures for which in-person attendance was strongly encouraged. Roughly 34% of students were online dominant learners and 4% attended in-person and online in equal measure. We excluded this latter group from our analysis.

There was no significant difference in engagement score or adjusted final grade between in-person dominant and online dominant learners (*p*=0.9901, *p*=0.9893). There was, however, a moderate correlation between engagement scores and adjusted final grades among both in-person dominant (*p*<0.001; *r*=0.536) and online dominant learners (*p*=0.006; *r*=0.382).

Figure 5

Engagement Scores and Adjusted Final Grades of Students in Life Sciences 3P03

Note. Engagement Scores and Adjusted Final Grades for In-Person Dominant (Blue) and Online-Dominant (Pink) Learners in LIFESCI 3P03, a Skills-Based Course. Lines indicate means. Correlation of engagement scores with adjusted final grades for B. in-person dominant (*n*=93) and C. online dominant learners (*n*=50).

LIFESCI 3Q03 ran in the winter of 2020. LIFESCI 3Q03 is a content-based class that is moderately interactive. Among the 124 students, 43% were in-person dominant learners, meaning they came to class more often than they tuned in virtually when given the choice. There were seven lectures for which students could choose their attendance method and one lecture for which in-person attendance was strongly encouraged. Of note, the final two lectures were delivered online only because of COVID-19. Roughly 51% of students were online dominant learners and 6% attended in-person and online lectures in equal measure. We excluded this latter group from our analysis.

There was no significant difference in engagement score or adjusted final grade between in-person dominant and online dominant learners (*p*=0.0518, *p*=0.9532). There was a moderate correlation between engagement score and adjusted final grade among in-person dominant learners (*p*<0.001; *r*=0.376) and online dominant learners (*p*<0.001; *r*=0.651).
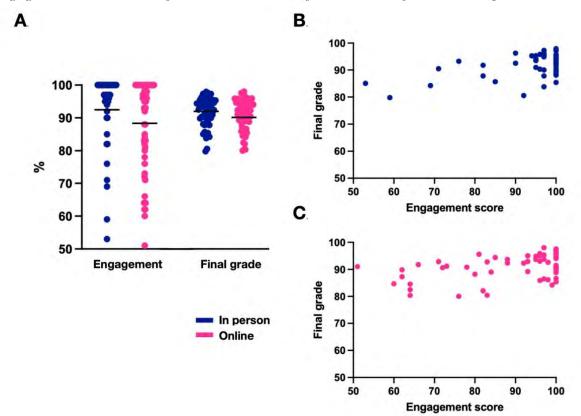
Figure 6

Engagement Scores and Adjusted Final Grades of Students in Life Sciences 3Q03

Note. A. Engagement scores and adjusted final grades for in-person dominant (blue) and online-dominant (pink) learners in LIFESCI 3Q03, a content-based course. Lines indicate means. Correlation of engagement scores with adjusted final grades for B. in-person dominant (n=53) and C. online dominant learners (n=63).

Discussion

A Modified HyFlex Classroom

We implemented a modified HyFlex model in a skills-based and a content-based course at a Canadian university. We saw no difference in engagement or final grades between in-person and online dominant lecture attendees (see Figures 5 and 6). Rather, we observed a moderate correlation between students' engagement scores and adjusted final grades among both groups of learners in both courses (see Figures 5 and 6). Students who actively engaged in their learning through Echo360 by following the lectures and participating in activities succeeded in both a skills- and content-based course, regardless of whether they attended classes in person or online.

Reluctance among university instructors to provide lecture replays or virtual learning opportunities has stemmed in part from concerns of reduced class attendance (Davis et al., 2009; Williams & Fardon, 2007). In line with previous literature, our findings suggest that the way students choose to attend classes does not affect their attendance, engagement or final course grade (Miller et al., 2013; Groen et al., 2016; Lakhal et al., 2014). In contrast to previous findings, we

provide evidence that virtual learning does not hinder students' performance or lecture attendance compared with their in-person learner counterparts (Bettinger et al., 2017). Our survey data suggest Echo360 improves the learning experience by removing barriers (see Figures 1 to 4).

Instructors may worry about the time burden of adding content to Echo360, embedding activity slides, scheduling recordings, and monitoring online activity while teaching in the classroom. In this study, the instructor strived to embed 4-8 activity slides per class to gauge student understanding of course content, prompt reflection or create discussion. She also provided a small amount of prep work in advance of each class—typically a required reading or viewing—with 2-3 activity slides to gauge student preparedness and/or solicit questions about course content and upcoming assessments. Uploading content to Echo360 and embedding these activity slides was not burdensome and provided opportunities across the semester for the instructor to strengthen constructive alignment and check-in with students. All recordings were scheduled at the start of the semester with support from an institutional classroom technology team, and replays were automatically posted and transcribed by Echo360. Monitoring online activity while teaching in the classroom was challenging at times. But in each course, a small group of students voluntarily took on the role of monitoring the discussion board, answering questions and speaking up for their online peers when necessary. The instructor encouraged this and took the time to endorse responses and thank these student mentors for their efforts. Managing a HyFlex learning environment requires flexibility and humility—traits that many instructors have honed over the pandemic. After the initial set-up, instructors can clone courses within Echo360, and update presentations and activity slides as needed for future offerings.

It is important to note that both courses in this study required lecture attendance and participation and attached a small grade value to attendance and participation (4-5%, depending on the course). This may account for the observed engagement scores. It is also possible that the relatively high grades in both courses motivated student engagement across the semester. It is clear, however, that a HyFlex model is one way to provide the flexibility students want—and in some cases feel they need—without compromising the learning experience or burdening instructors.

A Need and Preference for Flexible Learning

Most respondents to our program-wide survey self-identified as having at least one flexible learning need (see Figure 1). There is a demand for universally inclusive teaching practices to address a variation of learning needs. Current institutionally supported student accessibility services are limited to a small proportion of the student population who identify as having a defined disability (SAS, 2019). Typically, accommodation provisions aim to integrate disabled students into pre-existing inaccessible environments as opposed to addressing systemic inaccessible course designs and delivery (Da Bie & Brown, 2017). Although a Hyflex learning environment does not address all exclusions, it attempts to redevelop the teaching and learning environment such that accessibility is considered in the course design process. The diversity of learner preferences and accessibility should be considered and prioritized when designing a curriculum (LI, 2014; "Accessibility for Ontarians," 2005).

Allowing students to choose how they engage with lectures is one way to address these universal needs. Commuting was reported as the leading need for flexibility (see Figure 1). This learning barrier was reported to impact most of the survey respondents (see Figure 1), though only 31% of Ontario's post-secondary students report commuting for their education (Mitra et al.,

2020)**.** It is possible students with this flexible learning need were more likely than non-commuters to respond to our survey, but it is worth noting that Hamilton saw the largest rent increase of any Canadian city in 2019 (Mitchell, 2019). It is therefore also possible that many students are unable to afford housing close to McMaster University and opt to rent further away and commute by car or public transit. Attending classes virtually can reduce the time students spend commuting, particularly during winter months. Avoiding the need to commute can also reduce the cost of living for students, between transit passes, gas, car maintenance and parking.

The HyFlex approach also affords students the flexibility to learn at times that suit their schedule. Horzum et al. (2014) observed that evening learners perform worse than morning learners in an in-person classroom. By contrast, in a virtual classroom wherein students could choose when to learn, morning and evening learners performed similarly (Horzum et al., 2014; Escribano et al., 2012). A HyFlex learning environment also accounts for the potential time-zone barriers. For example, international students synchronously learning from their homes faced specific forms of exclusions (Selagy, 2020). Although students in their study were required to participate synchronously for full marks on their engagement score, they did have the flexibility to miss lectures and catch up with recordings later when necessary.

Now that public health restrictions have lifted, Canadian institutions have returned to in-person classes. There is, however, some anxiety among students about returning to campus and socializing with peers in a post-COVID context (Venable, 2021). A recent survey in the United States (*n*=1,000) found that 31% of college students did not feel safe returning to campus in Fall 2021 (Zaman, 2021). On the other hand, many undergraduates reported a decline in their mental health, including feelings of depression and anxiety associated with the isolation from online school (Lee et al., 2021). In our study, students cited mental health as a flexible learning need (see Figure 1). The HyFlex model provides institutions an opportunity to centre students and their preferences when designing post-COVID learning experiences.

Mapping Student Perceptions of Echo360

Our results indicate that Echo360 is a practical platform for teaching and learning. Students with experience using Echo360 reported overwhelmingly positive responses for all nine features that we explored (see Figure 2). Students have reported satisfaction with discussion boards to anonymously inquire with their instructional team and peers, and lecture replays to review content (Sammel, 2014). Groen et al. (2016) found that 73% of surveyed Canadian university students noted that lecture capture by Echo360 facilitated their learning.

These features are not unique to Echo360, of course. Echo360 is practical in that it combines several features into one learning platform that most survey respondents reported as easy-to-use (see TA3). The deficit in digital literacy of students and educators, as well as the lack of technology training and support from institutions, are barriers to the integration of Information and Communication Technologies in higher education (Mercader & Gairín, 2020; Hew & Brush 2007). A user-friendly interface such as Echo360 may circumvent the need for additional resources and is essential for implementing educational technology institutionally (see Figure 4).

We also found that most survey respondents were satisfied with their overall experience with using Echo360 (see TA2). Student satisfaction is an important indicator of their learning experience, as students with higher satisfaction levels tend to exhibit increased course engagement (Hwang & Wao, 2021). Although we did not examine the relationship between student satisfaction and learning outcomes, we did observe that most students who reported at least one flexible

learning need believed Echo360 increased their understanding of course content, performance, attendance or engagement (see Figure 4). Perhaps students developed a greater understanding of course content by engaging in active learning using Echo360 activity slides (Lucas et al., 2013; Kvam, 2000). Students 'enhanced' class attendance may have also contributed to their perceived academic success (Moore, 2006).

Most students in our study felt they benefitted or would benefit from one or more features of a HyFlex learning environment (Figure 2), and most preferred classes that blended in-person and online learning rather than being exclusively in person or online. Miller et al. (2013) similarly reported that American students favoured a HyFlex learning environment. We saw that the two most popular Echo360 features were lecture replays and pre-recorded videos (see Figure 2). These features provide students with the choice of when and where they engage with their lectures. This aligns with previous studies as students are found to prefer virtual learning primarily because it lends them flexibility, despite requiring a perceived increase in self-motivation and organization (Daymont et al., 2011).

It is important to note that Echo360 is just one example of a HyFlex teaching and learning platform and other technologies may achieve the same goal of adding flexibility while sustaining student engagement or success. This study does not explore whether Echo360 is superior to other HyFlex teaching and learning platforms, nor does it reveal how a HyFlex learning environment benefits individual students with unique flexible learning needs.

The outcomes we compared were engagement scores and final grades adjusted to remove the contribution of the engagement scores. It is possible that highly engaged students saw the benefits of engagement in their grades and were thus motivated to succeed in other assessments. It is also possible that students with high grades in the course were more motivated to engage during lectures. The observation that engagement scores and adjusted final grades were comparable between in-person dominant and online dominant learners and correlated within each condition suggests that giving students the flexibility to engage either in-person or virtually does not harm the learning experience. In future studies, we plan to explore whether adjustments to the in-class learning activities can strengthen the correlation between engagement and final grade for all learners. We also plan to investigate whether our modified HyFlex learning environment can improve the learning experience for students with flexible learning needs.

Our findings suggest that Echo360 can be leveraged to create a HyFlex teaching and learning environment that addresses student needs and preferences relating to accessibility and flexibility. We show that a HyFlex model can be applied to skills- and content-based courses with minimal effort by instructors and with no apparent adverse consequences for students. As we return to campus post-pandemic, we encourage instructors and institutions to explore ways to apply these findings to their unique contexts and diverse student bodies.

References

2019 Employment Equity Census Report. (2020). Human Resources. https://hr.McMaster.ca/employees/employment-equity/employment-equity-census/employment-equity-census-report/

Abdul, T. (2014). *Winter accessibility an uphill battle on campus*. The Silhouette. https://www.thesil.ca/winter-accessibility-an-uphill-battle-on-campus

Accessibility. (n.d.). *Echo360*. Retrieved from https://echo360.com/accessibility/

Accessibility for Ontarians with Disabilities Act. (2005). Retrieved from http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_05a11_e.htm

Armstrong-Mensah, E., Ramsey-White, K., Yankey, B., & Self-Brown, S. (2020). COVID-19 and distance learning effects on Georgia State University School of Public Health students. *Frontiers in Public Health*, *8*, 547. https://doi.org/10.3389/fpubh.2020.576227

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies*, *2*(2), 113–115. https://doi.org/10.1002/hbe2.191

Barr, M. L. (2014). Encouraging college student active engagement in learning: The influence of response methods. *Innovative Higher Education*, *39*(4), 307–319. https://doi.org/10.1007/s10755-013-9276-x

Beatty, B. J. (2019). *Hybrid-flexible course design: Implementing student directed hybrid classes*. EdTech Books. https://edtechbooks.org/hyflex

Bettinger, E. P., Fox, L., Loeb, S., & Taylor, E. S. (2017). Virtual classrooms: How online college courses affect student success. *American Economic Review*, *107*(9), 2855–75. https://doi.org/10.1257/aer.20151193

Brogan, P. (2009). *Echo360: Lecture capture solutions for students with disabilities*. Retrieved from https://www.automaticsync.com/wp-content/uploads/2022/08/AccessibleLectures-11.pdf

Carr, R., Palmer, S., & Hagel, P. (2015). Active learning: The importance of developing a comprehensive measure. *Active Learning in Higher Education*, *16*(3), 173–186. https://doi.org/10.1177/1469787415589529

Condra, M., Dineen, M., Gills, H., Jack-Davies, A., & Condra, E. (2015). Academic accommodations for postsecondary students with mental health disabilities in Ontario, Canada: A review of the literature and reflections on emerging issues. *Journal of Postsecondary Education and Disability*, *28*(3), 277–291.

Cooper, K. M., Downing, V. R., & Brownell, S. E. (2018). The influence of active learning practices on student anxiety in large-enrollment college science classrooms. *International Journal of STEM Education*, *5*(1), 1–18. https://doi.org/10.1186/s40594-018-0123-6

CUDO. (n.d.). Retrieved from https://cudo.ouac.on.ca/page.php?id=7&table=4#univ=25&y=2018

Cumming, T. M., & Rose, M. C. (2022). Exploring universal design for learning as an accessibility tool in higher education: A review of the current literature. *The Australian Educational Researcher*, *49*(5), 1025–1043. https://doi.org/10.1007/s13384-021-00471-7

Davis, S., Connolly, A., & Linfield, E. (2009). Lecture capture: making the most of face-to-face learning. *Engineering Education*, *4*(2), 4–13. https://doi.org/10.11120/ened.2009.04020004

Daymont, T., Blau, G., & Campbell, D. (2011). Deciding between traditional and online formats: Exploring the role of learning advantages, flexibility, and compensatory adaptation. *Journal of Behavioral and Applied Management*, *12*(2), 156.

De Bie, A., & Brown, K. (2017). *Forward with FLEXibility: A teaching and learning resource on accessibility and inclusion*. PressBooks. https://pressbooks.pub/flexforward/

Duffy, M., James, J., Campbell, C., & Williams, J. C. (2017). *Key success factors to implementing an active learning platform* [Paper presentation]. Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education (ASCILITE) Conference 2017, Queensland, Australia. https://research-repository.griffith.edu.au/bitstream/handle/10072/370547/DuffyPUB2835.pdf?sequence=3

Echo360—Lecture Capture and Student Engagement. (n.d.). McMaster University Library Retrieved from https://library.McMaster.ca/services/lecture-capture-echo360

Escribano, C., Díaz-Morales, J. F., Delgado, P., & Collado, M. J. (2012). Morningness/eveningness and school performance among Spanish adolescents: Further evidence. *Learning and Individual Differences*, *22*(3), 409–413. https://doi.org/10.1016/j.lindif.2011.12.008

Fei, J., Mather, C., Elmer, S., Allan, C., Chin, C., & Chandler, L. (2013). Use of Echo360 generated materials and its impact on class attendance. In *ASCILITE-Australian Society for Computers in Learning in Tertiary Education Annual Conference* (pp. 288–292). Australasian Society for Computers in Learning in Tertiary Education.

Government of Canada. (2018). *A demographic, employment and income profile of Canadians with disabilities aged 15 years and over, 2017.* https://www150.statcan.gc.ca/n1/pub/89-654-x/89-654-x2018002-eng.htm

Groen, J. F., Quigley, B., & Herry, Y. (2016). Examining the use of lecture capture technology: Implications for teaching and learning. *Canadian Journal for the Scholarship of Teaching and Learning*, *7*(1), 8. https://doi.org/10.5206/cjsotl-rcacea.2016.1.8

Henderson, D., Woodcock, H., Mehta, J., Khan, N., Shivji, V., Richardson, C., & Burns, A. (2020). Keep calm and carry on learning: using Microsoft teams to deliver a medical education programme during the COVID-19 pandemic. *Future Healthcare Journal*, *7*(3), e67. https://doi.org/10.7861/fhj.2020-0071

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, *55*(3), 223–252. https://doi.org/10.1007/s11423-006-9022-5

Horzum, M. B., Önder, İ., & Beşoluk, Ş. (2014). Chronotype and academic achievement among online learning students. *Learning and Individual Differences*, *30*, 106–111. https://doi.org/10.1016/j.lindif.2013.10.017

Hwang, J., & Wao, F. (2021). College student satisfaction typology and its relationship with engagement patterns. *Journal of College Student Development*, *62*(1), 118–124. https://doi.org/10.1353/csd.2021.0009

Knight, J. K., & Wood, W. B. (2005). Teaching more by lecturing less. *Cell Biology Education*, *4*(4), 298–310. https://doi.org/10.1187/05-06-0082

Kvam, P. H. (2000). The effect of active learning methods on student retention in engineering statistics. *The American Statistician*, *54*(2), 136–140. https://doi.org/10.1080/00031305.2000.10474526

Lakhal, S., Khechine, H. & Pascot, D. (2014). Academic students' satisfaction and learning outcomes in a HyFlex course: Do delivery modes matter? In T. Bastiaens (Ed.), *Proceedings of World Conference on E-Learning* (pp. 1075-1083). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/primary/p/148994/

Lederer, A. M., Hoban, M. T., Lipson, S. K., Zhou, S., & Eisenberg, D. (2021). More than inconvenienced: The unique needs of US college students during the COVID-19 pandemic. *Health Education & Behavior*, *48*(1), 14–19. https://doi.org/10.1177/1090198120969372

Lee, J., Jeong, H. J., & Kim, S. (2021). Stress, anxiety, and depression among undergraduate students during the COVID-19 pandemic and their use of mental health services. *Innovative higher education*, 1–20. https://doi.org/10.1007/s10755-021-09552-y

LI, K. C. (2014). How flexible do students prefer their learning to be? *Asian Association of Open Universities Journal*, *9*(1), 35–46. https://doi.org/10.1108/AAOUJ-09-01-2014-B004

Lucas, K. H., Testman, J. A., Hoyland, M. N., Kimble, A. M., & Euler, M. L. (2013). Correlation between active-learning coursework and student retention of core content during advanced pharmacy practice experiences. *American Journal of Pharmaceutical Education*, *77*(8). https://doi.org/10.5688/ajpe778171

Mercader, C., & Gairín, J. (2020). University teachers' perception of barriers to the use of digital technologies: the importance of the academic discipline. *International Journal of Educational Technology in Higher Education*, *17*(1), 1–14. https://doi.org/10.1186/s41239-020-0182-x

Miller, J., Risser, M., & Griffiths, R. (2013). Student choice, instructor flexibility: Moving beyond the blended instructional model. *Issues and Trends in Educational Technology*, *1*(1), 8–24. https://www.learntechlib.org/p/129818/

Ministry Reports. (2019). McMaster University Online Library. Retrieved from https://sas.McMaster.ca/ministry-reports/

Mitchell, D. (2019) Hamilton rental prices spike at 24 per cent year over year, study says. *Global News.* https://globalnews.ca/news/6169777/hamilton-rent-spikes/

Moore, R. (2006). Class attendance: How students' attitudes about attendance relate to their academic performance in introductory science classes. *Research and Teaching in Developmental Education*, 23(1), 19–33. Retrieved June 20, 2021, from http://www.jstor.org/stable/42802273

National Educational Association of Disabled Students (NEADS). (2018). *Landscape of accessibility and accommodation in post-secondary education.* https://www.neads.ca/en/about/media/AccessibilityandAccommodation%202018-5landscapereport.pdf

OCFUA. (2020, November). *OCUFA 2020 study: COVID-19 and the impact on university life and education*. [PowerPoint slides]. https://ocufa.on.ca/assets/OCUFA-2020-Faculty-Student-Survey-opt.pdf

Patel, P., Guzman, A. K., McLellan, B., & Blasiak, R. (2020). Optimizing education for dermatology residents during the COVID-19 pandemic. *Journal of the American Academy of Dermatology*, *83*(4), 319–320. https://doi.org/10.1016/j.jaad.2020.07.029

Pichette, J., Brumwell, S., & Rizk, J. (2020). *Improving the accessibility of remote higher education: Lessons from the pandemic and recommendations.* Higher Education Quality Council of Ontario. https://heqco.ca/wp-content/uploads/2020/10/Formatted_Accessibility_FINAL.pdf

Price, M., & Kerschbaum, S. (2017). Promoting supportive academic environments for faculty with mental illnesses *resource guide from the Temple University Collaborative on community inclusion.* http://tucollaborative.org/wp-content/uploads/2017/05/Faculty-with-Mental-Illness.pdf

R Core Team. (2021). *R: A language and environment for statistical computing.* R Foundation for Statistical Computing. https://www.R-project.org/

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, *2*(3), 923–945. https://doi.org/10.1007/s42438-020-00155-y

Read how institutions are using Echo360. (n.d.). Echo360. Retrieved from https://echo360.com/stories/

Selagy, C. (2020). *International students adapt to synchronous learning.* Penn State Great Valley. https://greatvalley.psu.edu/story/7071/2020/06/15/international-students-adapt-synchronous-learning

Saleh, Z., Heffernan, E., & Ros, M. (2020, January). Ensuring student engagement using conversational interview lectures during the transition to remote learning as a result of COVID-19. In *31ˢᵗ Annual Conference of the Australasian Association for Engineering Education (AAEE 2020): Disrupting Business as Usual in Engineering Education* (pp. 496–503). Barton, ACT: Engineers Australia.

Sammel, A. (2014). The pedagogical implications of implementing new technologies to enhance student engagement and learning outcomes. *Creative Education*, *5*(2), 104. https://doi.org/10.4236/ce.2014.52017

SAS. (2019) Student Accessibility Services 2019-2020 information for instructional support. Retrieved from https://sas.McMaster.ca/wp-content/uploads/2019/08/Yellow-File.pdf

Mitra, R., Habib, K. N., Siemiatycki, M., Keil, R., & Bowes, J. (2020). StudentMoveTO-From insight to action on transportation for post-secondary students in the GTHA: 2019 transportation survey findings. http://www.studentmoveto.ca/wp-content/uploads/2020/10/StudentMoveTO-2019-Report-Final-5-Updated-October-15-2020.pdf

Technology Resources for McMaster Students. (n.d.). UTS. https://uts.McMaster.ca/technology-resources-for-McMaster-students/

Thompson, K. M., & Copeland, C. (2020). Inclusive considerations for optimal online learning in times of disasters and crises. *Information and Learning Sciences*, *121*(7/8), 481–486. https://doi.org/10.1108/ILS-04-2020-0083

Venable, M. (2021). *Dealing with anxiety about returning to campus*. BestColleges. https://www.bestcolleges.com/blog/anxiety-returning-to-campus/

Watt, S., Vajoczki, S., Voros, G., Vine, M. M., Fenton, N., & Tarkowski, J. (2014). Lecture capture: An effective tool for universal instructional design? *Canadian Journal of Higher Education*, *44*(2), 1–29. https://files.eric.ed.gov/fulltext/EJ1038356.pdf

WebEx. (2014). Why WebEx? Connect with anyone, anywhere, anytime. http://www.webex.com/why-webex/overview.html

Williams, J., & Fardon, M. (2007). Lecture recordings: Extending access for students with disabilities. In S. Wheeler, & N. Whitton (Eds.), *ALT-C 2007: Beyond control, Learning technology for the social network generation, Research Proceedings* (Vol. 1, pp. 139–148). The Association for Learning Technology.

Zaman, N. (2021). 31% of college students don't feel safe returning to campus. ValuePenguin. https://www.valuepenguin.com/nearly-one-third-students-feel-unsafe-returning-to-campus

Zavarise, A. Winter accessibility on campus. (2015). The Silhouette. https://www.thesil.ca/winter-accessibility-on-campus

Appendix A
Survey Questions

Table A1
Survey Questions Mapping Student Experience and Perceptions Towards Echo360 as a Pedagogical Tool. Deployed to McMaster University Honours Life Sciences Students in the 2019-2020 Year

	Question	Responses
1	**Have you used Echo360 in a course offered through the Faculty of Science?**	• Yes • No • I'm not sure
2	If yes, please indicate up to five courses you feel are the most relevant:	[Variable responses]
3	**Please indicate whether you've used the following Echo360 features and how they affected your learning:**	
	I have viewed my instructor's slide deck on Echo360.	• I have not used this feature • I'm not sure if I have used this feature • This greatly hindered my learning • This slightly hindered my learning • This did not help or hinder my learning • This slightly helped my learning • This greatly helped my learning *Questions 3 posed identical multiple-choice options across all 9 statements.*
	I have watched pre-recorded videos (for blended or online classes).	
	I have watched lectures through a livestream.	

	I have used activity slides (multiple choice questions, short answer questions, numerical questions, ordered list questions).
	I have used the discussion board or the Q&A feature.
	I have used the confusion flag.
	I have watched lecture replays.
	I have used the searchable transcript.
	I have used the note-taking tool.

To what extent do you agree with the following statements:

4	Echo360 has aided in my understanding of course content.	- Strongly Agree - Agree - Neutral - Disagree - Strongly disagree - Not applicable ***Questions 4-8 posed identical multiple-choice options.*
5	Echo360 has made course content more accessible for me.	
6	The use of Echo360 has made course content more engaging for me.	
7	The use of Echo360 in my courses has increased my participation in class.	

8	The use of Echo360 in my courses has improved my performance in class.	
9	How would you rate the usability of the Echo360 interface?	• It's very easy to use • It's somewhat easy to use • Neutral • It's difficult to use • It's very difficult to use • Not applicable
10	How would you rate your overall experience with Echo360?	• Very satisfied • Satisfied • Neutral • Dissatisfied • Very dissatisfied • Not applicable

11	If you have not used Echo360, which of the following Echo360 features appeal to you?	• Live streaming of lectures (i.e., watching lectures in real-time using the internet) • Watching recorded lectures after class has finished • Searchable transcripts of words spoken during lecture • Activities, such as multiple-choice quizzes, relating to the course content • Questions posed by the instructor using the Echo360 discussion board • The ability to pose questions to the instructor using the Echo360 discussion board • The ability to pose questions to other students using the Echo360 discussion board • In-class discussions on the discussion board (instead of speaking out loud) • 'Flagging' slides when content is unclear • Making lectures notes that link to the instructor's slide deck or a recorded lecture
12	If given the choice, would you rather attend lectures in-person or online? Please justify your answer.	• In-person _____ • Online _____ • Some combination of the two_____

| 13 | Is there anything else you would like to share with us about your experience with Echo360 in the Faculty of Science? For instance, you could comment on how many courses use it, instructors' knowledge of its features, whether knowing a course uses Echo360 guides your course-selection process, etc. | [Open-ended] |

Appendix B
Links to Course Outlines

The course outline for LIFESCI 3P03 can be found here: [LIFESCI 3P03_fall 2019.pdf](#)
The course outline for LIFESCI 3Q03 can be found here: [LIFESCI 3Q03_winter 2020.pdf](#)

Appendix C
Supplementary Results

Table C1
Students Reported their Satisfaction Levels Toward their Overall Experience with Echo360 (n=188)

	Responses	%
Very satisfied	66	35.11%
Satisfied	95	50.53%
Neutral	20	10.64%
Dissatisfied	7	3.72%

Table C2
Students Report their Perspectives toward the Usability of the Echo360 Interface (n=183)

	Responses	%
It's very easy to use	81	43.55%
It's somewhat easy to use	86	46.24%
Neutral	11	5.91%
It's difficult to use	8	4.30%

Table C3
Students Report the Setting in which they would Prefer to Attend Class (n=205)

	Responses	%
Online	31	15.12%
In-person	62	30.24%
Some combination of the two	112	54.63%