Ollscoil Chathair
Bhaile Átha Cliath
Dublin City University

Moving Large Classes Online

Illuminating the experience of the sudden transition of large, face-to-face programmes to the online environment in Dublin City University, in response to the Covid-19 crisis

Ann Marie Farrell, Karen Buckley, Mark Glynn,
Rob Lowney, Seán Smyth, Suzanne Stone.

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Authors: Ann Marie Farrell, Karen Buckley, Mark Glynn, Rob Lowney, Seán Smyth, Suzanne Stone.

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Introduction

This study was financially supported by the Dublin City University (DCU) Educational Trust as one of the projects accepted for the DCU Covid-19 Research and Innovation Hub.

The proposal for this project was submitted on 24 April and notification of acceptance was received on 1 May 2020. The application for ethical approval was submitted on 20 May and granted on 5 June by the DCU Research Ethics Committee, following amendments to the original.

The motivation for developing the research project arose from discussions between the authors who, at the time of the call for proposals, were experiencing the emergency transition of a large class online from the perspectives of a teacher, a student, a learning technologist and an academic developer.

THE PURPOSE OF THIS STUDY IS THREEFOLD:

1. To shed light on the sudden transition of DCU's large classes (100+ students) from the face-to-face teaching and learning setting to the online environment in March from the perspectives of staff and students.
2. To contextualise the findings arising from the examination of the transition referred to above by reviewing relevant literature.
3. To inform the work (a) of academics in DCU teaching large-class cohorts and (b) of DCU's academic developers and learning technologists, supporting them in this endeavour, as large programmes and modules move online in the forthcoming academic year.

The composition of the research team was an advantage from the outset in terms of developing the proposal, designing the research and interpreting the findings. Viewing the above objectives from a range of perspectives ensured a richness in discussion, debate, synthesis, analysis and reporting.

Curriculum reform is a goal in Talent, Discovery, and Transformation, DCU's strategic plan 2017-2022 (Dublin City University, 2017a), with a commitment to "conduct[ing] a systematic review of the curriculum and learning design of our degree programmes with a focus on the learning experience of the individual student" (p. 20). The present study is underpinned by this goal; the student experience is at the heart of the study, with the inclusion of the perspectives of others enhancing the overall, holistic understanding of the student experience.

Technology-enhanced learning (TEL) and a greater flexibility in programme delivery are highlighted as indicators of success/progress in the DCU strategic plan. The swift pivot of face-to-face programmes to the online environment created a situation whereby students and staff had to engage with a teaching and learning context reliant on technology. We hope that this study will go some way to informing effective practices in the near future, as we continue to navigate the Covid-19 educational terrain. Moreover, we hope that it will inform TEL practice in the long term, even when we have returned to the face-to-face context.

The DCU Constituent Strategy for Teaching and Learning (Dublin City University, 2017b) is a key component of the strategic plan, focusing on the aspects of teaching and learning as being of critical importance to the university. This strategy stipulates the goal of creating a learning experience "characterised by innovative design in curriculum and delivery" and recognises that learning is a partnership between students and teachers. Central to this is a commitment to flexibility in programme delivery for both on- and off-campus students, with digital and blended modes described as key drivers of curriculum design. The sudden transition to the online environment required an immediate reconceptualisation of the student learning experience with implications for teaching practices and professional development of teaching staff. While this study contributes to the evidence base supporting the implementation of online and blended learning specific to large cohort teaching, many of the findings could be applied to any class size.

The timeframe for this project was tight and we could not have completed it without the support and help of others. We would like to thank:

- The DCU Educational Trust for the financial and moral support to enable this project in the first instance. Particular thanks are due to Professor Christine Loscher for her support and efficient management of the process.
- The DCU Teaching Enhancement Unit for providing supplementary funding which enabled us to access professional design services for the final report.
- Dr Antonia Owens and Ben Meehan, QDATRAINING PLC., for their attention to detail in the analysis of the survey data.
- The DCU Research Ethics Committee for its guidance and support in refining the ethical elements of the study.
- Dr Anita Prunty and Dr Pip Ferguson for generously giving their time and expertise to review the content, conventions and structure of the final report; they saw so much that had become invisible to the authors during the last lap or two. We owe them!!
- Dr Rachel Finnegan, Irish Academic Editing, for copy-editing the penultimate draft with care and attention to detail.
- Marie Leahy, DCU Communications and Marketing, for her patient advice and guidance in relation to branding.
- Berni, Tom & Austin in Snap Jervis for bringing the final draft of the report to life in terms of layout and design.

The report is divided into the following sections:

- Section 1 provides suggestions and guidance for transitioning large classes online, as we move into the academic year 2020/21. This is not a summary of the report; rather, it forefronts the implications and conclusions arising from the research process, instead of presenting them at the end. This section of the report was shared with DCU staff via email on 22 September 2020.
- Section 2 comprises the full report with the following elements: methodology; findings from the review of literature; findings from data analysis; discussion; authors' personal reflections and references.
- Section 3 is an appendix, which includes relevant documentation that may be of use to the reader when navigating the document.

This has been an enjoyable, if intense, project for all of us. We hope that it will be of help in supporting the transition of DCU's large classes as we navigate the next phase(s) of DCU's experience of the Covid-19 pandemic. There has been a little more time to consider that transition for the current academic year compared to our experience in March. However, the pedagogical redesign of the learning environment from face to face to online continues to be achieved in an emergency situation, in contrast with the development of programmes and modules originally designed for the online environment. This challenge is compounded by large student cohorts. This study will not solve all the problems; nor will it provide all the guidance required to redesign the pedagogical approach. However, we do hope that it provides a foundation for planning programmes and modules which, in turn, will support the reality of teaching and learning in large, online classes.

"In periods when fields are without secure foundations, practice becomes the engine of innovation"
(Marcus & Fischer, 1986, p. 166).

Ann Marie Farrell
(Assistant Professor and Doctoral Student)

Karen Buckley
(Assistant Professor and Doctoral Student)

Mark Glynn
(Head of the Teaching Enhancement Unit)

Rob Lowney
(Learning Technologist and Doctoral Student)

Seán Smyth
(Undergraduate Student)

Suzanne Stone
(Learning Technologist and Doctoral Student)

Date: January 2021

SECTION 1: GUIDANCE FOR TEACHING LARGE CLASSES ONLINE

This section of the report provides the key recommendations arising from a review of the literature and an analysis of the data generated by (a) exploring the engagement of staff with DCU Teaching Enhancement Unit (TEU) supports and (b) surveys of DCU staff and students.

This guidance in essence distils the research into practical and accessible actions and considerations that large class teachers can look to when moving or continuing to move their large, face-to-face classes online. For that reason it has been foregrounded in this report, as it is likely the key element of the report that staff will wish to examine to inform their work.

The research as a whole and therefore, this guidance that follows, is rooted in the experience of DCU staff and students with the aim of providing support to them. The guidance makes several direct references to DCU's virtual learning environment (VLE), which is branded 'Loop'. Loop is an amalgamation of different learning technologies but at its core is the open-source platform Moodle; many of the Loop tools referenced are in fact core Moodle features.

This guidance was first shared with DCU staff in a short, standalone resource in September 2020, so that they could draw on it in preparation for the forthcoming academic year. The guidance was circulated to all staff in an email and also hosted on the TEU website. This original version (1.0) contained some hyperlinks to internal web pages describing Loop tools, as well as hyperlinks to publicly available resources. What now follows is a slightly amended version of the guidance (1.1) with the internal hyperlinks removed to ensure ease of reading.

Although written directly with DCU staff in mind, the guidance nonetheless is transferable to virtually all higher education institutions. References to Loop (Moodle) tools can be replaced with those from one's own virtual learning environment.

Summary guidance for DCU higher education (HE) teachers, February 2021

This guidance is divided into four key parts:

- Curriculum design in the online space.
- Teaching.
- Learning and engagement.
- Assessment.

Moving large face-to-face classes online

Summary guidance for DCU higher education (HE) teachers.

This guidance is divided into four key parts:

- **Curriculum design in the online space.**
- **Teaching.**
- **Learning and engagement.**
- **Assessment.**

Curriculum Design In The Online Space

Immediate actions and considerations

- Think of your Loop page as an online classroom for students and not just a repository for materials and resources.
- Create a cognitive presence by ensuring that the module structure is clear and taking a systematic approach to content design. Multiple teachers contributing to a module is common for large cohorts. Establish a level of consistency of design of content and learning activities through consultation.
- As consistency in structure helps students to navigate their online classroom, organise the Loop page into weekly topics, chunk content and provide clear signposting to support student learning.
- Draw on Universal Design for Learning (UDL) principles to develop curriculum content, e.g., the principle of flexibility. Provide content in both text and video format, etc.
- Check that demands you are making at a modular level are not being replicated at a programme level, e.g., students "introducing" themselves, which could just be done once and copied to a range of modular pages.

Ongoing

- Use a learning design approach to efficiently reimagine curriculum design and delivery, e.g., ABC learning design.
- As you move through the semester, revisit to the CAST UDL guidelines and the DCU UDL toolkit for ideas for teaching strategies that embrace inclusive pedagogy.
- Build flexibility into the design and implementation of the curriculum content.
- Evaluate and review of programme/ module design and delivery.
- A mix of synchronous and asynchronous learning activities will support students in engaging with the curriculum and will mitigate against broadband challenges in live online classes. Explore the Bandwidth immediacy matrix for guidance.
- Evaluate the module online to include student feedback in the quality assurance process. With very large groups, it may be useful to check in with a random selection of students or with class representatives. Flag this strategy at the beginning of the semester, so that students know to expect this type of evaluative interaction with you.

Teaching

Immediate actions and considerations

- Allow an ethos of care to inform your online teaching. Teacher presence helps to reduce isolation in large classes. Upload a profile photo and a welcome video on your Loop module page. Use the Loop book tool to curate materials that you can introduce/explain through text, video or audio.
- Outline your expectations clearly regarding participation, standards of contributions, interactions, deadlines and online etiquette.
- Consider the balance of synchronous and asynchronous teaching. If designed well, synchronous teaching can support social presence. Two simple examples are to use breakout rooms to facilitate smaller group discussion, or polls.
- Provide a variety of materials for students to engage with (e.g., video, article, task) that develop knowledge, skills and concepts from a range of perspectives. Ensure that materials are accessible by screen readers.
- Create opportunities for students in large classes to discuss programme content at synchronous classes. It is likely that some students will have prior experience/knowledge of module elements. Explore this and invite them to present to the class (live or pre-recorded).
- Nurture contributions from students in live classes through the Vevox polling app. Encourage questions from students in large classes through asynchronous Loop activities such as the Glossary or the Database.

Ongoing

- Communicate regularly using Loop announcements forum and/or Loop messaging (text/video). Provide drop-in sessions online, so that students can speak directly to you.
- Set aside time in your session to allow students to foster social presence by using breakout rooms. Ask students in large classes to act as discussion moderators for online discussion fora.
- Develop activities to monitor student engagement and progress with low-bandwidth requirements that can be easily accessed from students' mobile devices.
- Record synchronous sessions and make them available quickly to students.
- Avoid making long "lecture"- type pre-recorded videos; chunk into smaller videos. Clips should be "curated" or contextualised to support engagement.
- As building confidence in online teaching is vital, avail of the broad range of professional learning (PL) opportunities on offer both at local DCU level and externally with the #IUADigEd community.
- Consider opportunities currently available to experience online learning from a student perspective such as FutureLearn. The experience of being an online student helps online educators to inform their own teaching practice.
- Explore the EDTL project resources to support your reflection. The ongoing pivot to online teaching presents an opportunity for some deeper reflection and for exploring the particular affordances of teaching online.

Learning and engagement

Immediate actions and considerations

- Encourage social presence among students in large classes. Set up a Loop discussion forum to promote interaction. Run a simple icebreaker to kick-start social interaction between students. For example, ask students to post a brief introduction about themselves in text/audio/video. Model this by providing one yourself.
- Set students tasks that are well structured, clearly signposted and realistic in terms of the time required. Consider how the tasks align with the assessment of the module. Ensure that these tasks are varied, authentic and relevant to the real world.
- Encourage students to develop teaching materials and supports that are useful for their learning, e.g., a Loop glossary or a Loop database will allow students to crowd-source and explain key concepts/terms in their own words.
- If relevant, consider the role of teaching assistants, note-takers, interpreters, personal assistants and any others who work with you face to face and plan for their involvement and interaction in the large online class.
- Check if any students in your cohort require very specific inclusive considerations, e.g., closed captioning on video presentations, or pictures/diagrams that require alternative text/image description. Invite students to express their needs anonymously through a feedback activity or to email you privately, if they wish.

Ongoing

- Provide opportunities for student collaboration in synchronous class sessions and asynchronously. Synchronous classes may be difficult to manage for very large cohorts but consider one or two live classes to enhance the sense of classroom community and social presence.
- Use Loop and Zoom reports to check students' progress with materials and tasks and reach out if they are struggling.
- Ask students what they find useful (or not) as teaching unfolds. Use a Loop feedback tool or schedule regular consultation and dialogue with class representatives.

Assessment

Immediate actions and considerations

- Align learning activities with assessment. Where multiple teachers are contributing to the module, collaborate to avoid duplication of assessment tasks.
- Consider using continuous assessment, where possible, and scaffold the learning, to allow for regular feedback opportunities.
- Use Loop functions such as the Loop quiz and Loop gradebook to manage assessment processes and procedures more efficiently at large scale.
- Embed assessment for learning opportunities in the module.
- Share assessment criteria with students and explain them in advance.
- Provide exemplars to students and talk through them, explicitly relating them to rubrics for assessment. This is another approach to feedback
- Provide choice, e.g., in relation to the task itself: which peers they might work with, how many peers they might work with, negotiate deadlines, etc.
- If possible, avoid online proctored examinations; and, if necessary, consider providing additional time to help ameliorate access issues such as connectivity, adequate space, access to appropriate device.

Ongoing

- Use a Loop forum for all assessment queries, so that students can problem solve collectively and you can respond to the whole group.
- Explore alternative assessments.
- Offer flexibility in relation to assessments and feedback. See UDL tips.
- Use assessment data to get an insight into how your students are performing and compare with previous iterations of the module to benchmark this online iteration.
- Consider ways to partner with students in the assessment process, e.g., engaging in ongoing dialogue about it, negotiating assessment briefs, co-creating assessment criteria and establishing structures for peer feedback.
- Explore options for assessment design that support academic integrity.
- Consider how you might provide feedback to a large cohort, e.g., ask students to submit an assignment draft, select an anonymous portion at random and provide feedback to all based on patterns you have observed, linked to assessment criteria.
- Do not automatically repeat assessments from previous years. Revisit to keep them relevant, current and authentic.

SECTION 2: RESEARCH REPORT

Methodology

The purpose of this research project was:

1. To shed light on the sudden transition of DCU's large classes (100+ students) from the face-to-face teaching and learning setting to the online environment in March 2020 from the perspectives of staff and students.
2. To contextualise the findings arising from the examination of the transition referred to above by reviewing relevant literature.
3. To inform the work (a) of academics in DCU teaching large-class cohorts and (b) of DCU's academic developers and learning technologists, supporting them in this endeavour, as large programmes and modules move online in the forthcoming academic year.

The research approach was evaluative in nature, with the aim of illuminating the innovation (Parlett & Hamilton, 1972) of moving large classes online from a range of perspectives in the DCU context and in the wider, international context. Data were collected from three key sources: (1) a rapid, systematised review of relevant literature; (2) surveys of DCU students and staff who experienced the recent pivot of their large classes online; and (3) information relating to the TEU teaching supports provided to staff during the period March-June 2020. The scope of the project was determined by the tight timeline for the project itself and by the urgency of providing guidance by September at the latest. so that it could be used by DCU staff as they moved large-class modules online for the new semester (January 2021).

Literature review process

From the outset, reviewing the literature was conceptualised as a data gathering process to inform the research questions, rather than an exercise in providing a rationale for the study *per se*. To that end, the approach to reviewing the literature was systematic. However, due to time constraints of (a) the project itself and (b) the phenomenon under investigation, it was not possible to conduct a systematic review in its purest sense.

The principles underpinning the literature review were as follows:

- To gather together and examine what was already known, understood and experienced by others (Gough, Oliver, & Thomas, 2017) in relation to each element of the focus of this study, that is, large classes, online teaching and learning, and the inclusion of all learners.
- To gather a range of perspectives to gain an understanding of how the two key pedagogical phenomena under investigation (large classes and the sudden pivot to online learning) were experienced by others and how they approached the challenges arising (Gough & Thomas, 2017). This was particularly important in relation to the sudden pivot online, hence we searched for material through the more unconventional social media route, Twitter, to ensure that we were accessing a range of perspectives.

- To use a systematic approach to searching the literature, which would minimise bias while simultaneously providing clarity (Cornish, 2015), taking the tight timeframe into account.
- To balance the more formulaic, systematised searching approach with the interpretive voice of the authors (Booth, Papaioannou, & Sutton 2012).

In terms of the swift pivot from face-to-face to online teaching and learning experienced globally by the HE community since March, it was deemed likely that there would be little value in looking for "evidence" of best practice in that circumstance but rather, the value in reviewing the literature was to take account of the context and complexity of the situation (Cornish, 2015).

The approach finally adopted can best be described as a combination of a rapid and a systematised review. The completeness of the former was determined by time constraints and the latter characterised by a systematic process, stopping short of a systematic review (Grant & Booth, 2009). This rapid, systemised review was conducted between 15 July and 30 August 2020, focusing on the following key areas:

- Large classes in HE.
- Inclusive approaches to designing learning.
- Perspectives on the recent and sudden pivot from the face-to-face to online teaching and learning context.
- Existing key DCU research reports relevant to the focus of this study.

It was decided from the outset of the project that it would be important to review the literature on the first three elements above. While the focus of the project was on the transition of large classes to the online context, it was decided to examine the literature on large class face-to-face teaching to (a) understand the context from which these classes had come and (b) to act as a foil upon which to map the literature from the sudden move online. The research team also felt it was important to examine the literature on UDL because the survey participants were either engaging in that practice or experiencing the practice as students. The decision to include some DCU reports was made during the literature review process itself because the research team acknowledged that some of those recent reports were relevant to this project. One external report was included because it explicitly addressed the experience of students with disabilities in Irish higher and further education settings as a result of the impact of Covid-19; an aspect of teaching and learning that was not explicitly addressed by our research project.

Table 1 provides the structural details of the search.

Table 1: Structural details of search

Literature	Terms and database	Filters	Results	Total cited
Large classes	Academic Search Complete: "Large class*" OR "large lecture*" (title) AND "Universit*" OR "higher education" (open)	Boolean phrase Full text Scholarly (peer-reviewed) journals PDF full text article 2000-2020 English	58 articles identified and reduced to 33 following screening	33 plus, additional sources = 5 Total = 38
Emergency pivot online	Academic Search Complete (pandemic OR Covid OR Covid-19 OR Coronavirus) AND (mov* OR transition OR pivot*) AND (online OR distance OR e-learning) AND ("higher education" OR universit*)	Full text Scholarly (peer reviewed) journals 2020 English	23 articles identified and reduced to 11 following screening	11
Results	Google Scholar "pivot online" AND Covid-19 AND "higher education"	Articles only 2020 English	15 articles identified and reduced to 8 following screening	8
	Other sources identified	Video presentation related to pandemic and papers	5	5

UDL	Academic Search Complete (universal design for learning OR UDL) AND (higher education OR college OR university online learning OR online education OR online instruction OR online teaching OR online courses OR elearning OR distance education)	Boolean phrase Full text Scholarly (peer reviewed) journals 2000-2020 English	85 articles identified and reduced to 14 following screening	14
Selected reports	Research team decision regarding relevance	DCU publications	3	3 PLUS 1 report from AHEAD Total = 4

Items were excluded for a range of reasons. For example, some papers included the term "large class" in the title but related to classes with fewer than 100 students.

Staff and student survey design[1]

Staff and students were surveyed by means of a questionnaire comprising open and closed questions. The research team decided to use questionnaires to maximise reach to the staff and student body, thus ensuring inclusion of as many perspectives as possible. Questionnaires for both staff and students were developed between May and June 2020. Both versions were piloted with two staff and two students respectively; time did not allow for the inclusion of more pilot participants. Feedback from the pilot participants was used to amend and refine aspects of each questionnaire. Google Forms was used as the platform for the questionnaire. Both questionnaires were launched on Monday 22 June and closed on Sunday 5 July 2020. The staff survey was circulated via the "all staff" email list. The student survey was posted on the home page of Loop and students were alerted through the Students' Union (SU). In addition, Twitter was used by the research team to increase awareness of the surveys. Both surveys were completed anonymously.

Analysis

The methodology adopted by this study is based on content analysis as defined by Krippendorff (2004), who drew on the work of Lasswell and Casey (1946) in developing this methodological framework. Maykut and Morehouse (1994, p. 18) point out:

> Words are the way that most people come to understand their situations, we create our world with words, we explain ourselves with words, we defend and hide ourselves with words … the task of the researcher is to find patterns within those words and to present those patterns for others to inspect (p. 18).

While qualitative research is not given to mathematical abstractions, it is nonetheless systematic in its approach to data collection and analysis. Framed by a focus of inquiry, data were collected using online questionnaires with open and closed-ended questions. Open-ended questioning allowed study participants to articulate their perceptions and experiences freely and spontaneously. In analysing data generated in this format, responses were not grouped according to predefined categories. Rather, salient categories of meaning and relationships between categories were derived from the data itself through a process of inductive reasoning known as coding units (Stemler, 2001). This process involved breaking down the data into discrete "incidents" (Glaser & Strauss, 1967) or "units" (Lincoln & Guba, 1985) and coding them into categories. Categories arising from this method generally take two forms: those that are derived from the participants' customs and language and those that the researcher identifies as significant to the project's focus of inquiry. The goal of the former is to restructure the categories used by participants when articulating their own experiences and understanding; the goal of the latter is to assist the researcher in developing theoretical insights into the social processes operating in the world under study, providing both description and explanation. Categories undergo both content and definition changes, as units and incidents are compared and categorised through cycles of coding, and as understanding of the properties of categories and the relationships between categories are developed and refined over the course of the analytical process.

1. The analysis of the data arising from the surveys was completed by Dr Antonia Owens and Ben Meehan, QDATRAINING PLC, in collaboration with the research team.

The software tool NVivo (Richards, 2005) was used to organise and interpret the data. It must be stressed that. in using qualitative data analysis software, the researcher does not capitulate the hermeneutic task to the logic of the computer. Rather, the computer is used as a tool for efficiency and not as a tool which in and of itself conducts analysis and draws conclusions. Importantly, such software also serves as a tool for transparency. Arguably, the production of an audit trail is the most important criterion on which the trustworthiness and plausibility of a study can be established. NVivo's logging of data movements, coding patterns, mapping of conceptual categories and thought progression rendered all stages of the analytical process traceable and transparent, facilitating the production of a detailed and comprehensive audit trail.

Data were collected from separate staff and student questionnaires. The questionnaire content was designed to address the research questions, as previously set out. There were eight discrete phases of analyses. This included coding, managing codes, initial categorisation of open codes and data reduction through consolidating codes into a more abstract framework. Writing was used as a coding tool to prompt deeper analysis of the data (Bazeley, 2009), leading to findings from which conclusions were drawn. Some of the managing coding cycles also involved additional coding. The eight phases of this study may be described as follows:

Phase 1: This involved importing both the questionnaires from digital to textual format, so that they could be imported into NVivo.

Phase 2: Open coding involved broad participant-driven initial coding of the participants' contributions to deconstruct the data from their original chronology into initial, non-hierarchical general codes. These codes were assigned clear labels and contained the units of meaning (text segments), which were coded from the content (Maykut & Morehouse 1994, pp. 126-149). One hundred and ninety-one open codes were developed at this phase of coding for staff and 219 for students, based on the open-ended questions in both questionnaires. When open codes common to both groups were combined, a total of 311 open codes were developed in this phase.

Phase 3: The categorisation of codes involved re-ordering the codes identified and coded in Phase 1 into categories of codes by grouping related codes under these categories and organising them into a framework that made sense, to further the analysis of this dataset and research question. This phase also included distilling, re-labelling and merging of categories, to ensure that labels and "rules for inclusion" accurately reflected the coded content. Thirty-two core categories of codes were developed in this phase.

Phase 4: The coding-on involved breaking down the now restructured categories into subcategories to offer more in-depth understanding of the highly qualitative aspects under scrutiny; to consider divergent views, negative cases, attitudes, beliefs and behaviours coded to these categories; and to offer clearer insights into the meanings embedded in them.

Phase 5: The data reduction involved consolidating and refining categories into a more abstract and conceptual map or final thematic framework of codes. Four themes were identified in this phase.

Phase 6: This involved writing analytical memos against the higher-level codes to accurately summarise the content of each category and its codes and to propose empirical findings against such categories. These memos considered the four thematic areas identified:

1. The content of the themes and categories of codes on which it was reporting.
2. The patterns, where relevant (e.g., levels of coding, although this could be used to identify exceptional cases as well as shared experiences).
3. Background information recorded against participants and any patterns that might exist in relation to participant profiles and demographics.
4. Situating the code(s) in a storyboard or creating a narrative that considers the relatedness of codes to each other; drawing and describing inferences and their importance to addressing the research question; and sequencing disparate codes and clusters of codes into a story which is structured and can be expressed in the form of a coherent and cohesive set of outcome statements or findings.

Phase 7: The validation involved testing, validating and revising analytical memos, so as to self-audit proposed findings by seeking evidence in the data beyond textual quotes to support the stated findings and seeking to expand on deeper meanings embedded in the data. This process involves the interrogation of data and forced the consideration of elements beyond the category itself, drawing on relationships across and between categories and cross tabulation with demographics, recorded by researchers during coding and analysis. This phase resulted in evidence-based findings, as each finding had to be validated by being rooted in the data itself and relied on the creation of reports from the data to substantiate findings.

Phase 8: This involved synthesising analytical memos into a coherent, cohesive, and well-supported outcome statement or findings report, offering a descriptive account of staff and students experiences, challenges, and perceptions, as relayed in the context of the Covid-19 pandemic emergency.

Table 2 sets out the relationship between the qualitative data analysis processes deployed in this study and the philosophical underpinnings that support Krippendorff's (2004) methodology known as content analysis.

Table 2: Stages and processes deployed in qualitative data analysis. Adapted from Krippendorff (2004)

Analytical process (Krippendorff, 2004).	Krippendorff Practical application in NVivo	Strategic objective	Iterative process throughout analysis
What data are analysed? How are they defined? What is the population from which they are drawn? (Source)	**Phase 1:** Downloading focus group transcripts and formatting demographic and other profiling information into a single table for import into a computer aided qualitative data analysis system (NVivo)	Data management (Open and hierarchal coding through NVivo)	Who said what? ↕ Why did they say it? ↕
What are the contexts relative to which the data are analysed? (Encoding process)	**Phase 2:** Open coding **Phase 3:** Categorisation of codes **Phase 4:** Coding on **Phase 5:** Data Reduction/ consolidation	Descriptive accounts (Reordering, "coding on" and annotating through NVivo)	How did they say it? ↕ What inferences may be drawn?
Exploring relationships and patterns across categories (Channel, message, recipient)	**Phase 6:** Generating analytical memos		↕ To whom did they say it?
Integrating data to write findings (Decoding process)	**Phase 7:** Validating analytical memos **Phase 8:** Synthesising analytical memos	Explanatory accounts (Extrapolating deeper meaning, and drafting summary statements and analytical memos through NVivo)	↕ To what effect?

Professional support data

Context

As the Covid-19 pandemic developed in early 2020, it became apparent to DCU that there was a tangible risk that all operations of the university, especially teaching and learning, would be impacted and that a campus closure was likely to come into effect. The university had already planned to adopt Zoom Meetings as its virtual classroom of choice for existing online (and blended) programmes commencing September 2020. This was brought forward and made available to all staff, not just those already teaching on online and blended programmes. Staff (and students) were enabled to activate licensed Zoom accounts with a meeting capacity of 300 participants, using Single Sign-On with their DCU account.

The VLE used by DCU is called Loop and is considered an amalgamation of a number of learning technologies, the primary one being Moodle, an open-source learning management system used widely across the globe (Moodle Pty. Ltd., 2020).

The TEU operates a Loop staff support sage (LSSP) for all teaching staff, which is intended to act as a one-stop shop for all information about using the Loop ecosystem of learning technologies, comprising Loop, Zoom, Urkund and more. Staff can visit the LSSP in their own time to engage with the resources, learn about various Loop features, troubleshoot issues, and so on. The LSSP has been in existence for several years and is continuously updated with new information.

The LSSP was updated in early March 2020 ahead of the anticipated campus closure, with information for staff about how to use Zoom and how to teach online. It was updated throughout the campus closure with additional information about teaching online and, later, how to grade online and combine and calculate module grades for students.

Among the responsibilities of the TEU is the provision of PL opportunities to those who teach at the university to help them enhance their practice. These offerings are varied and include supply-led and demand-led workshops, both structured and bespoke, community of practice events, an accredited module, self-paced learning and more. They are usually always synchronous, in-person events. The TEU provides these offerings throughout the academic year but they are largely scheduled during teaching semesters, although recordings of most of these offerings plus some other recordings are available to staff to access asynchronously.

When the emergency pivot first occurred in March 2020, the number of PL offerings increased dramatically. Prior to this, most offerings occurred in a physical, in-person environment, but from March 2020, all occurred exclusively online, synchronously, using the video conferencing platform Zoom meetings.

Data capture [2]

Both the self-paced resources (from the LSSP) and the synchronous sessions (via Zoom) involve the use of electronic systems that capture data about those who engage with them. As the TEU is responsible for the provision of these resources and offerings, these data were explored to enhance the synthesis of the data arising from the surveys. The TEU, in the course of its work, regularly analyses this type of engagement data.

The time period for the gathering and analysis of this data was 11 March-25 June 2020. DCU staff were first notified of the availability of campus closure-related information on the LSSP on 11 March 2020; this was also the day the first synchronous, online PL session took place, in anticipation of the announcement of a government-mandated closure (which occurred the following day, 12 March 2020). Data up to 25 June 2020 were examined, as this is the date that results were released to students, ending the assessment process for that semester.

The LSSP and the PL offerings are available for all those who teach in DCU, so the data gathered by the systems cover a wide range of people, not just those who teach large classes. To establish those who teach large classes, a list of active modules with 100+ students enrolled was retrieved, which totalled 339 modules. Two of the large modules on this list run twice in the academic year and so appear twice in the lists. Accounting for this brings the real number of large modules to 337. This list was cross-referenced with the list of 2019/2020 modules on Loop. Four of these modules had no information on Loop, bringing the number of large modules that use Loop to 333. Of these 333 modules, 162 unique user accounts were listed as teachers. Of these 162, four had non-DCU addresses linked to their account and were excluded, as they likely belonged to external examiners. Of the remaining 158, five were identified as duplicate accounts and removed. Following this identification process, 153 people were identified as teachers on Loop courses for modules with 100+ students enrolled.

As the LSSP is a Loop course, the actions that all users perform on the page are captured in the system logs. Logs generally contain the following fields (a non-exhaustive list):

- Date and time of the action.
- User who committed the action.
- The resource or activity visited by the user.
- The type of resource or activity visited by the user.
- The "event" generated by the user (e.g., in the case of a Moodle book, the user could have "viewed a chapter" in the book).

Logs were extracted from the period 11 March-25 June covering all users who accessed the page during that period. This was done by accessing Moodle course reports for the LSSP, selecting the course logs, and downloading them as a Microsoft Excel file. The date and time field in the logs places date information and time information in the one cell, so this was separated out into two different columns. The user field in the Excel file was cross-

2 This data was analysed by the three authors of the study who work in the TEU.

referenced with the list of 153 large-class teachers, as identified above, and logs relating to actions generated by non-large-class teachers were separated out. This created two sets of data: Loop logs from the LSSP covering actions generated by large-class teachers and logs covering all other users excluding large-class teachers. These two sets were then analysed using the PivotTable function in Excel to ascertain the most-accessed resources from the LSSP.

Table 3: Summary of the PL offerings from the TEU during the emergency pivot commencing March 2020

Sequence	Title	Date
1	ABC to online teaching	11 March
2	ABC to online teaching	12 March
3	Engage your students during class with Vevox	12 March
4	Getting to know Zoom	13 March
5	Getting to know Zoom	13 March
6	Getting to know Zoom	19 March
7	Getting to know Zoom	20 March
8	Assessment webinar: Loop quiz: What is it and what can it do?	20 March
9	Assessment webinar: Loop assignment: Collect student submissions	23 March
10	Zoom next steps	23 March
11	Assessment webinar: Loop quiz: Writing good questions	24 March
12	Zoom for meetings	24 March
13	Getting to know Zoom	25 March
14	Assessment webinar: Loop quiz: Setting up a conventional quiz	25 March
15	Getting to know Zoom	26 March
16	Assessment webinar: Loop quiz: Case studies to inspire	26 March
17	Zoom next steps	26 March
18	Zoom for meetings	27 March
19	Zoom next steps	27 March
20	Assessment webinar: Loop assignment: Grading student submissions	30 March
21	Getting to know Zoom	1 April
22	Assessment webinar: Loop Reflect	1 April
23	Assessment webinar: Engage students with Vevox	2 April
24	Video seminar series: What, why, how	6 April
25	Exploring H5P for interactive content	7 April
26	Video seminar series: Basic video editing	8 April

27	Video seminar series: Managing video assignments	9 April
28	Video seminar series: Basic video editing	16 April
29	Video seminar series: Managing video assignments	17 April
30	Assessment webinar: Get going with Gradebook	22 April
31	Assessment webinar: Get going with Gradebook	28 April
32	Assessment webinar: Loop assignment: Grading student submissions	29 April
33	The Sipping Point1: Lessons learned from online teaching	20 May
34	The Sipping Point: Assessment showcase	25 June

These PL offerings were open to all staff. While some restricted participant numbers for practical purposes, others had unlimited numbers. Some offerings, as can be seen in the table, were repeated. All the offerings took place using the Zoom Meetings video conferencing platform. Thirty-four sessions ran during the period 11 March-25 June 2020. A further nine were cancelled or failed to run due to low numbers of registrants.

Because the PL offerings used the Zoom Meetings platform, usage reports were generated for each one and stored in the university's institutional account, which is a default feature of the platform. The meeting data for the 34 offerings were downloaded individually as spreadsheet files. This data contained fields such as:

- Meeting information: title, date, time and ID.
- Participant name.
- Participants' join and end time.
- Information about participant's device.

The only relevant information was the participant name, with all other information being disregarded. The data in each spreadsheet needed to be cleaned because of the way that Zoom collects data. For example, if a participant joins a lecture, but their internet connection is disrupted, the usage report often displays this as the participant having joined, left, and joined again, thus creating duplicate entries in the report. Furthermore, depending on how a participant has configured their Zoom account and Zoom app, their full name may or may not be captured in the report. Often, an email address or simply a first name is present. Therefore, a significant cleaning of each of the 34 spreadsheets was required. Participants with no identity or duplicate identities were removed to arrive at the number of verified participants, including the meeting host(s). The 34 spreadsheets were then merged into a master spreadsheet and the list of 153 large-class teachers mapped against it using the VLOOKUP function in Excel to ascertain how many participants of these 34 PL offerings were LC teachers and how many were not. All data cleaning was carried out by one of the authors, thereby ensuring consistency throughout.

Limitations

Limitations of the literature review

The turnaround time for this project was tight and therefore a rapid systematised review was conducted that allowed the implementation of a review system. While this was detailed and clear, it was not as forensic as a full, systematic review. In addition, the platforms searched had to be limited to one (Academic Search Complete). This was chosen because it was felt that it would likely result in a range of relevant articles due to its size and focus.

A lot of literature has been published since we stopped our review and is therefore not encapsulated in this report. The output in relation to the impact of the pandemic on education is increasing and likely changing, as the response of the education system changes with the continuously shifting context.

Limitations of the survey

Forty-seven staff participants were surveyed, so the experiences, challenges and perceptions which they relayed may not reflect the wider staff population in the university. While there was a more generalisable cohort of 343 students, the attitudes, beliefs and behaviours reported in this study for both stakeholder types represent a snapshot in time just several weeks into the Covid-19 emergency. Therefore, levels of toleration reported for the unplanned elements of moving online may not carry forward into future semesters.

It is also probable that some respondents' interpretations of the survey questions posed may have differed from the intended meaning. For example:

- A number of students misunderstood the open-ended question probing their views on future requisite technical supports, with many referring to "learning" rather than "technical" support. This rendered such responses out of context with the question – an issue that was not picked up in the pilot phase.
- It is possible that the large-class focus may have occasionally been lost on by some respondents. The term "large class" was reiterated multiple times on the survey to serve as a reminder to respondents to focus on that context. However, Google Forms does not allow for the use of bold, italics or underline, so it was not possible to highlight the term. Therefore, some respondents may have answered some questions based on their wider teaching and learning experience during the sudden pivot online, rather than the large-class context exclusively. This is a supposition on the part of the research team; there is no evidence that this is actually the case and the repetition of the term "large class" may indeed have served to retain that focus throughout.

Quantitative data arising from closed questions were not analysed beyond description due to time and financial limitations. While the description does shed light on the overall nature of respondent insight, this data set would benefit from deeper quantitative analysis and interpretation.

Limitations of the TEU support data

It is important to note that PL offerings took many forms during the emergency pivot from March 2020. This report draws on data from the PL offerings that the TEU coordinated or supported directly. It does not include …

- PL offerings from other units of the university.
- PL offerings focused on how to use the bespoke online examination platform, Loop Exam, which was established in May 2020.
- PL offerings that were accessed by staff outside the university.
- Peer supports.
- Technical troubleshooting and support offered during daily Loop drop-in clinics

Although the LSSP was intended as a one-stop shop, it is likely that staff visited other external resources to learn about tools for, and approaches to, teaching online. Moreover, not all staff are enrolled on LSSP. Nonetheless, it remains the primary vehicle by which the TEU distributes asynchronous materials and resources about DCU's learning technologies.

The Information Systems Services (ISS) department of the university operates a ticket-system online helpdesk for staff to log queries and issues with all technologies they use for any work-related purpose (students can also use this system for their queries). It is powered by the platform Kayako. Tickets submitted by staff relating to learning technologies are handled by the Loop Support Team within the TEU with additional assistance from ISS team members. During the campus closure, the number of tickets received by the helpdesk rose, as would be expected, due to the increased reliance on technologies for remote working and teaching. The nature of tickets raised by staff can be such that multiple queries are contained in one ticket, or a query that is logged initially morphs into another query.

Although tickets within the helpdesk are organised by topic, such as "Loop", "Zoom", and "Account query", such organisation is not precise, owing to how staff phrase their queries. To examine the number and type of queries logged by staff during the campus closure would require all tickets to be exported from the Kayako system, coded individually and then mapped to the list of large-class teachers. Because of the hundreds of tickets involved and the short time frame available to the researchers as part of this rapid research project, it was decided to exclude this data.

Findings: review of literature

The approach taken to the review of literature is outlined in the methodology. The outcomes of the review are organised into the following sections:

- Large classes in HE.
- Transitioning face-to-face classes to the online context during the onset of Covid-19.
- UDL.
- Selected research reports recently published.

Large classes in HE

This purpose of this section of the literature review is to examine the nuances of pedagogy in the large-class context, with particular consideration of the implications for teaching, learning and assessment in which assumptions, challenges and possibilities for large classes are explored. This section of the review draws on articles published in peer-reviewed journals between 2000 and 2020, accessed on Academic Search Complete.

Challenges

Teaching and learning

Teaching is just one facet of the role of an academic in HE, who may be overwhelmed when presented with a large class (Mulryan-Kyne, 2010). Moreover, student evaluations sometimes report dissatisfaction with large-class learning contexts (Persky & Pollack, 2010), further reinforcing the negative perception of the context for those timetabled to teach these groups and perhaps contributing to the overreliance on part-time faculty (Broadbent, Panadero, & Boud, 2018).

Teachers may experience difficulty forming relationships with students in large classes because of numbers (Auslander, 2000) and the distance between teacher and the student body (Cole & Kosc, 2010), which renders it difficult to make eye contact, develop two-way communication, pitch a lecture correctly (Allais, 2014), systematically assess for learning and ensure that all students are actively involved in the lesson (Nicol & Boyle, 2003). This is not helped by the limitations normally presented by the physical spaces used for large-class teaching (Maringe & Sing, 2014), which do not allow for easy movement of students within a lesson. Student behaviour such as lateness and talking in class can be an issue for some teachers and an unwritten agreement may emerge, whereby teachers and students silently agree to disengage from each other as much as possible (Mulryan-Kyne, 2010). Moreover, absenteeism can impact not just on the absent learner's experience, but also on the overall classroom environment and climate (Westrick, Helms, McDonough, & Breland, 2009).

Large class size demands the implementation of creative pedagogical approaches (Zorn & Kumler, 2003) to overcoming some of the perceived challenges rather than accepting the assumption that a didactic, lecture-style approach is the only feasible teaching method. However, in realty, the latter approach is often the default, resulting in a one-way process with little interaction between teacher and students; and even though both parties see value in the lecture style, it tends not to be conducive to a positive, effective learning experience (Folley, 2010, cited in Arvanitakis, 2014). In addition, introducing more active pedagogical approaches may introduce an element of chaos into an already complex environment, requiring teachers to be strong (Cole & Kosc, 2010) and confident in their ability to manage movement and noise.

It may be perceived that some people do not have the "personality" required for teaching large classes and therefore will not perform well (DeRogatis et al., 2014). However, it is likely that "personality" will have no more or less an impact on the quality of teaching and learning in a large class than in any other class context. It is therefore far more likely that lack of consideration of the range of pedagogical possibilities and low-level technological skills have much greater impact on the teaching/learning experience in large classes. The development of such skills and the move away from a limited teaching and learning experience require planning, effort and support (Stoerger & Krieger, 2016).

It is sometimes assumed that student achievement and performance is impeded by large class sizes (Hornsby & Osman, 2014), however, there is no clear evidence that this is the case (Auslander, 2000), particularly in terms of low level skills acquisition (Messineo et al., 2007). The large lecture is sometimes aligned with a knowledge-banking approach whereby students passively receive information from an expert (Stoerger & Krieger, 2016), which has been the primary conduit for the dissemination and authorisation of scholarly knowledge (DeRogatis et al., 2014). This, in turn, leads to the assumption that it is only possible for the teacher to teach to the middle, with little opportunity to actively include learners who are struggling (Arvanitakis, 2014). Scale, in term of increased student numbers, sometimes results in a reliance on part-time faculty, particularly in relation to marking assignments (Broadbent et al., 2018), thus creating a disconnect between module/programme design and delivery and resulting in a gradual reduction in standards and deskilling of tenured faculty (Foley & Masingila, 2014). This reinforces the cycle of challenge of large classes for staff and students and reveals the self-destructive nature of massification (Allais, 2014).

All these assumptions combined seem to indicate that quality of education and student experience are the pedagogical elements most impacted by class size rather than achievement (Hornsby & Osman, 2014). This is further complicated by the lack of agreement in theory and in practice about what constitutes a "large" class, with the perception of "large" often influenced by experience, discipline and institutional norms (Kerr, 2011). Moreover, "students' approaches to learning in large classes are related to their teachers' approaches to teaching and their perceptions of their teaching context" (Prosser & Trigwell, 2014, p. 787). Therefore, if perceptions and assumptions are flipped, so that teaching large classes is considered to demand the same skills as those required for teaching smaller groups, for example motivating students, good planning, being systematic, or developing sound

assessment procedures (Exeter et al., 2010), then it is possible that the actions arising may result in a different approach to teaching and the creation of a more engaged and meaningful learning experience for students.

Assessment

"Although there is much research available regarding quality pedagogical assessment practice, there has been little research showing how these elements can be transferred to the large class context" (Broadbent et al., 2018, p.308). How students are assessed is core to encouraging deep learning; however, the sheer scale of a large class can result in the perception that the options for assessment are limited (Kerr, 2011) and that continuous assessment is not manageable (De Matos-Ala & Hornsby, 2015), further encouraging surface learning already embedded in the classroom context. In many cases, validity is sacrificed for reliability (Snowball & Boughey, 2012), often resulting in multiple choice questions being the main or sole assessment tools used. It is also very challenging to provide meaningful feedback to large numbers of students (Allais, 2014; Broadbent et al., 2018), although in recent years the use of technology, such as student response systems, has allowed the provision of instant and focused feedback in-class (Voelkel & Bennett, 2014), as teachers can use student responses to assess for learning. In addition, technological tools such as Peerwise™ have been shown to enable and enhance peer feedback for large groups (Kay, Hardy & Galloway, 2020), which, in turn, increases the impact of assessment on learning.

Possibilities

Increased class size has simultaneously increased access to, and diversity, in HE, reflecting more accurately the world outside the university (Auslander, 2000). The assumptions, challenges and negative outcomes associated with large classes are sometimes discussed more in the context of scale rather than pedagogy. While there may be acknowledgement of the role, for example, of the teacher or specific approaches using technological tools, consideration of pedagogical conceptualisations of the educational experience, regardless of student numbers, is often absent. Consideration of the four elements of pedagogy – teaching, learning, curriculum and assessment (Nind, Hall, & Curtin 2016) – could address many of the difficulties associated with large class size. The alignment of these four pedagogical elements can be supported through the appropriate use of technological tools in the large class (Foley & Masingila, 2014).

There is an inherent energy in large groups (DeRogatis et al., 2014). However, energy is a two-way process and in the first instance, the class teacher needs to consider the audience, invest energy and time, and consider the range of learners who are likely to be in attendance. In fact, that diversity can be used to the advantage of teachers and students alike, if the range of perspectives and skills are harnessed effectively. Once energised, the teacher will receive more feedback from a large group which, in turn, is energising for the teacher and so the cycle of positive interaction grows.

The more personally involved and invested the teacher in the large-class context, combined with a willingness to share responsibility for learning in an open manner with students,

the better, it seems, are the learning outcomes (Long & Coldren, 2006; Goodman, 2008). "Creating a classroom community in large classes is key to active discussion and interaction' (Iaria & Hubball, 2008, p. 6). Building a relationship with students in a large class demonstrates that the teacher cares. This, in turn, increases students' motivation to respond and engage, and therefore potentially experience deep learning (Straits, 2007). The teacher is a key person in any class but arguably even more so in a complex environment with hundreds of students. A teacher who cares enough to create a caring learning environment increases opportunity and motivation for students to learn, because "they explicitly recognise the importance of developing students' comprehension of the subject matter and ability to critically examine and apply the information being learned" (Straits, 2007, p. 174) and in the large-class context, will find ways to accomplish this goal. Even reaching out through emails, especially if targeted at particular groups or individuals, can increase student engagement and focus (Isbell & Cote, 2009). The explicit expression of care on the part of the teacher is arguably even more important for students in large classes, in the context of a global pandemic.

Transitioning face-to-face classes online during the onset of the Covid-19 pandemic

The purpose of this section of the literature review is to examine the recent and sudden pivot from the face-to-face environment to the online teaching and learning context. This section of the review draws on literature published between January and mid-August 2020, from two key sources:

1. Peer-reviewed literature identified from a search of Academic Search Complete, Google Scholar and some other sources acquired elsewhere by the review team.
2. "Grey" literature sourced primarily through systematised searches of the social media site Twitter, as the review team acknowledged its proliferation of commentaries and, in some instances, publications, from practitioners in the field.

Full information on the search strategy can be found in the methodology section of this report.

Transitioning online: observations arising from "traditional" sources

Since the beginning of the pandemic, a number of commentaries, presentations and small-scale research papers have been published in what might be considered "traditional" academic journals, periodicals and academic conference presentations. The focus of the vast majority of the included outputs provide insight into the impact of the pandemic on HE teaching and learning generally. Only two specifically considered the impact of the pandemic on large-class cohorts from the outset (Hornsby 2020a, 2020b), although some others did refer to implications for large classes within a wider focus, for example, Carless (2020).

Approximately 1.5 billion students worldwide have been impacted by Covid-19 (UNESCO, 2020, cited in Teräs, Suoranta, Teräs, & Curcher, 2020) and that impact has been swift and sudden with much face-to-face teaching moving to the online context. Online teaching and learning in this context is not the same as planned online learning because the former is underpinned by panic, while the latter is underpinned by a deliberate orientation to the online environment in the first instance (Eaton, 2020; Hodges, Moore, Lockee, Trust, & Bond 2020). This new teaching and learning environment was alien to many students and staff, who each had to learn how to navigate the new terrain (Roy, Ray, Saha, & Ghosal, 2020), as it became their "classroom". For many courses, especially undergraduate programmes, the online learning environment was traditionally seen as supplementary to the face-to-face one (Yusoff et al., 2020), a repository for materials, which had now flipped to become the main vehicle for teaching and learning (Anzovino et al., 2020). In addition, online learning has a stigma of being a lesser experience compared to face-to-face learning, even though there is research to show the opposite (Hodges et al., 2020).

A number of commentaries, either directly or indirectly, referred to the importance of creating a classroom environment when transitioning online. The importance of collaborating with students to make decisions about teaching and learning was emphasised (Sekulich, 2020), requiring mutual commitment (Yusoff et al., 2020). Reaching out to first-year undergraduate students during the emergency pivot was particularly important (Persky et al., 2020), especially for some modules and programmes, for which the move to the online environment was seen to impact negatively on the potential for student-to-student interactions (Anzovino et al., 2020). The challenge for the teacher was to create an online environment that involved interaction and collaboration between teacher and student (Roache, Rowe-Holder, & Muschette, 2020), leading to an atmosphere of a classroom community. For large classes, this is a challenge in the face-to-face context; a challenge likely to be magnified in the online space, especially if the class cohort comprises many hundreds of students. There is evidence to show that there was a balance shift for the better in the student-teacher empathy dynamic, with each more aware and understanding of each other's potential difficulties in this new context, building solidarity and community in the online space (Impastato & Topper, 2020). Embedding an ethic of care (Hornsby, 2020a), whereby we model the way we would like to be treated is crucial for all classes, but especially large classes, because students may feel isolated and lost in a large group, particularly when trying to maintain engagement within an unfamiliar learning environment.

Some commentaries noted a reduction in student interaction and engagement following the move online because of difficulties with connectivity, competing home demands, student cameras being turned off and a reduction in student-to-student interactions (Anzovino, 2020). Some students found it difficult to maintain ongoing engagement with synchronous classes, preferring to log on for some of these and to supplement this engagement with accessing videos and resources in their own time (Roy et al., 2020), thus demonstrating the importance of balancing synchronous and asynchronous learning opportunities (Milligan, 2020). In many cases, it may be possible to include students in the planning for, and implementation of, teaching in an online module (Naamati Schneider & Meirovich, 2020). Active learning methodologies based on real-life scenarios enable learning in the online space (Assante, 2020). It is important for teachers to actively structure learning for their students when

moving to the online environment by, for example, developing critical thinking by eliciting prior knowledge, applying ideas to real-life contexts and making links for students (Sekulich, 2020). Indeed, some have found that the move online has opened up access to learning tools and improved the implementation of the educational interaction through creating interactive tasks and providing feedback (Terenko & Ogienko, 2020).

Some papers focused specifically on assessment, with a range of observations and arguments offered in light of the sudden move online, which revealed a lack of understanding of enacting assessment practices in that space, leading to increased incidences of breaches of academic integrity in some instances (Eaton, 2020). Questioning the notion of excellence during a pandemic, Stranger (2020) argues for making all courses pass/fail in the interests of equity and fairness, issues which she argues are multiplied in large-class contexts. According to Ogrutan and Aciu (2020), the provision of problem-solving, formative tasks seemed to increase engagement and deepen learning which, going forward, should attract summative marks to reward that learning. Students also require feedback, an element of teaching and learning that might be overlooked in the sudden move to online learning, especially in the context of a large class. To enhance student learning, feedback should be goal-referenced and aligned with rubrics that clearly outline expectations (Sekulich, 2020). Carless (2020) recommends using exemplars to clarify expectations outlined in rubrics or assignment guidelines which, though clear to the teacher (perhaps), can be impenetrable for a student, if not illustrated with examples. This may be a particularly important point for large classes where ongoing, individual, formative feedback provided by the teacher may not be realistically possible. It is useful for students to produce a draft of an assignment first and then be exposed to an exemplar, scaffolded by clear guidance from the teacher alongside the rubric, against which they can compare their own efforts and self-assess to identify areas for improvement (Carless, 2020). Two of the benefits of the Covid emergency were: (a) the collaboration it often fostered to develop alternative assessments; and (b) the necessity to debate assessment types in terms of their possibilities and limitations (Brown & Sambell, 2020); collaboration and debate were required, so they happened. Opportunities to forefront strategies that breed success in large classes (Hornsby, 2020a) are presenting themselves because of the emergency pivot online and should be grasped. The perceived challenges presented by large classes, as described earlier, may be compounded in the online environment, unless teachers challenge their own perceptions of large classes (Hornsby, 2020b) and the online environment.

Teachers may need to consider other staff with a role in teaching and learning. The role of teaching assistants (Persky et al., 2020) and note-takers (Hope, 2020) was often unclear when classes suddenly moved online, an issue which needs to be planned for as we move into the next phase of the pandemic, especially to ensure adequate support for students in the online environment with disabilities. Furthermore, the flexibility needed by students when moving online is also required by staff, especially those who themselves have a dual role as teacher and frontline worker (Anzovino, 2020), and those who may have a disability themselves and for whom the online environment creates barriers not experienced in the face-to-face teaching context. In addition, the emergency pivot online provides the perfect opportunity to ensure that pedagogy leads technology in the educational space (Gadbury-Amyor, 2020), although, in the context of the proliferation of new educational technologies, many of

which are being offered for free, there is potential for the opposite to be achieved (Teräs et al., 2020).

"The opportunity to take lessons learned from this crisis and create best practices and an even better future is truly a once in a lifetime circumstance" (Persky et al., 2020, p. 701). Those in leadership roles at every level need to make decisions which will have incremental benefits for the institution (Roache et al., 2020). This includes teachers making decisions at a class or module level as much as it includes those leading at an organisational level. We need to see past the pandemic to identify long-term pedagogical improvements that will positively impact the teaching and learning experience in the future, regardless of the context.

There is little point in making ongoing comparisons between face-to-face and online teaching, as both are impactful. What is important is the pedagogical understanding of the teacher, regardless of the context (Hodges et al., 2020). While teaching in the online space does require the acquisition of certain skills (Roache et al., 2020), this is normally provided over a period of time greater than that available during this emergency pivot to the online space by most staff simultaneously (Hodges et al., 2020). Smith and Hornsby (2020) describe a "pandemic pedagogy" that incorporates the approaches we enact to foster learning in the context of a serious health crisis, underpinned by our values that inform our teaching, whether face to face or online. They go on to advocate that universities need to end the culture of competition and replace it with a culture of cooperation, whereby expertise and experience are shared through teaching networks in the same manner as research networks operate.

Hornsby (2020b) suggests six principles for moving large classes to the online environment during this time of emergency:

1. Use active learning methodologies – group work; a mix of synchronous and asynchronous learning; formative assessment tasks and feedback,
2. Ensure equity and inclusion – students are not experiencing the pandemic in the same way; build in flexibility; consider a variety of assessments.
3. Focus on student success – foster incremental improvement; provide opportunities to learn from mistakes; explore alternative ways of providing feedback.
4. Embed an ethos of care – for teachers and students; consider the content of the Learning Management Software (LMS) from the perspective of the student; build in ways to connect, such as drop-in sessions or personalising the experience.
5. Learning is not just about assessment – think about the skills and attributes to be developed
6. Provide a range of approaches to grading – rubrics; ungrading; LMS quizzes; collaboration with teaching assistants, if they are available.

Hodges et al. (2020) describe the role of lecturers during the onset of the pandemic as analogous to the television character McGyver – fashioning solutions quickly and under

pressure. However, as we approach our next phase of pandemic pedagogy (Smith & Hornsby, 2020), we have a little more time to plan and a little more experience to inform our interactions with our students, even if we are still operating in an emergency and seemingly temporary phase. For our large-class cohorts, this will require us to challenge our assumptions and perceptions, as well as providing us with an opportunity to reimagine the experience of teaching and learning for large groups.

> … large classes are only bad because we allow the form or the size to dictate the pedagogical strategies that reinforce these problems … the problems of large classes are not embedded in the form per se, rather in the pedagogical approaches we choose. Imagine the possibilities for large classes if we adopt pedagogical strategies that seek to engage students, frame and establish clear pathways for student success and place important higher order cognitive skill development alongside the delivery of our disciplinary content. It is in our power to organise these spaces to be meaningful experiences, even in the context of a pandemic … (Hornsby, 2020a).

Transitioning online: observations from social media

The focus of academic social media output relating to the sudden move to online learning mirrored that of the more traditional output contexts, as described above. In the main, Twitter discussions and posts of the emergency response to Covid-19 in HE highlighted the accessibility of online, remote learning for staff and students (Dwyer, 2020; Vergroesen, 2020; Edufuturists, 2020), viewing it as removing some of the barriers to HE faced by students with disabilities, such as the physical restrictions of face-to-face learning (Nash 2020) or the sensory overload of in-person exchanges (Sklar, 2020).

Since March 2020, video conferencing platforms, like Zoom and Microsoft Teams, have been used for synchronous remote teaching and learning. In some ways, this has enhanced the accessibility of HE. For instance, the structure of discussion in these sessions (i.e., asking questions at a particular time or using the "chat" tool) is of benefit to students who have "neurological difficulty with in-person exchanges, such as those with autism who can become overwhelmed by multiple people talking" (Sklar, 2020). However, these platforms require "significantly higher bandwidths to function effectively" (Creechan et al., 2020), which has acted as a barrier for students with low broadband bandwidth speed, particularly those who are deaf/hard of hearing and who require live, sign-language interpretation during lectures (Disabled Students UK, 2020). Video-conferencing platforms can heighten the fatigue felt by both staff and students (Disabled Students UK, 2020; Sklar, 2020; Cooper et al., 2020; Lehman, 2020). This fatigue is caused by an impaired ability to process non-verbal cues during the synchronous session, which "forces the brain to focus harder on verbal dialogue" (Creechan et al., 2020).

However, the facility to record synchronous sessions is of benefit to all (Creechan et al., 2020; Conestoga College, 2020), ensuring that students who are affected by frontline work scheduling, access to shared devices, poor connectivity at the time of the synchronous session,

or increased fatigue do not fall behind in their studies, as a result of missing the session (Vergroesen, 2020). The recording of synchronous sessions also allows for flexibility, providing time for students to review content at a suitable pace and in a suitable environment (Galane & Gierdowsky, 2020; Creechan et al., 2020).

Moreover, students should be given the option to keep their camera on/off during the synchronous session, which may be particularly helpful for those with sensory difficulties and who may find the experience overwhelming (Sklar, 2020), as well as for those who may not wish to allow others to view their home context. It also eases the bandwidth strain of streaming video during a synchronous session and which is helpful for students with low broadband bandwidth speed.

The provision of opportunities to engage with concepts and materials asynchronously in the first instance was also highlighted throughout the commentary on social media for many of the same reasons as cited above, in relation to recording of synchronous sessions, that is the accommodation of students with poor internet connectivity (Hamraie, 2020); the prevention of "Zoom fatigue" (Sklar, 2020); and flexibility for students with competing time demands (Shew, 2020; Vergroesen, 2020). Moreover, lack of a quiet workspace is a barrier to accessing remote HE (Association of NMH Providers, 2020), particularly impacting on students with multiple synchronous sessions. Therefore, providing asynchronous materials or recordings of synchronous sessions allows students to access the course content at a suitable time and place (Creechan et al., 2020). Additionally, socio-economic factors (access to digital devices, unreliable internet connections, etc.) impacts on the participation of students in remote HE (Cooper et al., 2020), leading, for instance, to absence from synchronous lectures. Staff need to consider activities and tasks requiring low bandwidth, such as posting to message boards, which are easily accessed from students' mobile devices (Cooper et al., 2020).

However, the development of asynchronous materials and tasks that are mindful of access issues and encourage student engagement is an element of the pivot online which those academics who had been teaching face-to-face previously may have found challenging to plan, manage and implement. This is particularly important in relation to very large-class cohorts where, for practical or perceptual reasons, synchronous teaching may not be used at all. Development of materials and online structures to scaffold self-directed learning in the online space normally requires (a) time, which was not available in March, and (b) an understanding of the online learning context, which was non-existent for many who made that transition. Moving forward, some students will require specific consideration of accessibility; for example, voice-over recordings of presentations may require closed captioning; pictures/diagrams may require image descriptions with alternative text (Kamis, 2020; Bauer-Wolf, 2020; Hamraie, 2020; Dwyer, 2020). Accessibility plug-ins within the Microsoft, Apple, and Google interfaces (Nash, 2020; Edufuturists, 2020) may be of use. PDFs with optical character recognition should also be considered, meaning that they can be understood by third-party software (Lehman, 2020; Hamraie, 2020; Bauer-Wolf, 2020). This benefits students who require screen readers to access course content and those who prefer to use third-party, text-to-auditory software when taking notes on academic readings.

In general, the recent commentary on the pivot online suggests avoidance of the use of timed, closely-monitored assessments because "proctored" examinations can prevent other software from opening during the examination, which is not beneficial for students who require third-party software, such as screen readers, to access material (Lehman, 2020). Moreover, as discussed earlier, the availability of a suitable, quiet study area is not possible for all students, which causes particular anxiety in the context of an examination. Where deemed necessary, tests should be made available for a longer duration (Conestoga College, 2020; Bauer-Wolf, 2020). This is of benefit to students with learning disabilities or poor internet connectivity, or for those who share devices between several members of their household. It is important to note that ongoing planning for teaching online should differ significantly from the emergency response of moving lectures, seminars, and tutorials online in March 2020. Lessons learned from the crisis response in March should inform staff when designing module content for the upcoming academic year (McStravock and Fitzpatrick, 2020).

Universal design for learning (UDL)

Much of the literature on both large-class and online pedagogy refers to the importance of pedagogical structure and design, either directly or indirectly. In response, this section on UDL is included to illustrate one way of approaching pedagogical design in a way that recognises the importance of inclusion and diversity, particularly in relation to large classes. Moreover, the DCU Teaching and Learning Strategy, 2017-2022 (DCU, 2017a) commits to embedding UDL in the teaching and learning contexts of the university.

Defining UDL

UDL is a pedagogical framework that aims to provide an equal and inclusive learning experience for students and which caters for differences of learning approaches. It is centred on three core principles (Meyer, Rose and Gordon, 2014):

1. Multiple means of representation (the "what" of learning). Here, the focus is on communication of the key concepts and ideas in the curriculum.
2. Multiple means of action and expression (the "how" of learning). This refers to the ways in which learners demonstrate their learning and understanding.
3. Multiple means of engagement (the "why" of learning). Here, motivation to learn and persistence to stay on task is considered.

UDL is based on neurological understanding of the needs of individual learners (Rose, Harbour, Johnston, Daley, & Abarbanell 2006). It emerged from the concept of Universal Design (UD), developed by Ron Mace in 1985, which is based on a philosophy of ensuring that buildings, products and services can be readily used and accessed by the widest possible range of users, making a distinction between UD and barriers to access, the latter of which he regarded as focusing on disability, while the former focuses on access for all from the outset (Mace, 1998). Likewise, UDL "focuses on eliminating barriers through initial designs that consider the needs of diverse people, rather than overcoming barriers later in individual

adaptation' (Rose et al., 2006, p. 136). There are terms other than UDL to refer to UD in educational settings, including Universal Instructional Design (UID) and Universal Design for Instruction (UDI), the basic principles of which are similar to UDL but are conceptualised in a different manner. The UDL pedagogic framework was developed in the 1990s by the Centre for Applied Special Technology (CAST) in the United States and is the educational UD adaptation that has been most widely adopted in educational contexts.

The UDL framework provides a growing international evidence base for its efficacy as a model for inclusive practices (Al-Azawei Serenelli, & Lundqvist, 2016; Bracken & Novak, 2019). While many studies report on the use of UDL in primary and post-primary educational settings, there are some that specifically refer to its use in HE contexts.

Impact of UDL in HE

Davies et al. (2013) conducted a study in which students reported that UDL intervention strategies increased their understanding of concepts in third-level courses. Further, UDL strategies can increase student interest and engagement, with multiple means of representation having the greatest perceived value (Black, Weinberg, & Brodwin, 2015; Smith, 2012). Black et al. (2015) found that university students with at least one disability emphasised the importance of being offered various options for receiving learning materials (including instructor-prepared notes, notes prepared by student volunteers, recorded class lectures, alternative media and hard-copy textbooks). In particular, students reported that the provision of lecture notes permitted them to focus on retaining information, thus lowering the pressure of making adequate notes in class and increasing their perceived engagement level during lessons. Recently, Dean, Lee-Post, and Hapke (2017) demonstrated that engaging students both in class and outside class by using accessible instructional methods (interactive multimedia, such as interactive electronic textbooks, flashcards, practice quizzes, activity lists, video lectures or personalized instructor content) has a positive impact on learning, especially for large-class settings that are typical of introductory university courses. Embedding UDL in online courses impacts positively on learning flexibility and success, reducing learning stress and enhancing the social presence of learners (Kumar & Wideman, 2014).

In addition to benefiting students, the process of incorporating UDL principles can have a positive impact on instructors. Faculty members who participated in a UDL development programme reported (a) increased engagement and commitment to improving student learning; (b) improved professional relationships with peers, in that it encouraged faculty members to observe each other's course instruction and discuss the ways they applied UDL principles towards making their courses more accessible; (c) motivation among instructors to think about active learning and plan their lessons strategically, to engage students by using demonstrations, simulations, models and examples; and (d) placing less emphasis on theoretical foundations, offering students more ways to demonstrate competence (Langley-Turnbaugh, Blair, & Whitney, 2013). At the Metropolitan State University of Denver, a team of instructors sent out weekly UDL-inspired tips for other instructors to try in their classrooms (Herring, Morrison, Young, Kleinfeld, & MacDonald, 2017). The response was positive and as a result, a website was developed to archive all instructional tips and offer a library of

UDL resources, providing faculty with the opportunity to comment and offer new tips. Using UDL to design courses also reduces workload because it can lead to students practising a learner-centred approach rather than relying solely on a traditional teacher-centred delivery of a module (Kumar & Wideman, 2014). Educational institutions can also benefit from UDL principles in designing flexible and accessible curricula (Mavrou & Symeonidou, 2014; Smith & Harvey, 2014), which may reduce the required interventions of a disability service (Kumar & Wideman, 2014). The literature suggests that a positive impact of using UDL is not limited to one discipline, with a powerful impact observed in disciplines such as psychology (Davies, Schelly, & Spooner 2013); language learning (Coyne et al., 2012; Hall et al., 2015; Kennedy et al., 2014); and chemistry (King-Sears et al., 2015; Kumar & Wideman, 2014).

Criticisms of UDL

As noted by Davies et al. (2013), there has been limited research on the larger-scale impact of UDL on student performance, or of the value of UDL PL development for instructors. Dean et al. (2017) were among the first to examine learning gains on undergraduate students as a result of UDL-inspired strategies in a large lecture hall setting. In this study, instructional tools that were accessible both inside and outside the classroom had more of a positive gain on actual and perceived learning than tools that were accessible in class only.

Rao, Ok, and Bryant (2014) questioned the extent to which UDL principles and guidelines must be implemented in a course to be considered accessible and equitable. A cross-cultural examination of the influence of UDL-inspired curricula is also missing and is currently limited to a few countries that are similar in culture and socio-economic conditions (Al-Azawei et al., 2016).

A major limitation of the application of UDL across third-level settings appears to be the amount of time that would be required to fulfil the three principles (Kumar & Wideman, 2014). Further limitations, such as class size, may limit the application of UDL strategies in large classes (Dean et al., 2017), even though these are the very classes which, by default, likely comprise a diverse student population, whatever the context.

Selected reports

This section provides the key points from three recent, relevant reports carried out by units in DCU. They are supplemented by an additional report (AHEAD, 2020), also recent and relevant. We make specific reference to these reports outside the main body of the literature review because of their very recent publication and their direct relevance to the DCU teaching and learning context going forward.

DCU student survey: The learning experience during Covid-19 emergency (Quality Promotions Office, 2020)

This survey was conducted between 12 June and 7 July 2020; 2,510 valid responses were received. It is not possible to determine the size of the classes to which participants belonged; the responses reflect an overall snapshot of student perception from a range of learning contexts. The following are key findings that may have relevance for large-class teaching and planning for the forthcoming academic year. The word "agreed", below, refers to respondents who agreed or strongly agreed to relevant statements.

- While 94% of students agreed that they had access to devices, 69% said that they had a reliable internet connection and only 53% that they had a quiet place to study.
- A total of 70% agreed that they were able to "attend" live classes.
- A total of 79% agreed that they were clear on assessment deadlines, while 60% agreed that assessments themselves are clear.
- A total of 83% of respondents agreed that they sometimes felt overwhelmed with their studies during the stay-at-home period, while 74% reported that they had to learn new skills to complete their studies.
- An open question required respondents to identify their biggest challenge in managing their studies. The three main themes identified were (a) access to a quiet place to study and connectivity; (b) lack of motivation to study; and (c) competing demands (e.g., family and work responsibilities).
- A second open question asked students to identify one thing that DCU could have done to improve its support for learning. Students identified (a) clearer information, which the quotations in the report suggest referred to how teachers communicated information about assessments and other coursework; (b) quality and frequency of student-teacher interaction; (c) access to the library and learning resources; and (d) more flexibility in setting deadlines for assessments.
- Students were also asked about their priorities for university life in the forthcoming academic year. Respondents ranked the following as important or very important:
    - Having full information on assessments at the beginning of the semester: 92%
    - Having flexibility in when lectures can be viewed: 85%.
    - Having online lectures delivered "live": 56%.
- Respondents also valued opportunities to meet with staff and students on-campus and to receiving timetabling information.

In terms of large-class teaching, the importance of personal interaction cannot be underestimated. As mentioned previously, large classes can be viewed as impersonal learning contexts, where teachers and students are isolated in a teaching-learning cycle that does not allow for active learning methodologies. This can potentially transfer to the online environment, particularly if it is perceived that "live" classes are not possible.

Teaching online is different: critical perspectives from the literature (Ní Shé et al., 2019)

This report is based on the findings of a systematic literature review to answer three research questions (p. 9):

1. What is the role of the online educator?
2. What competencies characterise effective online teaching?
3. What is the most effective way of delivering professional development to part-time online educators?

The report concluded that the role of the online educator comprised of 10 facets.

- Managerial – administration and organisation of the online space
- Pedagogical – interactions used by the educator and the support provided for students
- Social – creating a friendly environment; mentoring and supporting students
- Technical – using technology pedagogically and administratively; supporting students to use technology
- Assessor – assessment and feedback
- Facilitator – encourages, monitors and guides students
- Content expert – be an expert in a body of knowledge
- Instructional designer – designing the course for the online environment
- Researcher – researching course content and making sure it is up to date
- Evaluator – evaluating pedagogy, administration and content to identify improvements (Adapted from Table 8, p.27 of Ní Shé et al., 2019)

The authors of the report highlight the possibility that the roles (h) – (j) above could be carried out by others. The report provides a detailed discussion on competencies that characterise effective online teaching, which are summarised below:

- The creation of a social presence by providing a supportive learning environment using clear communication skills, modelling appropriate online behaviour and establishing a cordial learning environment.

- The creation of a cognitive presence by communicating and organising course content clearly, updating content regularly, interpreting and integrating research into teaching and suggesting resources to students.
- The competencies relating to the creation of a teaching presence are addressed in relation to the administration of the course and facilitating students online. Related competencies include:
- Encouraging cooperation between students by providing opportunities to interact, resolving conflicts.
- Challenging students by using authentic assessments and different, novel, pedagogically sound learning activities based on real-life problems; communicating expectations using rubrics; providing feedback and monitoring progress; and using UDL when designing each element of the course.
- Establishing clear expectations of student engagement from the outset and providing a clear structure for each element of the course that is easily understood by learners.

Many of the competencies identified map onto the roles as previously described. The report goes on to outline some key considerations for effectively facilitating an online course.

- Novice online educators perceive barriers to facilitating online courses compared to those who have some online teaching experience.
- When starting out, educators should focus on the clarity of course structure, chunking content and signposting elements that support student learning.
- Educators need to clarify their expectations relating to student engagement, standards of contributions and deadlines for assignments and tasks.
- When facilitating discussions, educators should listen and answer questions; probe for greater depth of thinking; and manage the discussion to ensure equity of contribution. As in face-to-face scenarios, students may be afraid to post online, especially when asked specific questions. This difficulty may be ameliorated if the teacher posts first, modelling the nature of the expected postings.
- It is important for online educators to communicate regularly, maintaining their presence in the virtual environment.
- Educators should ensure that discussion fora are used for cognitive reasons rather than managerial ones. Provision of feedback to students is important to enable and enhance learning, especially if it is built into the module and iterative over time.
- Communicating course content in an accessible manner is important for student learning, which can be enhanced by use of real world examples provided by teacher and students.
- Consideration of a range of active learning activities and tasks enhances student engagement and allows them the opportunity to explore key issues in an applied manner, while simultaneously providing a context for engaging with each other, if

collaboration is built i to at least some of the tasks. Group work in the online environment generally needs to be directly managed by the teacher, in contrast with face-to-face sessions, where in-class interactions such as think-pair-share can be enacted by the student themselves. However, while this does require more work to organise online, it allows for the development of the social presence of the course, as well as engagement with course material.

Findings from the literature relating to professional development of online educators are also presented in the report. The following is a summary of the key findings most relevant to the present research study:

- Educators moving from face-to-face teaching to the online context may bring pedagogical approaches with them that are not appropriate or useful in the online environment. Moreover, the confidence they have teaching face to face may not necessarily transfer to the online environment. In this context, teachers are, themselves, learners who are experiencing threshold concepts in terms of their own pedagogical development.
- As teachers gain experience of teaching online, their professional development needs to change from warily asking "why" to requesting upskilling in the more technical elements of managing the online environment and then on to the desire to inject creativity and experimentation in course design and delivery.
- Part-time teachers need direct access to teaching supports to ensure quality, especially if they are responsible for as significant proportion of teaching on a course.
- Time and institutional support were identified as the two key factors enabling professional development in online teaching. Ideally, professional development in this area should be ongoing and cohesive.
- A community of practice model is especially useful for providing support to online teachers at a peer-to-peer level. The literature review highlighted the value of teachers sharing their experiences and knowledge, particularly when novice and experienced teachers interacted with each other.
- It is important for all professional development initiatives to take the opportunity to model best practice for online teaching.

This report is extensive and the above is a selective summary of key points considered to be directly relevant to the present study. While the focus is on online teaching, most of the findings actually relate to pedagogy as defined at the beginning of this literature review; for example, findings relating to assessment, feedback, active learning, student engagement, clear communication, creating a culture of cooperation and ensuring a sense of teacher presence. Moreover, the findings relating to teachers transitioning to the online space somewhat mirror concerns expressed by teachers of large classes, particularly in relation to feeling confident in the online space.

Learning from Home During Covid-19: A Survey of Irish FET and HE students with Disabilities (AHEAD, 2020)

This report is included as one of those reviewed because of its direct relevance to the pivot online in the context of Irish HE and its explicit focus on the experiences of students with disabilities. Responses to the call for participation in the AHEAD survey were answered by 601 students between 9 and 27 April 2020. Two-thirds of the respondents were enrolled in a HE programme, while the remaining third were enrolled in a further education and training (FET) programme. The respondents represent a wide range of disabilities with the two largest groups having either a specific learning disability (34%) or a mental health condition (22%). Key findings from this survey are summarised below with some identifying differences between the experience of FET students and their HE peers:

- More than half the respondents either disagreed or strongly disagreed that they were coping well with learning from home, while 25% agreed or strongly agreed and the remaining quarter were neutral. However, when the data were examined at programme level, they revealed a difference in the perceptions of students with 59% of HE undergraduate students with disabilities and 53% of HE post-graduate students disagreeing that they were coping with learning from home compared with 39% of FET students. When the data were broken down by disability type, students with a mental health condition (67%), Attention Deficit Disorder (ADD)/Attention Deficit Hyperactivity Disorder (ADHD) (62%) or a specific learning disability (58%) disagreed or strongly disagreed with the statement that they were coping well learning from home, while those who agreed or strongly agreed identified as being in the categories of physical disability (42%), autism (37%) and deaf/hard of hearing (36%).
- Responding to the statement regarding the extent to which teaching staff consider the accessibility of teaching/learning materials, 42% of respondents agreed or strongly agreed that they did, while 27% disagreed or strongly disagreed. However, once again, when analysed at programme level, FET students tended to be more positive in relation to this statement (52% agreeing/strongly agreeing) while only 42% in HE undergraduate students and 37% in HE postgraduate students agreed with the statement. Groups of students who had the highest negative reaction to this statement were those with significant ongoing illness (42%), those who were blind/vision impaired (33%) and those on the autism spectrum (32%).
- Ninety-eight per cent of respondents indicated that they had access to a laptop, with 24% of these reporting that they shared it with another person.
- Respondents identified five main difficulties with learning from home: (a) lack of structure and motivation (64%); (b) distractions/other demands (52%); (c) lack of clear communication from their institution (26%); (d) reliability of the internet (24%); and (e) disruption to the disability support provided by their institution (20%).

Recommendations relevant to teaching and learning include:

- Providing choice in assessment tasks to mitigate existing barriers for students with disabilities.
- Providing flexible deadlines for assessments.
- Ensuring that reasonable accommodations are enabled, where necessary.
- Ensuring that materials provided online are accessible to those with disabilities.
- Ensuring that "live" lectures are recorded and made available as soon as possible, so that they are accessible to students with disabilities.
- Considering how informal peer-to-peer support can be replicated and supported in the online environment.

This report provides an interesting and important insight into the experiences of a sample of students with disabilities during the pivot to online learning in the spring term of 2020. The fact that HE students perceived themselves as coping less well when learning at home, compared to their FE peers, should be noted. Many of the challenges experienced by this group of students are likely experienced at some level by all students at some stage. Moreover, the recommendations of the report mirror those of the previous reports referred to in this section, suggesting that careful consideration of pedagogy is crucial for the enhanced learning experience of all students.

OpenTeach Pilot Evaluation Report (Farrell et al., 2020)

This report arises from the #Openteach: Professional Development for Open Online Educators project, which was funded by the National Forum for the Enhancement of Teaching and Learning in Higher Education and delivered by DCU in 2020. It ran from 23 March to 10 April 2020, coinciding with the early stage of the Covid-19 pandemic experience in Ireland and the resultant crisis pivot on online teaching in HE. Due to the fact that #Openteach was an open and free professional development course about teaching online, the numbers signing up rocketed in a matter of days from 120 to 450. The course focused on five key aspects of teaching online: (1) social presence; (2) facilitating discussion; (3) collaboration online; (4) live online teaching; and (5) supporting online students. The course was designed following the ABC Learning design approach which resulted in a 10-hour fully online professional development course, following a scenario-based approach. Participant engagement was largely asynchronous and self-paced, as this provided the flexible approach recommended in the literature. There were two live synchronous sessions for the purposes of building community. The course was evaluated from the perspective of participants using a questionnaire and focus groups.

Some of the findings were as follows:

- The course impacted participants' knowledge and understanding of teaching online in a number of ways. The participants increased their confidence in teaching online; developed new knowledge about online teaching, including key theories, technology,

and strategies for encouraging student interaction; gained insight into online learning by experiencing it from a student perspective; and gained ideas and strategies about engaging students in asynchronous and synchronous environments.

- The majority of the Openteach course participants reported that they felt part of the course learning community, particularly from engaging in activities such as the icebreaker, the live online sessions and the interaction on the discussion forums.
- The scenario-based learning approach using online educator dilemmas was perceived positively by participants and encouraged engagement.
- The flexible asynchronous self-paced chunking of content into short units incorporating animated video and discussion was described in positive terms by participants.
- Participants indicated a number of course design issues, including the fact that the recommended time of 10 hours to complete the course was too short.
- The interaction in the course discussion forums was perceived to be somewhat unstructured and overwhelming, due to the volume of course participants. Further scaffolding and prompting of the discussions and the use of smaller groups were indicated as areas to improve.

The authors of the report drew a range of conclusions from the evaluation data, including:

1. PL about online pedagogy should be situated online, as is beneficial for online educators to experience what it is to be an online student.
2. Developing a course learning community contributes positively to the learning experience for educators.
3. PL experiences should be flexible in terms of engagement, as time management is a challenge for educators.
4. Building confidence and reducing the fear of online teaching is an important aspect of PL related to online education.
5. Developing understanding and knowledge of online pedagogy is an important element of PL about teaching online.
6. Confidence and competence with the tools and technologies for teaching online are important digital competencies for online educators.

Summary of literature review findings

The review of literature was carried out in a rapid, systematised manner with the aim of contextualising the data gathered in relation to the DCU experience of moving large classes online in the early stages of the Covid-19 pandemic. This section provides a synthesis of the findings arising from the review.

Teaching

There is no agreement on what defines "small" or "large", when it comes to HE classes. These terms are themselves based on the assumptions and perceptions as viewed through the eye of the beholder and are usually different, depending on prior experiences and institutional norms (Kerr, 2011). In many ways, some of the commentary in the literature reviewed suggests that moving such classes to the online environment may actually reduce some of the difficulties faced by teachers and students in large classes. For example, the management of group work at scale in a large class is hampered by the physical space (Maringe & Sing, 2014) and the difficulty in maintaining students in the same groups over time. In the online space, this is arguably much more manageable either by using teacher designated break-out rooms and/or allowing students to choose who to work with over the course of the semester and when. However, this requires much more hands-on management by the teacher than would be the case if they were teaching face to face using an approach such as "think pair share" (Ní Shé et al., 2019). Moreover, if the class size is very large, it may be completely impractical to use breakout rooms in live classes; indeed, it may not even be possible to have live classes, depending on the capacity of the system available.

It must be remembered that the transition of large classes from the face-to-face to the online context occurred overnight and at scale, at a time when the crisis was being faced at all levels of society, nationally and internationally. Therefore, online teaching and learning in this context could not be the same as planned, online courses because the former was reactive in nature at a time of crisis, while the latter is usually underpinned by evidence-based best practices regarding online pedagogy (Eaton, 2020; Hodges et al., 2020). These practices include developing social, teacher and cognitive presence through carefully designed engagement pathways and activities (Ní Shé et al., 2019); embedding UDL to enhance the inclusion of all learners online (Kumar & Wideman, 2014); and providing appropriate professional development for teachers embarking on the online teaching journey (Farrell et al., 2020). When beginning to teach online, practices that are appropriate in the face-to-face context are often transferred by teachers to the online context (Ní Shé et al., 2019). This was particularly the case in March 2020, when teachers and students transitioned online very suddenly, with almost no opportunity to consider pedagogy – at least for those in the very early stages of online teaching and learning. The AHEAD (2020) survey of Irish HE students with disabilities suggests that many of these students were struggling and felt overwhelmed. The recommendations of that survey mirror those of the literature on UDL, for example, the use of a range of instructional methods and approaches and the creation of opportunities for peer-to-peer learning and engagement in the online space (Langley-Turnbaugh, Blair, & Whitney, 2013). Is it crucial for teachers to clearly structure learning, providing signposts for students to navigate learning in the online space (Sekulich, 2020)?

It is also important to consider the role of those supporting teaching and learning, for example, teaching assistants (Persky et al., 2020) and note-takers (Hope, 2020), to ensure appropriate support for students. In addition, the flexibility required by students may also be needed by staff for a variety of reasons when moving to the online context (Anzovino et al., 2020).

The response to the pandemic presents new opportunities to rethink pedagogy, not just as we move through the phases of this crisis, but in the long term (Persky et al., 2020). By default, teaching staff have learned new skills and been forced to (re)consider pedagogy, while staff providing support to teachers have had the opportunity to engage with a greater number of individuals than normally would be the case.

Student engagement and learning

Learning in a large-class cohort is often aligned with the idea of knowledge-banking, whereby the teacher imparts knowledge to a large group with minimal discussion or opportunity for active learning and hands-on engagement (Stoerger & Krieger, 2016). In addition, it can be perceived that the student achievement is negatively impacted by the large-class context, although there is no clear evidence that this is actually the case (Auslander, 2000). Interestingly, within the parameters of our literature review, we found almost nothing relating explicitly to the transition of large classes from face-to-face teaching to the online environment; rather, most of the literature we found explored that transition generally, without specific reference to the implications of class size. Therefore, the findings of the literature review in relation to the swift move online need to be mapped onto the literature relating to large classes.

The importance of creating a classroom environment when transitioning online was emphasised and underpinned by collaboration and interaction between teachers and students (Roache et al., 2020). Accomplishing a sense of classroom community is difficult for teachers new to the online space and this difficulty is mirrored in the literature relating to large-class teaching in the face-to-face context. Reduction in student engagement following the move online was noted by some (e.g., Anzovino, 2020). Bandwidth was a problem for some students (Creechan et al., 2020), which meant they could not access some aspects of learning in the same way as their peers. Learning online resulted in fatigue for some students, while for others, socio-economic factors may have resulted in lack of access to appropriate technology and/or a quiet space in which to work (AHEAD, 2020; Cooper et al., 2020; Quality Promotions Office, 2020).

Students valued having the choice of engaging either synchronously or asynchronously, which highlights the importance of providing a balance when developing online learning contexts (Milligan, 2020). There was evidence that moving online actually increased access for some students (Terenko & Ogienko, 2020), because some of the barriers created by the face-to-face context were removed in the online space (Nash, 2020). For example, the online space removed the sensory overload experienced by some students in large lecture theatres (Sklar, 2020). Moreover, the online environment is perhaps more structured than the face-to-face context, which was helpful for some students (Sklar, 2020), as was the availability of recordings, especially those of live lectures (Galane & Gierdowsky, 2020).

First-year large-class cohorts require particular consideration because, even when taught in a face-to-face context, students are generally not prepared for learning in the university context (Snowball & Boughey, 2012). In the context of the emergency pivot online in March 2020, it is likely that the student involved had little prior experience of learning in the online space. However, as the pandemic period extends, it is likely that existing and incoming students will be more familiar with the online space because of their educational experiences since March.

Assessment

Broadbent et al. (2018) comment that knowledge and understanding of assessment in HE generally is rarely explored in the context of large-class cohorts. There can be a perception that the possibilities for assessment of large cohorts are limited because of scale (Kerr, 2011), with validity often sacrificed for reliability (Snowball & Boughey, 2012). The Covid-19 pandemic forced teachers to discuss and redesign assessment and in many cases, to collaborate with others (Brown & Sambell, 2020; Hornsby, 2020b). It is very likely that many teachers transitioning to the online environment may not have had a complete understanding of good online assessment approaches (Eaton, 2020). In particular, the literature suggests that online proctored examinations were best avoided and that the timing of examinations be reconsidered, for example, making tests available for a longer period of time than would normally be the case in a face-to-face context (Conestoga College, 2020; Bauer-Wolf, 2020). Students need focused feedback (Sekulich, 2020), particularly in the unfamiliar online environment. This can be difficult to manage and organise for very large cohorts – a difficulty that may be ameliorated by the careful use of exemplars (Carless, 2020).

Overall

Whatever the future holds, one thing is clear from the literature published since March: the centrality of teaching and learning in HE generally, and in universities specifically, has been laid bare as a result of the pandemic. Hodges et al. (2020) compared HE teaching staff to McGyver – fashioning solutions quickly and under pressure. This analogy could be extended to include teaching enhancement staff who were part of the "A-Team" in HE contexts throughout 2020. The acquisition of online teaching skills was rapid and at scale, as the majority of classes, programmes and modules transitioned online simultaneously. However, the literature also hints at the emergence of a pandemic pedagogy characterised by an ethic of care (Smith & Hornsby, 2020), whereby staff and students appreciate the challenges that each may be experiencing (Impastato & Topper, 2020). For large-class cohorts, the renewed focus on pedagogical practice awakened by the pandemic is welcome. Basic pedagogical principles such as good planning, being systematic and developing authentic assessment practices are important as much for teaching large classes (Exeter et al., 2010) as they are for teaching online.

Findings: primary data collection

Primary data were collected from two key sources: (1) surveys aimed at staff and students participating in large-class teaching and learning contexts and (2) an examination of requests for advice and assistance through the TEU of DCU.

Findings: surveys of staff and students

Data were collected via online surveys conducted between 22 June and 5 July 2020. These were aimed at teachers and students involved in large-class cohorts which, for the purposes of this project, were defined as classes of 100+ students. Responses were received from 47 staff and 343. Both surveys comprised closed and open-ended questions, whereby participants could describe their experiences and/or elaborate on closed-ended questions. The data providing the overall respondent profile are presented, followed by the findings of the survey of both staff and students in relation to moving large classes online.

Participant profile

Participants were drawn from the following faculties, as shown below in Table 4.

Table 4: Faculties represented in staff survey

Faculties represented	Students	Staff
Institute of Education	134	14
Faculty of Humanities and Social Science	83	10
DCU Business School	66	9
Faculty of Engineering and Computing	25	7
Faculty of Science and Health	32	7
Other	3	0
Total	**343**	**47**

Overall, there was slightly above a 7/1 ratio of students to staff.

While all staff and student participants confirmed that they were involved in large classes up to March 2020 and the commencement of the Covid-19 crisis, Table 5 below shows the various configurations for both cohorts.

Table 5: Class size configurations

Class size configurations in March 2020	Students	Staff
I was enrolled in at least one module of 100 or more students that was taught as a full group up to mid-March and which had to move online because of Covid-19.	153	34
I was enrolled in at least one module of 100 or more students that was only taught in smaller groups up to mid-March and which had to move online because of Covid-19.	11	6
I was enrolled in at least one module of 100 or more students that was sometimes taught as a full group and sometimes split into smaller group up to mid-March, and which had to move online because of Covid-19.	70	5
I experienced some or all the above configurations.	105	0
Other	4	2
Total	**343**	**47**

Table 6 below shows the largest class size experienced by both stakeholder types:

Table 6: Class sizes of respondents

What best describes the size of your large class(es)?	Students	Staff
100-200 students	167	29
201-300 students	40	7
301-400 students	39	2
More than 400 students	97	9
Total	**343**	**47**

Teaching and learning

Here we report the findings from the student and staff surveys relating to the sudden move from face-to-face teaching and learning to the online environment.

Synchronous teaching and learning

The majority of both staff and students reported that they had engaged in synchronous classes to varying degrees. Tables 7 and 8 provide details of that engagement:
Staff were asked the following multiple-choice, closed question: "What best describes your practice in relation to teaching your large class(es) synchronously (live)? Tick all that apply." Table 7 below shows the nature and levels of responses.

Table 7: Synchronous teaching practice

What best describes your practice in relation to teaching your large class(es) synchronously (live)? Tick all that apply	Staff n47	%
I taught all of my timetabled sessions synchronously (live) with my large class as a full group	20	43%
I did not teach any synchronous (live) sessions with my large class as a full group	15	32%
I taught at least one synchronous (live) session with my large class as a full group	10	21%
I taught a large class in smaller groups, as I had done in the face-to-face context	5	11%
Other:		
I taught part of each of my timetabled sessions synchronously, expecting students to also work asynchronously	1	2%
Recordings of these weekly lectures were also provided in advance	1	2%
Total responses	**52**	

Table 7 shows that 64% of participating staff taught at least one or all their timetabled sessions synchronously to their full groups. Eleven per cent broke up the groups but worked synchronously, meaning that 75% of all participating staff engaged in some form of synchronous online teaching.

A similar question was put to students to discover the extent of their experiences of synchronous classes. Students were asked the following multiple-choice, closed question: "What best describes your experience of large class synchronous (live) teaching since your class(es) moved online? Tick all that apply". Table 8 shows the nature and levels of responses.

Table 8: Synchronous learning experiences

What best describes your experience of large class synchronous (live) teaching since your class(es) moved online?	Students n343	%
I had synchronous (live) lectures in a large group (more than 100 students)	191	56%
My large-class year group was split into smaller groups (fewer than 100 students) for synchronous (live) lectures	100	29%
I had no synchronous (live) lectures.	72	21%
Other		
My large lectures did not go live but my lectures with smaller groups did	5	1%
Total responses	**368**	

Asynchronous teaching and learning

Staff were asked about their approach to asynchronous teaching and learning following the move online. Table 9 provides some insight into these approaches with large cohorts, with many staff members using a variety of approaches.

Table 9: Asynchronous teaching practice

What best describes your asynchronous (not live) teaching for your large class, i.e., materials and supports provided online that students could access in their own time? Tick all that apply	Staff n47	%
I provided documents for students to read	38	81%
I provided videos and other materials I sourced from the web	30	64%
I set tasks for the students so that they could engage with the concepts	26	55%
I provided my presentation slides with no audio video on Loop	21	45%
I created a presentation with audio video using the same timeframe as if face to face. For example, a 50-minute face-to-face session became a 50-minute recorded screencast	17	36%
I created a screencast recording of my presentation slides with voiceover in smaller chunks than the face-to-face session. For example, a 50-minute face-to-face session became three shorter screencasts	17	36%
I recorded audio files for students to listen to	9	19%
I did not provide any additional materials or supports for students in large classes after moving online	3	6%
Total responses	**161**	

Most respondents identified at least three of the approaches presented to them, reflecting a range of considerations regarding how students might engage with materials in order to access key concepts.

Students were also asked about their experiences of asynchronous engagement when their large classes moved online. Table 10 provides an overview of their responses.

Table 10: Asynchronous learning experiences

What best describes the asynchronous teaching materials provided for your large class when moving online (i.e., materials that could be accessed in your own time)? Your answer might be based on more than one module. Please tick all that apply	Students n343	%
Screencasts – recordings of presentation slides with voiceover using the same timeframe as if face to face (e.g., a 50-minute face-to-face session became a 50-minute recorded screencast)	268	78%
Materials I had to read	206	60%
Videos I had to watch	198	58%
I had to perform independent tasks instead of having my face-to-face lectures	147	43%
Presentation slides with no voiceover	134	39%
Screencasts/recordings of presentation slides with voiceover in smaller chunks than the face-to-face session (e.g., a 50 minute face-to-face session became three shorter screencasts)	111	32%
I had to engage with materials online before coming to a synchronous (live) lecture	103	30%
Audio files I had to listen to	100	29%
Other	5	2%
Total responses	**1267**	

The range of asynchronous learning experiences of the students reflects the range identified by staff in their survey. However, it is concerning that 134 students report engaging with slides without any contextualisation of those slides in terms of teaching/presentation. Of these, eight respondents seemed to indicate that slides without commentary were the only materials with which they engaged.

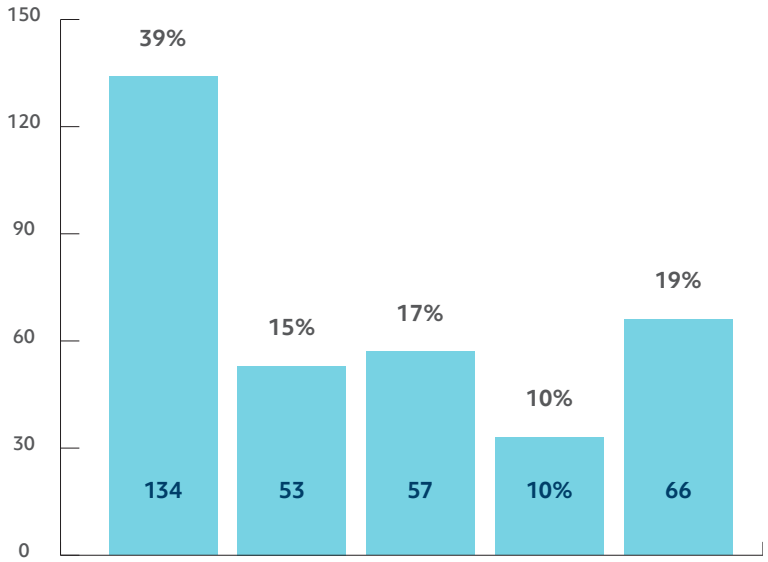
Experiences and perceptions of online teaching and learning

Only three of the 47 staff respondents indicated that they had not used Loop before moving online in March. Fifty-five per cent (n=26) of staff respondents reported having prior experience of teaching online. However, the depth and breadth of that experience was not explored in the survey. The parallel question for the students produced a strikingly different picture in terms of experience of online learning with 90% (n=307) indicating that this was their first experience of learning in an online environment.

Using a Likert scale, staff were asked to indicate their comfort levels in terms of teaching online, with 73% (n=34) indicating higher levels of worry about teaching their large classes online at the beginning of the emergency transition. Perhaps unsurprisingly, 70% (n=33) indicated that they lacked confidence about teaching their large classes online, with at least half of these identifying as being at the lower end of the scale. Interestingly, despite feeling worried and lacking in confidence, staff indicated that they did feel competent to teach their large classes online, with 40 staff respondents indicating that they felt competent in their ability to carry out their work in the new environment. However, they did indicate that they were more worried about moving their large-class cohorts online than they were about smaller groups, with 89% (n=42) indicating medium to high concerns.

Students were split in terms of worrying about moving their large classes online, with 54% (n=188) indicating some concern. However, 39% (n=134) indicated that they strongly disagreed when asked if they preferred online learning to face-to-face learning. However, it is important to note that a sizeable number of students clearly indicated that they strongly preferred the online learning environment (19%, n=66). Figure 1 provides an overview of the responses to this question, with 1 indicating strongly disagree and 5 indicating strongly agree.

Figure 1: Students' preferences for online or face-to-face learning



Challenges

Open questions were used to provide deeper insight into respondents' experiences. When asked their perceptions of the challenges faced by students in the transition online, staff indicated that broadband speed (n=21) was the single greatest issue. Staff perceived other difficulties experienced by students across a range including distractions in the home environment, uncertainty about assessment and lack of equipment. Students were asked the same open-ended question. Table 11 indicates the theme of their responses.

Table 11: Learning challenges/concerns faced by students

Students describing other challenges experienced	343
Working from home negative	73
No other challenges	47
Broadband issues	36
Increased workload	36
Cannot ask questions	25
Group work problems	22
Technical issues	21
Lack of contact with lecturer	19
Lack of peer learning	17
Poor communication	17
Not sticking to timetable	14
Not enough online resources	13
Assessment:	12
Change in assessment type	8
Change in assessment time	4
Audio and video on demand	8
High amount of self-teaching	8
No live lectures	8
Extended lecture time	4
Slow to upload materials	3

The comments below illustrate some of the difficulties experienced by students.

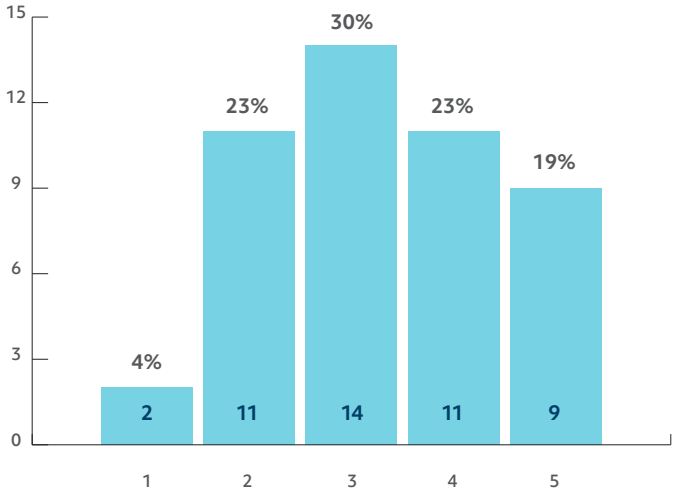
> The home learning environment was very disruptive, and it was hard to keep focused with a lot of distractions [ST19].
>
> As we had just finished a huge block of placement, it was really disheartening to have to miss out on our semester 2, which we had looked so forward to. I found it so difficult to get out of bed for online classes. Looking at a screen made me feel groggy and sleepy. I was easily distracted being in my own room. I missed my friends. I did not attend a lot of the lectures online and, unfortunately, I did not study half as much as I would have done in classes. I found it difficult to find topics covered in the online classes and to try and catch up with them while also having six assignments to do for exams [ST104].
>
> I don't really have a proper quiet place to study other than the kitchen, so it could be quite distracting with people moving in and out. I found it harder to stay motivated. It would have been better if the lecturers had told us how exactly they were approaching the module, what we needed to do, and a timeline of when things were being done [ST139].

Organisation of the online environment

Approximately two-thirds of the student respondents indicated broad agreement that the pre- and post-Covid timetables aligned. Students generally indicated that materials were provided in a timely manner, with 84% (n=290) agreeing/strongly agreeing. Students also seemed to indicate that they experienced consistency of approach from staff teaching the large-class cohorts (75%, n=258).

Responses from staff seemed to indicate that teaching large classes synchronously was a challenge. Figure 2 (Scale of synchronous lectures as a challenge) indicates the range of agreement ranging from 1 (strongly disagree) to 5 (strongly agree).

Figure 2: Scale of synchronous lectures as a challenge



However, when asked if using Zoom was a challenge, 74% (n=35) disagreed that it was, with 26 of these respondents strongly disagreeing. This seems to indicate that the use of Zoom as the "classroom" was not a key factor in contributing to the challenge experienced by staff in terms of synchronous teaching. The perceived lack of challenge in using Zoom may possibly be attributed to the support that staff received in using the platform: 78% (n=37) disagreed that lack of support was a challenge, although 80% (n=38) indicated that finding the time to attend training sessions was challenging. However, staff responses (85%, n=40) reveal a very strong feeling of disconnect with the student cohort and it may be likely that this is a factor relating to the perception of staff that teaching synchronously was challenging. At least two-thirds of staff strongly agreed that transferring tasks online was a key challenge. Staff were asked open questions regarding what elements of teaching they believed remained the same and what changed when they moved their large classes online. Table 12 (Staff perceptions of changed and unchanged elements of teaching large classes online) provides an overview of the key themes emerging from the analysis of that qualitative data.

Table 12 Staff perceptions of changed and unchanged elements of teaching large classes online

Unchanged elements of teaching large classes online	**47**	**Changed elements of teaching large classes online**	**47**
Content being covered	34	Less personal interaction	24
Presentation	13	Harder to adapt delivery to students' needs	22
Very few similarities	5	Student participation	21
Getting students engaged	4	Less student participation	19
Learning outcomes	3	Greater student participation	2
Poor student engagement	2	Greater workload	6
Answering questions	2	Technical issues	4
PowerPoint	2	Course put together quickly	4
Engagement with Content	2	Attendance	3
Students' attitudes	1	Worse attendance	2
Independent learning	1	Better attendance	1
Low student attendance	1	Giving feedback	3
Gauging level of student engagement	1	Listen back to course	1
Class size too large	1	Home is a better working environment	1
Feedback	1	Loss of humour	1
Formative tasks	1		

Some comments from staff illustrate their perceptions particularly of the changed relationship with students.

> The biggest difference for me was the lack of teacher/student engagement … in the big class, I speak to students as they enter the room; I walk all around the lecture "theatre" … for me, teaching such a large group online was much "flatter" than F2F and, as a teacher, I found that difficult. Perhaps that is partly due to the fact that it was a sudden, emergency transition … perhaps if planning an online module/ programme from the outset, I might feel differently [S15].
>
> Lack of relationship-building with the class. Students won't turn their cameras on – when they do, I can see them caring for their kids and that they are also mopping the floor: they don't do that in the lecture theatre. I can't see the response to some of the really difficult things I'm saying … I don't feel I can push the students morally, when I'm not there to safeguard the class [S18].
>
> It is more difficult to gauge the attention of the students. It is more difficult to gauge whether the students are finding the material difficult to digest and adapt accordingly [S1].

In terms of students, 65% (225) agreed or strongly agreed that they felt more isolated in the online large-class context than they did when learning face to face. They were also asked open questions about what they believed to be the similarities and differences between teaching in online and face-to-face contexts. Table 13 outlines the key themes emerging from their responses.

Table 13: Student perceptions of changed and unchanged elements of teaching

Unchanged elements of teaching in large classes online	343	Changed elements of teaching in large classes online	343
PowerPoint presentations	121	The Lecture	272
Lectures	121	Ability to ask questions	86
Content being covered	79	Lack of peer learning	32
Nothing stayed the same	26	Recorded videos	30
Taking notes	17	High amount of self-teaching	17
Recorded presentations	15	Greater workload	16
Readings	11	Most things different	16
Assessment same	6	Broadband issues	14

Resources on Loop	5	Less practical work	14
Most things	5	Videos on demand	11
Working from home positive	2	Working from home negative	10
Working from home negative	1	Can't ask questions	10
Lack of access to books and materials	1	Technical Issues	10
Broadband Issues	1	Assessment different	7
		Recorded videos concise	7
		Working from home positive	7
		No one source for information	4
		Most things the same	3
		Less access to library	3
		No handouts	1
		Recorded videos gave flexibility	1
		Assignment different	1
		Reliance on third-party resources	1
		No tutorial class	1
		Lack of feedback	1
		Allowed work to continue	1

The single most recurring element that changed for students was the lecture, with 272 out of 343 students raising this issue unprompted. Table 14 shows the lecture elements that changed for students.

Table 14: Themes emerging from student data regarding the changes in lectures

Themes emerging from student data regarding the changes in lectures	272
Engagement (nature of engagement changed)	111
Less contact with lecturer	76
Poor engagement	35
No live lectures	15
Not sticking to timetable	12
Little help from lecturer	12
Extended lecture time	10
No audio on PowerPoint	10
Lecture was rushed	6
Poor attendance	5
Fewer practical examples	3
Shorter lecture time	3
Need for more live lectures	3
Little help from lecture	2
Lecturer not taking feedback	2
Poor communication	2

The sense of disconnect experienced by staff appears to have also been experienced by students, despite the fact that they are in large-class cohorts which, even when conducted face to face, have a reputation for creating a sense of detachment between teacher and students. Fourteen students commented on positive changes arising from moving the large class online, which mainly related to the flexibility afforded by having the lecture recordings available for review whenever required and/or less noise compared to lecture theatres. However, most comments were negative.

> One cannot just ask a question or wait until the end to correspond with lecturer – many of us did not hear back from lecturers when we emailed with queries. Lacking peer interaction can make it difficult to seek clarity when you are confused or experiencing difficulty [ST20].
>
> Lack of group discussion and activities. Even when split into smaller "chat rooms", nobody would have their camera or audio on, so there were no discussions [ST217].

> Less interaction between class and lecturer, as it was recorded, so we couldn't ask questions in the moment, if needed [ST169].
>
> Some of my lectures were pre-recorded, which meant noting questions I had during the recording and emailing them to my lecture instead of just asking as they came up. This wasted some time [ST343].

However, when *specifically* asked what alternative arrangements were useful, 37% (n=125) identified the availability of audio and video material on demand, with a further 21% (n=72) indicating that they had access to a wider range of materials.

> Some lecturers, once finished, would put the recording of the lecture up onto Loop. I felt that this was extremely helpful as, due to being at home/being surrounded by distraction and the lack of the physicality of actually being present in the lecture hall, my attention tended to drift at some point and I sometimes missed some important pieces of information. I couldn't simply turn to the person next to me to ask them what I had missed, so having that backup was very helpful [ST172].

However, in response to that same question, 11% (n=39) indicated that they had not found any of the alternative arrangements helpful, as illustrated by the comments below.

> I mostly had just online lectures and tutorials that would have been the case in person if we were on campus. I do not think there were many arrangements put in place that stood out to have been of great benefit [ST314].
>
> I found that the large classes didn't really have many supports or were properly organised for us students [ST211].

Students were then asked to *specifically* consider alternative arrangements which they thought were unhelpful. Twenty-one per cent (n=72) indicated that they found nothing unhelpful. The most frequently cited unhelpful arrangement was associated with staff uploading PowerPoint presentations with insufficient guidance or notes to accompany them (14%, n=48).

> One lecturer only provided their slides, but they did not add more information or adapt them. No voice-overs were provided, so it was just bullet points about a topic we did not understand [ST122].

Given the already stated popularity of having on-demand content, it is unsurprising that some students identified the lack of lecture recordings as unhelpful (11%, n=36).

> One lecturer refused to record any live lectures and never put up the slides before the live lecture, which meant students had to be there at a certain time when some students had no childcare … This was addressed with the particular lecturer and the response was "the lectures would not be recorded if we were in the lecture hall" … Totally unhelpful, as we were learning from home for a reason [ST126].
>
> Enforcing a system whereby if you were not at the lecture you would miss the lecture. This system was disruptive as, especially at the start, the internet was bad and I could not attend/hear the lecture [ST321].

Other unhelpful arrangements identified by students included increased workload, poor communication, lack of live lectures, changes to assessment, difficulties asking questions, and not sticking to the timetable.

Staff views mirrored those of students in terms of their perception that the main advantages of online learning were the provision of additional online resources (36%, n=17) and the opportunity for students to engage with materials asynchronously (21%, n=10). Some staff also reported that the chat function enabled greater participation with the large-class cohort.

> Recorded lectures, so students could revisit. Students with accessibility or language issues have additional chances to engage with content. Can use more video and audio content (which may be time consuming to use in class). For large classes, guest speakers would have had to attend three sessions for my module. However, now I can get even international experts to talk to the class. Site visits and other options could be conducted if only I or a small team can go and record from external locations [S36].
>
> More questions asked by students in general through the chat interface, rather than being intimidated in class with regard to asking questions in front of a large crowd [S01].

To enhance our understanding of the student viewpoint, students were asked what they liked about learning online. Thirty-two per cent (n=108) indicated that the most advantageous aspect of online learning was the flexibility of being able to access recordings of lectures and other materials on demand. This reflects their responses regarding what they found helpful in terms of alternative arrangements being made following the move online. However, 18% (n=61) stated they found nothing about learning online advantageous. Other responses were varied but those of note included: no background noise (12%, n=41); no time constraints (11%, n=38); working from home (11%, n=37); and easier to ask questions (9%, n=30).

Fewer distractions than when in a large lecture hall full of people. It was easier to see all the material and hear the lecture [ST139].

We were able to hear other people contributing for the first time [ST192].

I hated it. You felt like you were so isolated and because you weren't talking to peers. We could have had a completely different understanding and a limited viewpoint [ST337].

As a commuter, I found it was nice to not have to spend €600+ on transport for a semester. This obviously comes from a place of privilege but it was very nice especially not having to get up at 6am for a 9am lecture. It would be great if online learning were available on a part-time basis, so that students could do both, especially for days where a commuter only has one lecture [ST137].

Students were also asked to talk about the differences and similarities between online and face-to-face learning. Table 15 provides an overview of the themes emerging from this open question.

Table 15: Student perceptions of learning aspects that changed and remained the same

Aspects of Learning that Changed	343	Aspects of Learning that Remained the Same	343
Lack of peer learning	58	Notes and PowerPoint	90
Poor engagement	48	Course content	85
Less contact with lecture	38	Lecturers' teaching style	77
Cannot ask questions	31	Nothing remained the same	37
Nothing changed	30	Student engagement	19
High amount of self-teaching	21	Most things	15
Staying focused	20	Live lectures	15
Audio and video on demand	18	Timetable	14
Most things changed	16	Able to ask questions	12
Assessment different	14	Help from lecturer	10
Practical work	14	Independent tasks	9
Not enough online resources	11	Self-teaching	8
Not sticking to timetable	11	Assignment	7
Increased workload	9	Assessment	6
Poor communication	9	Taking notes	6
Easier to ask questions	9	Length of lecture	6
Course put together quickly	7	Workload	2
More contact with lecturer	6		
No time constraints	5		
Extended lecture time	4		
Course content cut	4		
Faster learning	4		
Assignment different	3		
Shorter lecture time	2		
Broadband issues	2		
Insufficient notes or PowerPoint	2		
Saved money after going online	2		

One characteristic of the move online was the use (or not) of the camera during synchronous sessions. Fifty per cent (n=170) of students reported never turning on their cameras, while a further 35% (n=121) reported that they sometimes turned on the camera. It is possible that some students may not have been thinking specifically about their large-class context when responding to this question. When asked the same question, 47% (n=21) of staff reported that students in their large-class cohorts sometimes turned on their cameras with 30% (n=14) reporting that students never turned them on. Again, it is likely that this phenomenon contributed to the feeling of disconnect in the large online class context. Students also seemed to be reluctant to ask questions using the microphone from both staff and student perspectives whereas respondents on both surveys reported much higher rate of asking questions using the chat function on Zoom.

Staff mostly used whole-class email (72%, n=34) and/or the announcements feature on Loop (64%, n=30) to communicate with the full class. However, 96% (n=45) of the staff respondents reported using individual emails to communicate with students. It is not clear how many students were in the large class they engaged with. However, it could be assumed that the number of enquiries rises in accordance with class size.

Assessment

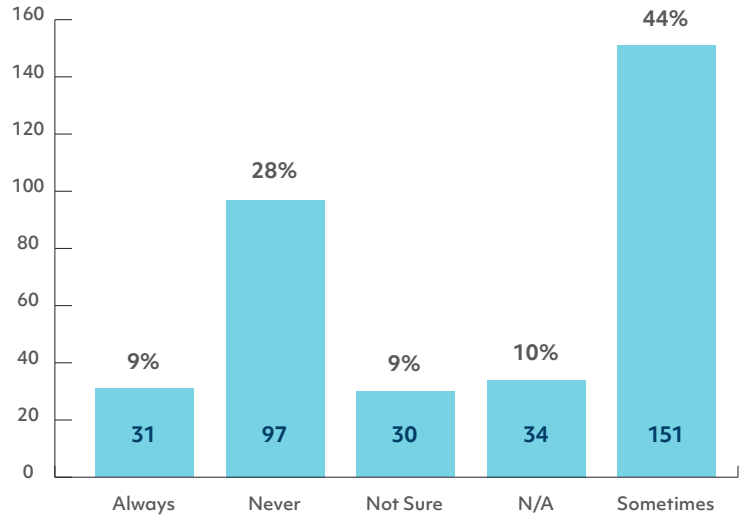
Students and staff were asked questions about formative and summative assessment approaches in the move to the online environment.

Formative assessment

Fifty-seven per cent (n=27) of staff indicated that they transferred pre-existing formative assessment tasks to the online teaching and learning context. Twenty-eight per cent (n=13) of staff reported requesting students to complete formative tasks as an alternative for face-to-face classes. Just over half (53%, n=25) reported that they provided whole-class feedback on formative tasks and 51% (n=24) indicated that they provided individual feedback.

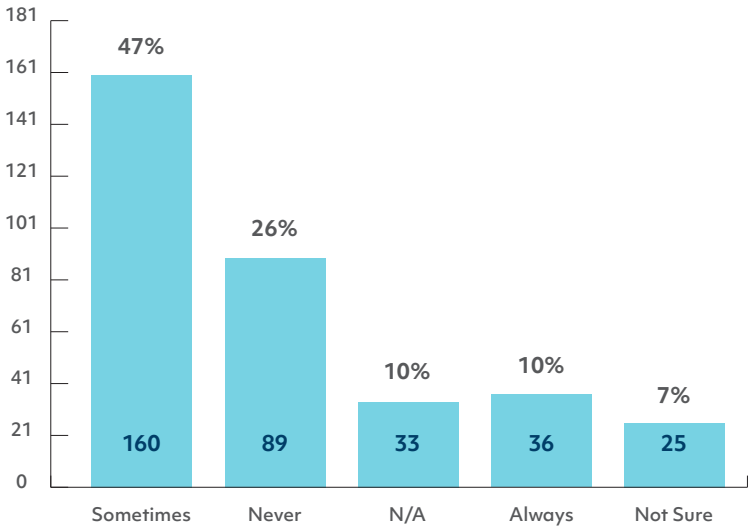
Students were also asked about their experience of formative assessment following the move online. Forty-nine per cent (n=167) indicated that they engaged with formative assessment tasks, which had transferred from the face-to-face context, but 17% (n=60) were unsure if this was the case. In hindsight, this was probably an unfair question to ask of students, as they may not have been aware of the genesis of the tasks in the first instance. When asked if new formative tasks had been created because of the move online, 59% (n=203) replied that this had been the case, which contrasts with the perceptions of staff in this regard. This may be due to a misalignment with the staff and students responding to our surveys in terms of the programmes they were associated with; or it may be due to a different understanding of the question asked. The perceptions of students in terms of feedback provided are also interesting. Figure 3 illustrates responses from students to the statement "Feedback was provided on formative tasks for my large-class modules".

Figure 3: Provision of whole-class feedback (students)



The range of responses illustrated in Figure 3 may reflect a range of experiences in relation to the practice of staff providing feedback to students. However, it may also be influenced by a lack of understanding or awareness of the nature of feedback, whereby students may not recognise feedback unless directed at an individual level. Students were also asked to consider the statement "An explanation of the task outcome/answer was available on the Loop page so that I could self-assess". Figure 4 illustrates the responses to this statement.

Figure 4: Explanations available on Loop (students)



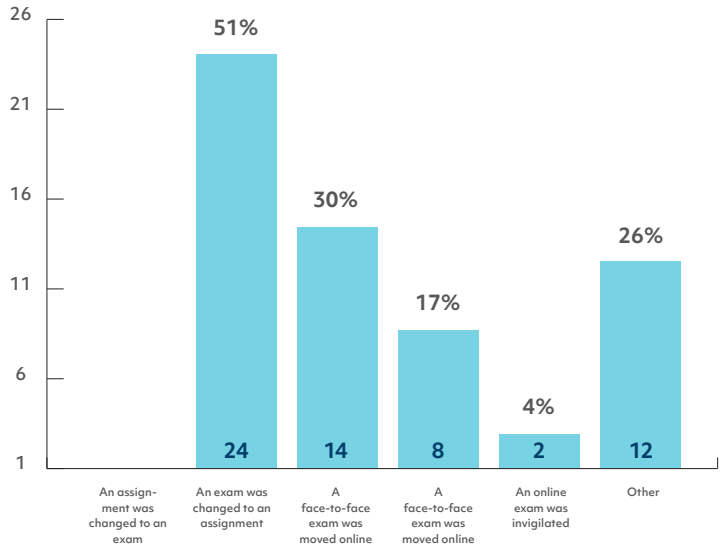
The combined perceptions of students, as illustrated in Figures 3 and 4 are concerning in terms of the effectiveness of formative assessment tasks. If tasks are not supported with some sort of feedback, whether provided after the task is completed and based on the students' responses, or whether provided generally in the form of the teacher modelling the nature of the desired engagement or response, it is difficult for students to gauge the accuracy of their own attempts. Even if Figures 3 and 4 illustrate a lack of understanding of feedback on the part of students, this has implications for staff in terms of being explicit. This disconnect

between engagement with the task and feedback on that engagement may be associated with moving the large classes online: it is possible that feedback and/or explanation was provided in the face-to-face context but that it failed to translate to the online context either in terms of staff feedback action and/or student perception and/or recognition of feedback.

Summative assessment

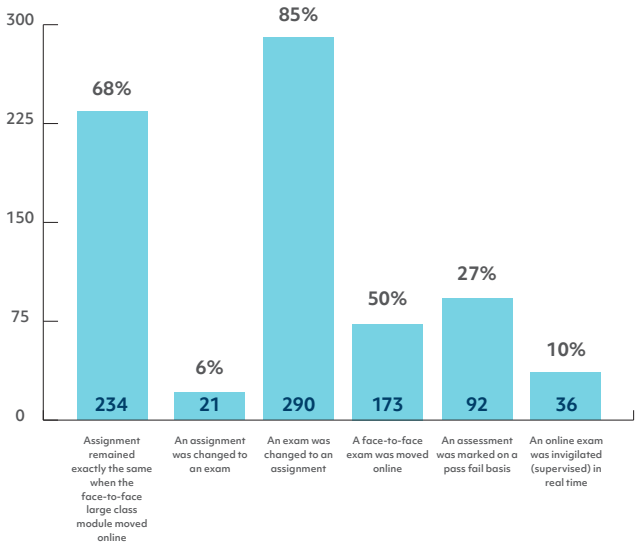
Almost all staff reported that the summative assessment for their large-class groups had changed either partly (49%, n=23) or entirely (19%, n=9), as a result of the move online. Figure 5 illustrates the nature of that change.

Figure 5: Overall impact of moving online for summative assessment (staff)



The changes to summative assessments as experienced by students surveyed provide a slightly different picture.

Figure 6: Overall impact of moving online for summative assessment (students)



The difference here may be explained by the fact that the students are probably reporting on their experiences of multiple assignments across a range of modules, whereas the staff are mainly considering their experience of assessment in relation to one large-class module.

Most staff disagreed that changes to assessment compromised integrity (68%, n=32). However, when presented with the statement "There was more opportunity for plagiarism in the online environment", students were divided, with 42% (n=145) disagreeing and 39% (n=132) agreeing. Again, it is possible that this difference reflects the fact that students were considering the issue in relation to multiple assessments compared to staff. Alternatively, this difference may reflect the fact that staff were not as aware of the possibilities of infringements to the integrity of new assessments as they might have been with the original assessments.

Staff indicated a range of challenges in relation to assessment when moving their large-class cohorts online, the greatest being the increase in their associated workload (28%, n= 13) and changing the assessment method itself (21%, n=10). The comments below illustrate some of the challenges perceived by staff.

> Because the exam was open book, the answers were longer and so took me much longer to grade. It was also very hard correcting the exams online compared to correcting written answers in an answer book. At least I didn't have any handwriting issues [S09].
>
> I had to change the assessment from an exam to a detailed quiz. This was a skill I had to learn, as I had no experience, and I found it quite time-consuming [S44].
>
> Creating new assessments. Trying to get agreement across a range of people working on the module – very difficult. Also, the speed at which we had to change ... we didn't have time to really consider the new assessment [S15].
>
> For the group project, I reduced the "size" of the project to better fit to the work of one person. However, we lost the diversity of inputs that different group members would bring to the assignment, and students lost the group-work learning as a result. For the individual assignment which replaced a "regular" exam, a challenge was to design the assessment so that it required more than a simple copy & paste from notes [S33].

Students also identified a range of challenges arising from moving large-class assessments online, including feeling rushed (25%, n=85), not having enough supporting resources (16%, n=53), the lack of opportunity to ask questions (14%, n=48), and broadband issues (13%, n=45). The comments below illustrate some of their insights.

> Last-minute changes to assignments or exams that were changed to assignments were changed hugely, so it meant a huge workload. Very little support from lecturers with last-minute changes. Some assessments changed to pass/fail, which was unfair. Due dates for assignments were also not well thought out and were bunched together, meaning that in one week, 12 assignments could be due! [ST228].
>
> In one case, an exam was changed to an assignment but the information on the assignment was not given very far in advance and I felt that I did not complete the assignment to the best of my ability, as I was already working on many other assignments and I could not give it as much time as it needed [ST25].
>
> It was difficult because lecturers were often not quick to respond. I had an online exam, during which I grew very ill. However, my lecturer would not email me back quickly, so I just completed the exam as best I could. It is hard when you are so far from everyone [ST113].

However, 60% (n=206) of students indicated that they agreed that the assessments for their large-class modules were fair, although 55% (n=187) also agreed that engaging with the assessments in the online environment was more stressful than in the face-to-face context. Staff were asked if they were happy with the decisions they had made regarding assessment. Sixty per cent (n=28) indicated that they were happy with their decisions in this regard, with a further 26% (n=12) qualifying their satisfaction with the choices they made by indicating that some improvements were needed to the assessments they had designed.

> Yes, in the circumstances, I was relatively happy with decisions made under time constraints and other pressures, but I could certainly do it much better. In the end, it challenged me to think more about the assessment relative to the learning outcomes, which was good. Over the summer, I intend to explore the TEU and other resources on Loop to up my game [S33].

Staff also provided some insights into how they supported students in terms of assessments, which included the use of email, online group sessions and the provision of formal guidance before an exam.

Students were asked what they liked about large-class assessment in the online context. They provided a range of responses which could be themed as follows:

- I liked nothing about the online assessments (18%, n=62).
- Assessment in your own time (15%, n=52).
- Less stressful (14%, n=46).
- I liked continuous assessment (12%, n=40).
- No time constraints (9%, n=30).

The following comments illustrate the range of perspectives on this issue.

> Nothing. I would have preferred exams [ST131]. I did not like large-class online assessments [ST314].
>
> I liked the idea of exam papers being changed to papers you could complete in your own time online over a day or two, instead of timed exams in a hall [ST81].
>
> I had the same amount of time to prepare but I had more time to work, if that even makes sense, because I wasn't freaking out about getting to my exam and then what if I'm late and it's just the logistics stress of actually taking the exam. Also, I wasn't freaking out – I was nervous, but not like I usually am. Also, most of the exams I was supposed to take were turned into CAs and I prefer that mode of assessment [ST283].

Twenty-four per cent (n=84) of students surveyed indicated that they did not have group assignments in the large-class context. Of those who did, 33% (n=114) were never offered the opportunity to choose who to work with, and a further 30% (n=104) indicating that they sometimes were offered choice.

Seeking support

Both students and staff were asked about the supports they had accessed to aid the move to the online environment.

Figure 7: Topic/tools for which support was sought (staff)

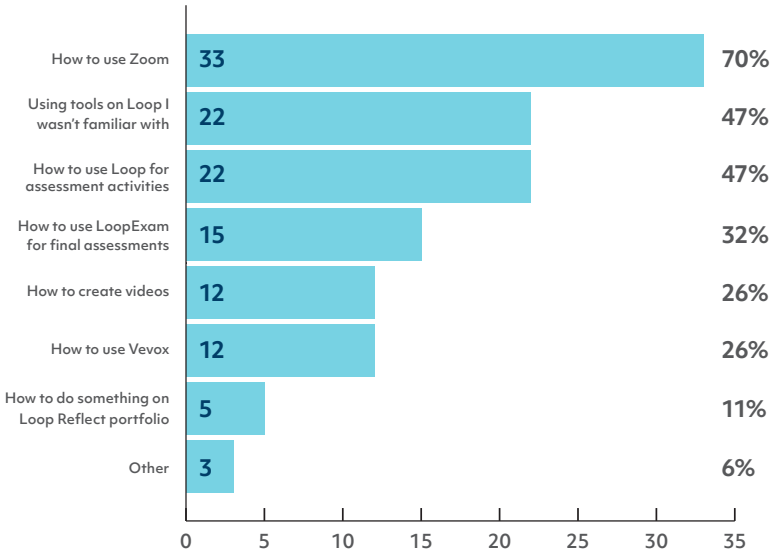
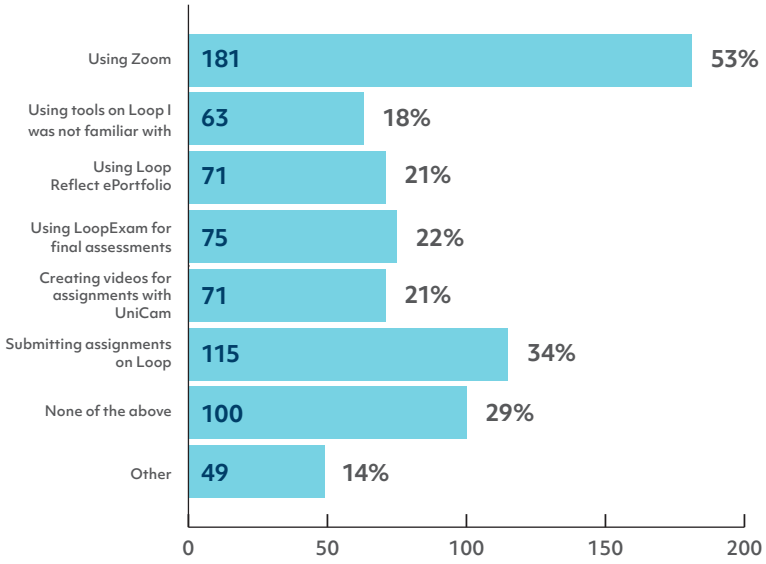


Figure 8: Topic/tools for which support was sought (students)



It is perhaps unsurprising that the majority of both groups indicated that they sought help using Zoom, as it had been introduced to DCU immediately before the campus closure and became the alternative classroom overnight.

Students and staff also sought help from wide range of sources. However, as Figures 9 and 10 illustrate, the majority of staff and students sought help from their peers.

Figure 9: Resources used to draw down support (staff)

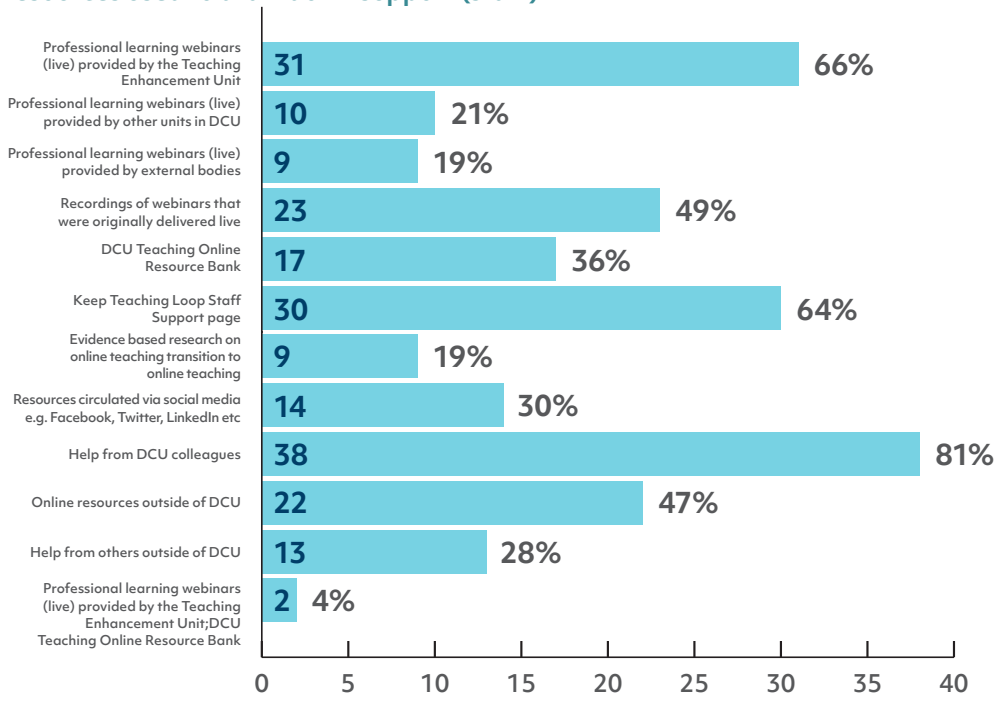
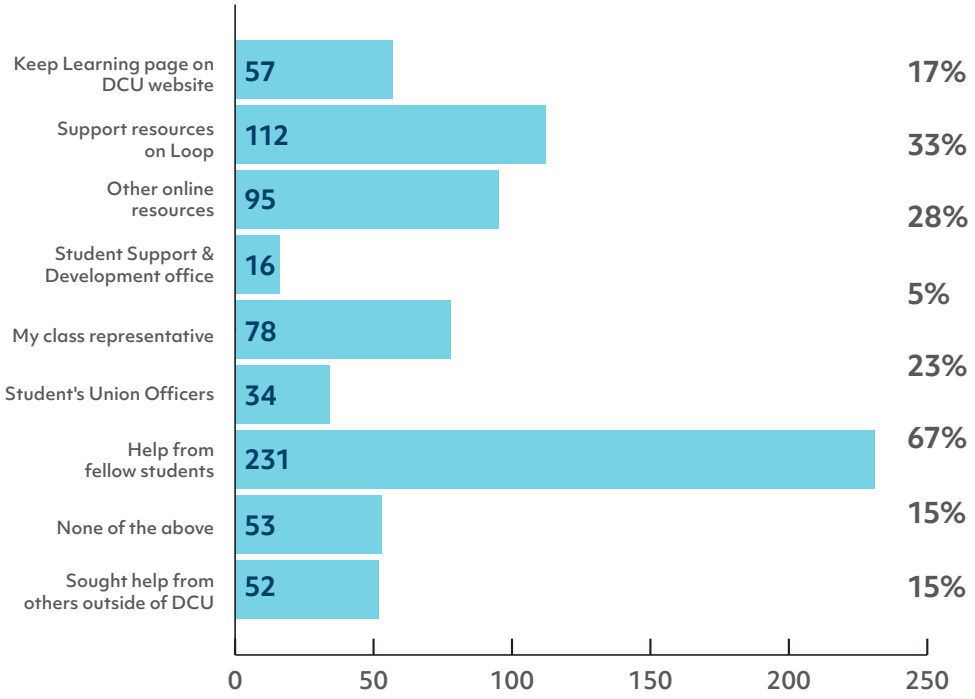


Figure 10: Resources used to draw down support (students)



Sixty-four per cent (n=30) of staff and 84% (n=288) of students reported that they did not raise a query with the TEU. This may reflect the large numbers seeking help from peers. Alternatively, it may be the outcome of the TEU taking the initiative by anticipating the needs of staff and students in the context of the emergency pivot online.

Moving forward

Staff and students were asked to consider recommendations and suggestions for each of the teaching, learning, assessment and technical supports for the next semester, acknowledging that Covid-19 would likely still impact in some way at least in the immediate future. Respondents identified a very wide range of areas for improvement; Table 16 outlines the main themes arising from both groups.

Table 16: Main themes emerging regarding suggestions for moving forward with large classes in the online environment

Area of focus	Staff	Students
Teaching	Provide more pre-recorded videos (38%, n=18) Consider anticipated challenges ahead (36%, n=17) Develop blended learning techniques (34%, n=16)	Provide audio and video on demand (29%, n=100) Give live lectures (23%, n=77) Allow time for asking questions (12%, n=41)
Learning	Improve teaching approach (30%, n=14) Increase student engagement (28%, n=13) Increase range of technological tools used (28%, n=13)	Provide ore online resources (20%, n=69) No suggestions (11%, n=38) Allow time to ask questions (10%, n=33) Provide audio and video on demand (9%, n=31)
Assessment	Assign more continuous assessments (38%, n=18) No proposed changes (21%, n=10)	Assign more continuous assessments (35%, n=121) Give clear instructions for assessments (19%, n=64)
Assistance with technology	Enhance technical support (43%, n=20) Provide training for online teaching (30%, n=14)	No supports required (29%, n=99) Provide a way to stay in contact (8%, n=26) Provide audio and video on demand (6%, n=22)

Many other themes emerged from the responses to these open questions but the table above provides information on those that emerged most frequently. The staff who responded to suggestions regarding learning going forward tended to make recommendations for their own pedagogical approaches (as was the case when considering teaching), rather than suggesting that approaches students might make to enhance their learning in the online space. Students emphasised the provision of time for asking questions and the availability of video and audio recordings on demand as recommendations for teaching and learning. The sample comments below provide a flavour of the staff and students views.

Staff:

I will redesign the whole module to a problem-based module. Teach the students in smaller groups and repeat teach. This is never a module that should be anything other than blended at most, and probably face to face 100%. There are problems of class size and safety of the students in face-to-face mode too, so this is only exacerbated with 100% online. I will utilise YouTube clips from various experts … I always did, but I will do more of that [S18].

I would like to spend more time researching effective teaching in an online environment, rather than simply concentrating on delivering lectures and providing materials in an "emergency" transition [S47].

If I am teaching a large class, there will be a lot of differences in how the material is delivered. I would intend to do short, recorded lectures and quizzes for students to engage with asynchronously, and then use synchronous hours for engagement, questions, and answers, etc. However, there is no guidance as to how this will be run as an adjunct lecturer [S17].

It will be a challenge to support student engagement and sustain it throughout the semester for a large group. One possible approach might be to reschedule modules to deliver them intensively (double the time per week) over half the semester – I did this successfully (in parallel to another module) for the second half of last semester [S03].

Will utilise more functions on Loop to engage the students. Will aim to get a better handle on the chat box when I teach! [S28].

Students:

Some lecturers don't record their lectures and post them for us to view not in real time, as they wouldn't do this if it was face to face. While I understand where they're coming from, it isn't face to face, so I think they need to adapt more and by posting lectures for everyone to view at their own time, it makes these difficult circumstances more manageable for everyone [ST42].

Encourage/make lecturers carry out all lectures on zoom (and record it and upload after for those that couldn't attend), as I felt I did much better in modules that had Zoom lectures that explained their slides and engaged with students live, than in modules where lecturers did not hold lectures live/on Zoom [ST97].

The lecturers should think about providing a half audio presentation for half an hour and then for the next half hour a live class, where people can ask questions and discuss the information provided [ST54].

Having live lectures or pre-recorded lectures rather than just independent tasks, where possible. Using things like Vevox or Mentimeter, to make it more interactive [ST216].

Content online needs to be structured clearly, so that resources are easy to find. The extended time we will probably have to spend online means that we need resources to be very clear, as we cannot waste time looking for things [ST118].

It was frustrating, where a number of groups existed in the same course, to see other tutors posting material such as formative assessments, which you, as a student, had no access to. There was always the sneaking suspicion that other groups were being more favoured and having a better learning experience [ST114].

Have a Q&A forum or a method for students' questions to be answered [ST333]

Providing accessible learning materials that are device/software agnostic, or providing them in multiple formats, as well as catering for those with poor connection (e.g., uploading a video to YouTube so it can be automatically viewed in different resolutions OR downloaded ahead of time from any device, versus a single uncompressed video which must be downloaded directly from Loop) [ST189].

Both students and staff focused on the continued and enhanced use of continuous assessment, as we move forward into the next phase of online teaching and learning.

Staff:

I intend to change some elements of assessment: for example, smaller pieces of assessment regularly throughout each semester, to keep students engaged [S20].

Overall, I see it as a positive that I was forced to think upon, and use, alternative forms of assessment. I now have more options and more skills; and moving away from a traditional exam did not upset the students in any way [S44].

As the entire module will be online and can be planned for in advance, I intend to build in more formative assessment, effective in an online context. Similarly, given the advance notice of online delivery, the usual summative assessment can be modified to address the learning outcomes in a way more appropriate to an online environment and students can be properly prepared for this [S47].
I am concerned about the best way to manage group assignments [S09].

Students:

Divide the module into multiple assessments, so that the stress of having the entire grade resting on one assignment is taken away. It's also helpful to have variety in the assessments, for example, an essay, research piece and online exam across the 12 weeks [ST35].

Move to assignments not exams. People with poor internet connection are at a serious disadvantage with timed exams, as uploading it can take up to 30 minutes for a Word document. One of my assignments took over five hours to upload this year; it's not viable [ST158].

Clarity with regard to assessment delivery is essential. It is understandable that lecturers, and the university as a whole, were not prepared for this event, but some lecturers provided information which subsequently turned out to be incorrect [ST57]

Provide ALL information about the assessment at the beginning of the semester. This will reduce stress levels, as there can be a lot of assignments due around the same time [ST73].

Online completion of exam papers over a few days relieves stress. Submission dates for assignments need to be well spread out – I had one day where seven essays were due [ST81].

The following comments relate to future needs in terms of technical support.

Staff:

Assessment and feedback training for large groups would be very helpful. A few "back to basics" sessions about Loop might also be helpful. I feel like I may have picked up some bad habits with trial and error over the years! Clarity in presenting material to students on Loop will be very important and I would like to see various options on some of Loop's design features [S39].

Class advisors should be available at the time of lecture delivery every week, with ISS to fill in the gaps (ST114].

Having an anonymous/private forum where students could ask their lecturers questions without getting called out in front of the whole class on a Zoom lecture [ST217].

Findings: TEU Data.

LSSP logs

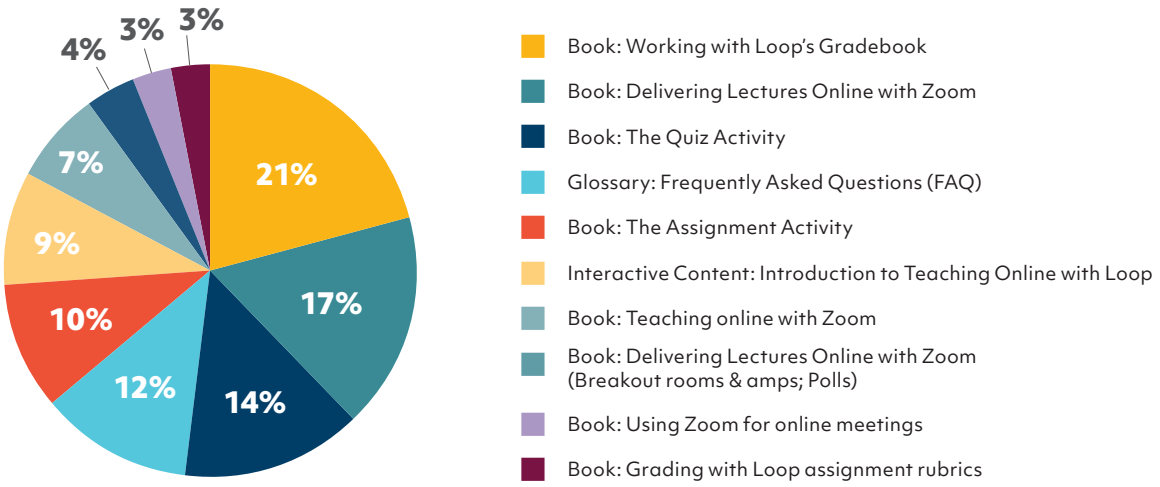
As outlined in the methodology section of this report, staff engagement with support materials and PL offerings was explored to enhance understanding of the data arising from the surveys.

Having separated the LSSP logs into two datasets, (a) covering all staff users excluding large-class teachers and (b) large-class teachers only, the following results were found when the most popular LSSP resources were explored.

Table 17: LSSP resources with highest number of hits from users, excluding large-class teachers

Resource	Total hits
Book: Working with Loop's Gradebook	3080
Book: Delivering lectures online with Zoom	2463
Book: The quiz activity	2006
Glossary: Frequently Asked Questions (FAQ)	1708
Book: The assignment activity	1423
Interactive Content: Introduction to teaching online with Loop	1318
Book: Teaching online with Zoom	1068
Book: Delivering lectures online with Zoom (breakout rooms & polls)	645
Book: Using Zoom for online meetings	506
Book: Grading with Loop assignment rubrics	465

Figure 11: Top 10 LSSP resources visited by all users



The most visited resources by all users (excluding large-class teachers) cover assessment topics, teaching online, and using Zoom.

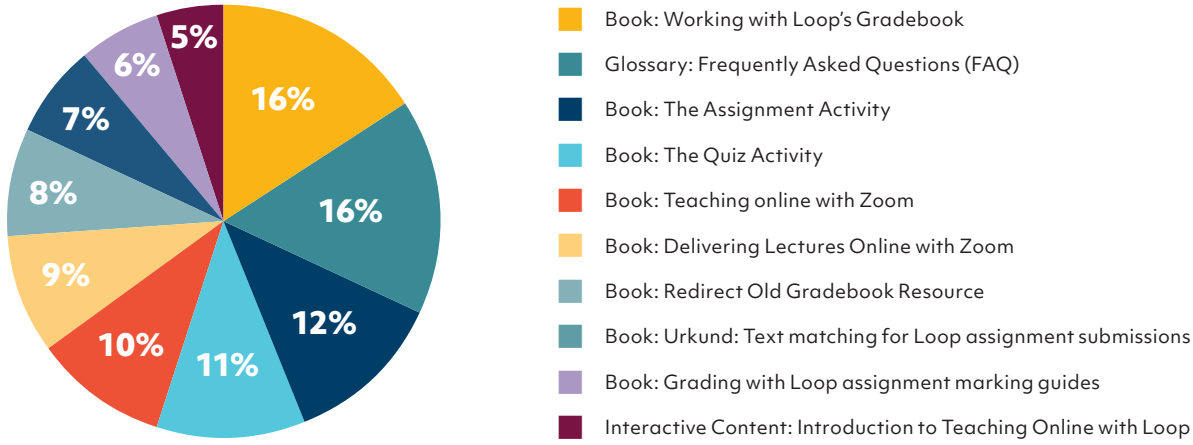
Ninety-six (or 63%) of the 153 large-class teachers visited the LSSP at least once during the period 11 March to 25 June. Fifty-seven (or 37%) of the large-class teachers did not.

Of the 96 large-class teachers who did visit the page, Table 18 lists their most visited resources.

Table 18: LSSP resources accessed by large-class teachers only

Resource	Total hits
Book: Working with Loop's Gradebook	313
Glossary: Frequently Asked Questions (FAQ)	309
Book: The assignment activity	234
Book: The quiz activity	223
Book: Teaching online with Zoom	198
Book: Delivering lectures online with Zoom	172
Book: Redirect old Gradebook resource	161
Book: Urkund: Text matching for Loop assignment submissions	134
Book: Grading with Loop assignment marking guides	**111**
Interactive Content: Introduction to teaching online with Loop	**101**

Figure 12 Top 10 LSSP Resources visited by large-class teachers



There is some overlap between the most visited resources for all users, including large-class teachers, particularly in relation to assessment topics. However, large-class teachers seemed

to have accessed resources supporting use of Zoom less than the staff who did not teach large-class cohorts.

Table 19 compares the most visited resources among both groups of LSSP visitors.

Table 19: Most visited LSSP resources – comparison between large-class teachers and others

Resource	Ranked place in terms of most visited resources by all users, excluding large-class teachers	Ranked place in terms of most visited resources by large-class teachers
Book: Working with Loop's Gradebook	1	1
Book: Delivering lectures online with Zoom	2	6
Book: The quiz activity	3	4
Glossary: Frequently Asked Questions (FAQ)	4	2
Book: The assignment activity	5	3
Interactive Content: Introduction to teaching online with Loop	6	10
Book: Teaching online with Zoom	7	5
Book: Delivering lectures online with Zoom (breakout rooms & polls)	8	N/A
Book: Using Zoom for online meetings	9	N/A
Book: Grading with Loop assignment rubrics	10	N/A
Book: Redirect old Gradebook resource	N/A	7
Book: Urkund: Text matching for Loop assignment submissions	N/A	8
Book: Grading with Loop assignment marking guides	N/A	9

The staff members teaching large classes did not engage as much with Zoom LSSP resources as those teaching in other contexts. This is possibly due to the fact that there was more asynchronous engagement planned for large-class cohorts than for smaller groups. Furthermore, very large classes (300+) could not be hosted on Zoom Meetings, so all engagement was likely to have been asynchronous for those cohorts. Interestingly, the highest ranked resource was that supporting Loop's Gradebook, indicating perhaps that assessment is a key area requiring staff support, regardless of class size.

Professional learning offerings from the Teaching Enhancement Unit

Table 20 displays a summary of the PL offerings from the TEU during the period 11 March-25 June 2020. appended with the number of verified participants after the data-cleaning steps outlined in the methodology section above had been completed.

Table 20: Engagement of all staff with PL offerings from TEU, March-June 2020

Sequence	Title	Date	Verified participants
1	ABC to online teaching	11 March	27
2	ABC to online teaching	12 March	14
3	Engage your students during class with Vevox	12 March	42
4	Getting to know Zoom	13 March	135
5	Getting to know Zoom	13 March	50
6	Getting to know Zoom	19 March	10
7	Getting to know Zoom	20 March	43
8	Assessment webinar: Loop quiz: What is it and what can it do?	20 March	10
9	Assessment webinar: Loop assignment: Collect student submissions	23 March	9
10	Zoom next steps	23 March	26
11	Assessment webinar: Loop quiz: Writing good questions	24 March	9
12	Zoom for Meetings	24 March	25
13	Getting to know Zoom	25 March	26
14	Assessment webinar: Loop quiz: Setting up a conventional quiz	25 March	7
15	Getting to know Zoom	26 March	23
16	Assessment webinar: Loop quiz: Case studies to inspire	26 March	9
17	Zoom next steps	26 March	24
18	Zoom for Meetings	27 March	17
19	Zoom next steps	27 March	25
20	Assessment webinar: Loop assignment: Grading student submissions	30 March	11
21	Getting to know Zoom	1 April	5
22	Assessment webinar: Loop Reflect	1 April	4

23	Assessment webinar: Engage students with Vevox	2 April	26
24	Video seminar series: What, why, how	6 April	22
25	Exploring H5P for interactive content	7 April	12
26	Video seminar series: Basic video editing	8 April	27
27	Video seminar series: Managing video assignments	9 April	18
28	Video seminar series: Basic video editing	16 April	14
29	Video seminar series: Managing video assignments	17 April	5
30	Assessment webinar: Get going with Gradebook	22 April	74
31	Assessment webinar: Get going with Gradebook	28 April	16
32	Assessment webinar: Loop assignment grading student submissions	29 April	9
33	The Sipping Point: Lessons learned from online teaching	20 May	97
34	The Sipping Point: Assessment showcase	25 June	62
Total unique verified participants across all 34 offerings: 491			**Total: 933**

The list of 153 large-class teachers was cross-referenced with the list of verified participants at the 34 offerings. In total, 148 of the 933 participants across the offerings were large-class teachers (roughly 16% of participants). Of the 491 unique participants across the offerings, 65 were large-class teachers (roughly 13%). Of the 153 large-class teachers, 65 attended offerings (roughly 42%).

Table 21: Large-class teachers who attended TEU PL offerings, March-June 2020

Sequence	Title	Date	Verified participants who teach large classes
1	ABC to online teaching	11 March	3
2	ABC to online teaching	12 March	3
3	Engage your students during class with Vevox	12 March	10
4	Getting to know Zoom	13 March	12
5	Getting to know Zoom	13 March	7
6	Getting to know Zoom	19 March	2
7	Getting to know Zoom	20 March	6
8	Assessment webinar: Loop quiz: What is it and what can it do?	20 March	0
9	Assessment webinar: Loop assignment: Collect student submissions	23 March	0
10	Zoom next steps	23 March	5
11	Assessment webinar: Loop quiz: Writing good questions	24 March	0
12	Zoom for Meetings	24 March	2
13	Getting to know Zoom	25 March	6
14	Assessment webinar: Loop quiz: Setting up a conventional quiz	25 March	2
15	Getting to know Zoom	26 March	4
16	Assessment webinar: Loop quiz: Case studies to inspire	26 March	0
17	Zoom next steps	26 March	4
18	Zoom for Meetings	27 March	4
19	Zoom next steps	27 March	7
20	Assessment webinar: Loop assignment: Grading student submissions	30 March	3
21	Getting to know Zoom	1 April	0
22	Assessment webinar: Loop Reflect	1 April	0
23	Assessment webinar: Engage students with Vevox	2 April	7
24	Video seminar series: What, why, how	6 April	2

25	Exploring H5P for interactive content	7 April	2
26	Video seminar series: Basic video editing	8 April	2
27	Video seminar series: Managing video assignments	9 April	1
28	Video seminar series: Basic video editing	16 April	5
29	Video seminar series: Managing video assignments	17 April	1
30	Assessment webinar: Get going with Gradebook	22 April	21
31	Assessment webinar: Get going with Gradebook	28 April	2
32	Assessment webinar: Loop assignment grading student submissions	29 April	2
33	The Sipping Point: Lessons learned from online teaching	20 May	13
34	The Sipping Point: Assessment showcase	25 June	10
Total unique verified large-class teacher participants: 65			**Total: 148**

The PL offerings (across all iterations of them) with the highest number of large-class teachers in attendance were:

- Getting to know Zoom (37 out of 292 or 13% of attendees).
- Get going with Gradebook (23 out of 90 or 26%).
- Zoom next steps (16 out of 75 or 21%).
- Sipping Point: Lessons learned (13 out of 97 or 13%).
- Sipping Point: Assessment showcase (10 out of 62 or 16%).
- Engage your students during class with Vevox (10 out of 42 or 24%).

Large-class teachers seemed to prioritise getting familiar with Zoom, getting familiar with setting up their online grading schemes, wanting to learn from peers around ways to teach online and about assessment methods, and wanting to engage students during class with an audience engagement/student response tool like Vevox. However, it is impossible to conclude that these teachers wanted to put this in practice in their large modules or if they had other modules in mind.

A fairly significant proportion (58%) of the large-class teachers do not seem to have accessed the PL supports. This may be due to the fact that they already felt equipped in terms of the skills and resources offered across the PL offerings. Alternatively, it could be that much of their intended student engagement was asynchronous and the majority of PL offerings focused on concepts most applicable to synchronous teaching and learning. Or, perhaps they were overwhelmed, felt they did not have time to engage and soldiered on as best they could.

Summary of findings from surveys and TEU data

While the number of respondents is small, considering the size of DCU, they do provide an insight into the experiences of staff and students during the transition of large, face-to-face classes to the online space. Overnight, the DCU VLE (Loop) changed from being mainly a repository for materials to becoming the classroom space itself, requiring sudden and significant adjustments for teachers and learners. It must be noted that the student respondents likely considered the questions from the perspective of experiencing a number of large-class modules compared to staff who may only have transitioned one or two modules to the online space.

The one theme coming through in student responses to a number of questions is the enhanced flexibility that learning online provided and the value placed on the opportunity to review recordings for a variety of reasons. In addition, while 39% of students indicated that they did not prefer learning online, 19% clearly indicated that they did. This is a significant minority for whom the online space was preferable because of the aforementioned flexibility it provided, but also because of the nature of the engagement, the lack of noise and distractions, and so on. However, both staff and students indicated a sense of disconnect, that is, lack of opportunities to ask questions of clarification; cameras turned off during synchronous sessions; lack of peer interaction generally and specifically in relation to tasks; and lack of feedback on tasks. It would seem that the importance of teachers being explicit in terms of their expectations of synchronous and asynchronous engagement cannot be overemphasised. It would seem that opportunity was seen in the face of adversity, whereby both students and staff have identified potential for better ways of doing things as a result of their experiences between March and May, which may be useful going forward, regardless of face-to-face or online contexts.

It is difficult to draw definite conclusions from the TEU data in relation to staff engagement with synchronous and asynchronous support materials and resources. However, there does seem to be a trend, whereby those teaching large-class cohorts did not engage with Zoom support materials as much as others, which may indicate less intention to engage in synchronous teaching and learning. However, that is a tentative conclusion at best.

Discussion

The purpose of this study was threefold:

1. To shed light on the recent, sudden transition of DCU's large classes (100+ students) from the face-to-face teaching and learning setting to the online environment, from the perspectives of staff and students.
2. To contextualise the findings arising from the examination of the transition referred to above by reviewing relevant literature.
3. To inform the work (a) of academics in DCU teaching large-class cohorts and (b) academic developers and learning technologists, supporting them in this endeavour, as large programmes and modules move online in the forthcoming academic year.

As the proposers and authors of this study, we had experienced this transition ourselves, albeit from different stances. Over the course of the study, the Covid-19 context has morphed and changed and while this project sought to shed light on DCU's sudden transition to the online environment between March and June 2020, this can now be viewed as shedding a light on what has become the first phase of DCU's response to the pedagogical implications of the Covid-19 pandemic.

The main findings from the surveys are interpreted below and aligned with those of the systematised literature review. Key implications are then outlined and these form the basis for our recommendations.

Presence in the online environment

The literature on large-class teaching in HE is characterised by the challenges associated with the context, for example, the perceived difficulty in teaching large numbers of students (Allais, 2014); the preponderance of the knowledge-banking dynamic (Stoerger & Krieger, 2016); the impeding of student performance (Hornsby & Osman, 2014); and the limitation of only being able to teach to the middle in the context of scale (Arvanitakis, 2014). The issue of presence and connection in the large-class context is often debated with both teachers (Auslander, 2000; Cole & Kosc, 2010; Maringe & Sing, 2014; Mulryan-Kyne, 2010) and students (Suchman, Smith, Ahermae, McDowell, & Timpson 2000; Arvanitakis, 2014; Cuseo, 2007) experiencing a sense of isolation. That sense of isolation is mirrored in the present study in the online context arising from lack of synchronous teaching, students having cameras turned off when synchronous teaching did take place, and the fact that many of the asynchronous tasks and activities required individual student engagement and therefore did not provide the opportunity for students to interact with each other.

Creating a teacher presence in the online environment is a very important aspect of online pedagogy (Ní Shé et al., 2019), both in terms of synchronous and asynchronous teaching and learning. In the emergency pivot of large-class cohorts online, there was a reliance on

asynchronous engagement and Loop materials had to be created very quickly, in many cases over the weekend period between 13 and 16 March, to ensure that student engagement was supported and meaningful. There was little time to consider the finer points of online teaching at that stage, as there was a sense of urgency and panic (Eaton, 2020; Hodges et al., 2020); staff were grappling with the challenge of navigating the new terrain, as a result of turning their Loop pages from repositories to virtual classrooms and the creation of materials (Roy et al., 2020). However, as we journey through the continuum of this transition, the manner in which teacher presence is explicitly included in that "classroom" will be important, particularly for first-year student groups.

Care should be taken not to confuse teacher presence with solely teacher-led, teacher-centred, synchronous online teaching. There are many ways in which teacher presence can be created, both synchronously and asynchronously (Farrell et al., 2020) and a variety of methods should be explored and implemented. This is particularly important from a universal design viewpoint, when we consider that not all students can access synchronous teaching all the time, and that many students will have varying degrees of ability to engage with different forms of media (AHEAD, 2020).

Attitude and perceptions

The perceptions of staff and students differed on some aspects of the swift transition to online teaching and learning. However, it must be remembered that the staff were likely responding to the questionnaire on the basis of their involvement in a very small number of large-class modules, whereas student respondents had likely experienced lots of large-class modules because the programme enrolment would have been large. So, the student experience was, by default, more varied than that of the staff. Teachers' attitudes and perceptions of what constitutes a "large class" are influenced by experience, discipline and institutional norms (Kerr, 2011), but it is also likely influenced by a lack of understanding of the totality of the student experience in that same context. This also appears to be the case in terms of moving online.

Much of the literature supports adapting pedagogy in the swift move to online learning for large-class teaching. The basic principles of effective teaching, learning and assessment are to be addressed in the online space, as in the face-to-face/traditional classroom. While the context is different, teachers adapted pedagogy to align with the sudden move to online delivery and students reported a mostly positive experience. In fact, a sizable minority of the students surveyed reported that they preferred the online learning environment.

Staff expressed concern and lack of confidence about moving their large classes online. However, they also were clear that they felt competent to teach their large classes in the new context. This appears to be somewhat contradictory. It may be the case that the expressed lack of confidence was more to do with engaging with the online environment specifically, while the perceived competence might be linked to the fact that most large-class lectures were recorded in a way that mirrored the face-to-face approach. Those new to teaching online tend to perceive barriers to teaching effectively in that space, compared to those

who have some experience (Ní Shé et al., 2019), and are learners themselves, experiencing pedagogical threshold concepts. In the case of the crisis transition to online delivery, that learning had to be swift and without the luxury of deep reflection.

The data mining of staff engagement with the TEU PL offerings also indicates that large-class teachers attended more sessions relating to assessment than to the use of Zoom for teaching. This is possibly because those large-class teachers with cohorts over 300, in particular, felt that they did not need to think about their teaching approach because they knew they could not use the Zoom for the very large groups.

Seventy-eight per cent of the student respondents reported that they had to engage with long lecture recordings of at least 50 minutes, and so it may be the case that the staff were thinking about this when they clearly stated that they felt competent to teach online, that is, they were transposing the face-to-face lecture format to video which did not feel too different from their normal practice. However, many staff respondents stated that they provided long recordings but also shorter, chunked recordings. Again, this discrepancy may arise from the fact that students had to engage with a much larger range of recorded lectures than did staff. Furthermore, it could also be that the students who completed the survey were not taught by the staff who participated in the survey.

The attitudes of students to the move online were more polarised than those of the staff. While 54% of students disagreed or strongly disagreed that they preferred online learning, 29% agreed or strongly agreed that they did prefer learning online. The reasons for this included the flexibility the online context provided; less noise than in the large, physical classroom, making it easier to attend to the material; the availability of video and audio recordings on demand; and access to a wider range of materials on Loop. Moreover, some students raised the point that it was less intimidating to ask questions online using the chat function than it was in a large lecture theatre. It is also important to note that, while 29% agreed that they preferred online learning, the percentage of students specifically indicating the positive aspects of online learning was much higher. For example, 37% identified the on-demand availability of lecture recordings as useful, indicating that even some of those who preferred the face-to-face context valued some of the features of their online learning experience. In fact, this element of online learning was reiterated on many occasions throughout the student survey data. However, the study carried out by DCU's Quality Promotion Office (2020) indicates that 83% of the students surveyed stated that they felt overwhelmed following the move to online learning. Our study did not explicitly examine the perceptions of students with disabilities. However, there is an indication, at national level, that students with disabilities in HE felt they were not coping in the new context compared to their disabled peers in further education contexts (AHEAD, 2020).

It must be remembered that both staff and students were reflecting on the sudden, swift move to the online environment in the context of a crisis (Eaton, 2020; Hodges et al., 2020) and that the reservations expressed by both groups are most likely expressed in that emergency context, that is, it was the stressful emergency that participants did disliked, rather than the move to the online environment per se. Both groups were navigating the revamped terrain

of the VLE (Roy et al., 2020), which had recently been used primarily to curate and access materials (Anzovino et al., 2020), and now repurposed as the teaching and learning context (Roy et al., 2020). So, not only was the educational environment in a constant state of flux for staff and students alike, but life generally was changing simultaneously, and likely changing significantly for some, depending on their individual circumstances.

However, the emergency fostered a shared empathy between staff and students. As we move into the extended period of online teaching due to the pandemic, it is likely that more will be expected of both staff and students in relation to their online engagement. While we have not reached the point of designing online learning from the outset, we are at a point where we have had more time to think and plan at least for the upcoming semesters. We appear to be on an extended transition path, a continuum, where we are still transitioning large-class modules and programmes online for the first time in this academic year; but, in contrast with our experiences in March, we have more time to plan and consider the teaching and learning experiences of staff and students. However, while we are moving closer to the context of online pedagogy, rather than pandemic pedagogy, we are still trying things for the first time in many instances and the foundations of uncertainty still exist as the Covid-19 pandemic continues to lead us into unknown territory.

Student engagement and motivation

The literature regarding large-class pedagogy in the face-to-face context suggests that students experience feelings of anonymity (Auslander, 2000), neglect (Suchman et al., 2000) and boredom, causing disengagement (Arvanitakis, 2014). The wider context of the pandemic is likely to have impacted further on the motivation and engagement levels of both staff and students, which may have been further exacerbated by aspects of online design or lack thereof. For example, in this study, students raised the issue of not being afforded the opportunity to ask questions to clarify concepts and tasks following the move to online delivery. While staff indicated that they used whole-class email and the announcements forum on Loop to communicate with the full large-class cohorts, 96% also stated that they responded to individual emails throughout the emergency move online, which would seem to be a potentially onerous task with very large cohorts. In addition, it is likely that responding to questions on an individual basis disadvantages those students who did not ask questions and does not enhance engagement in a whole-class context. This suggests that a method of supporting questions needs to be built into pedagogical planning, for example, using the Forum tool on Loop. Moving forward, this is an issue that needs to be considered, especially in relation to large-class cohorts, both in terms of staff workload and equity of support for all students in the class.

Peer-to-peer interactions were also hampered, which is mirrored in experiences of the move online generally (Anzovino et al., 2020). It was challenging to create a classroom community that fostered student-teacher and peer-to-peer interactions (Roache et al., 2020), especially with very large classes (300+), because teaching and learning was conducted asynchronously due to the capacity limit of DCU's Zoom video conferencing platform at the time. However, it was evident from the data that students really valued the on-demand availability of materials

and recordings of synchronous sessions. The availability of asynchronous materials enabled access for students with poor connectivity (AHEAD, 2020; Hamraie, 2020) and provided flexibility (Shew, 2020; Vergroesen, 2020). This also relates to the issue of teacher presence (Ní Shé et al., 2019) and how teachers act and behave in the online environment in considering the entirety of their student cohort. Students want more opportunity to interact with the teacher and other students, and staff want increased student motivation and engagement. This is a complex task in the large-class context, where multiple educators are involved, particularly at such times of stress and challenge as those presented by the pandemic.

It was evident that students and staff appreciated the extraordinary circumstances of the sudden move to the online space and the difficulties each might have been experiencing, building a sense of solidarity in the online space (Impastato & Topper, 2020). In terms of teacher presence, embedding an ethic of care (Hornsby, 2020a) is important, especially for large cohorts in which some students may already feel isolated because of the large class as much as the online context. That ethic of care will inform pedagogical decisions at every level.

Provision of opportunity for student interaction and engagement in the convergence of the large-class and online contexts is a key pedagogical element to be considered, requiring the creation of a social presence by ensuring a cordial learning environment and a cognitive presence by communicating content clearly (Ní Shé et al., 2019). This will require reflection on the interface between (a) the balance of synchronous and asynchronous engagement (Milligan, 2020) and (b) the content and purpose of online tasks (formative and summative), as well as the nature of the engagement with these tasks (Terenke & Ogienko, 2020). It is evident from the data in the present study that students valued the opportunity to engage in synchronous sessions, which is mirrored in the literature around the emergency pivot online (Creechan et al., 2020; Conestoga College, 2020). In the large-class context, this is not easy, and it is even more challenging when considering how tasks can be used to provide an opportunity for student-to-student interaction. Using the UDL framework (Meyer et al., 2014) as a guide may go some way to helping large-class teachers to design the learning space to include attention to student interaction, particularly if provision of choice is explicitly embedded across the module in relation to tasks and engagement.

Assessment

Following the transition online in March, DCU implemented oversight procedures in relation to assessment changes at faculty level, whereby changes had to be formally proposed and managed through an online submission system and overseen by the faculty's Associate Dean for Teaching and Learning and administrative staff, to ensure fairness, consistency and alignment with the overall module/programme grading system. That level of oversight was afforded to this pedagogical element only: there was no corresponding oversight of academic decisions made in relation to teaching approaches or learning design in the online environment. Moreover, the data arising from examination of the TEU supports provided during the crisis show that the most popular resources accessed were those relating to assessment.

Broadbent et al. (2018) consider assessment to be the least researched aspect of pedagogy in the large-class context and by virtue of scale, assessment approaches can be perceived as limited (Kerr, 2011). The move of large classes to the online environment has most likely highlighted a pre-existing dilemma with assessment possibilities and challenges and the need for a wider debate on the purposes and procedures of large-class assessment: how it aligns with curriculum, teaching and learning; the supports required to enable authentic assessment opportunities for large-class cohorts; and the development of an understanding of assessment literacy for both staff and students. The dilemmas above pertain as much to formative assessment as they do to summative assessment. Students indicated that they sometimes did not know how to engage with formative tasks and, even when they did, they were unsure of whether they had engaged correctly because, from their perspective, feedback was not provided. This confusion was likely compounded by the aforementioned individualistic structure of formative assessments, which failed to provide an opportunity for peer-to-peer feedback. There is also a likelihood that feedback was embedded somewhere but not recognised by students or not made explicit by staff. This may also have contributed to the sense of isolation and diminished levels of motivation experienced by some students and is likely to be what some respondents were thinking about when they indicated the lack of opportunity to ask clarifying questions following the pivot online. Formative tasks can enhance student engagement and deepen learning (Ogrutan & Aciu, 2020) but feedback is required, so that students are clear on expectations (Sekulich, 2020). However, this requires planning and professional development, especially in relation to group work, that was not possible in the swift move to the online context in March. For example, teachers need to consider how to structure tasks in a way that enables student interaction and in a large-class context that can be tricky to manage. In addition, it is important that large-class teachers consider how feedback can be embedded in online tasks. The inclusion of exemplars that are clearly aligned with the rubric of expectations for the task is one way of illustrating the stated expectations (Carless, 2020). Whatever the task, it is important that students have some way of situating their formative attempts in the context of teacher expectations for learning outcomes and those expectations need to be explicit.

As we move into the next phase of this pandemic, teaching staff really need to consider these assessment dilemmas, otherwise, we risk creating an even greater sense of disconnect for our large-class cohorts. Moreover, both staff and students need to be clear on the language and literacy of assessment and feedback. Furthermore, in terms of large classes, these issues are not just related to the move from the face-to-face to the online environment: they are characteristics of the assessment of large-class cohorts whatever the context. Discussion about assessment in relation to the move online in March 2020 has provided an opportunity to debate assessment types and fostered a more collaborative approach to assessment development (Brown & Sambell, 2020) which may open the door to challenging some of the assumptions about large-class assessment. One of the limitations of the present study was the lack of in-depth exploration of the effectiveness and experience of online, proctored examinations. Since completing the literature review for this study, there seems to be a growing resistance – from teaching and learning experts in the field of HE on social media – to the use of online proctoring, and indeed for examinations themselves.

Concluding thoughts

The context and rationale for this study are rooted in the initial teaching and learning response to the Covid-19 pandemic, which required decisions to be made very quickly at all levels of the university, from senior management to individual academics. The emergency context created stress and anxiety. It did not allow time for extended thinking, planning and reflection (Hodges et al., 2020), which is important when developing any programme of learning, but particularly so when moving to the online mode of delivery in terms of building competence and confidence regarding digital tools and understanding (Ní Shé et al., 2019; Roache et al., 2020). However, it also necessarily enabled flexibility in terms of structures and procedures, allowing, for example, a range of options for alternative approaches to assessment. Most of all, it put teaching firmly back in the spotlight of the university. The focus of university professional development supports was on teaching and learning from the outset and throughout the months immediately after the closure of the campus on 12 March. Indeed, teaching and learning continues to be prioritised in terms of supports, as we move into the next phase of this global emergency. Even the research aspect of the university has been impacted with funding provided to support studies specifically relating to the impact of Covid-19, including this study. The focus on teaching in DCU during the pandemic is mirrored internationally in social media, mainstream media and academic outputs, as evidenced in the literature review of this report. This emergency has highlighted the centrality of teaching as the key raison d'etre of HE, signifying a shift away from its position on the side-lines in favour of research.

The emergency response to the pandemic also exposed how pedagogy is conceptualised and enacted, albeit in terms of moving from the face-to-face to the online context. While the transition online provided the foundation for the discussions, in actuality, pedagogy was the topic at the heart of the debate. The swift move online revealed how learning design is approached and how diversity and range of learners is considered. The importance of designing learning, considering universal access from the outset (Meyer et al., 2014), was central in the move to the online environment. However, it is a concept that is central to any teaching and learning context and is particularly important for large-class cohorts which, by default, will comprise a wide range of learner profiles just because of scale. There is an opportunity for DCU to learn from the experiences of the crisis to inform pedagogy (Persky et al., 2020) at institutional, faculty, school, programme and individual academic levels. The assessment element of the pedagogical approach to teaching large classes online (or face to face for that matter) needs to be particularly considered, to ensure that academic integrity, assessment authenticity and recognition of student diversity in large-class cohorts are supported meaningfully, allowing for alignment of the four elements of the pedagogical relationship curriculum, teaching, learning and assessment to be explicit and aligned (Nind, Hall, & Curtin 2016). Curriculum reform is stated as a strategic goal in the DCU Strategy 2017-22 (2017) and that goal will hopefully be met and informed by what we learned in the crisis pivot online in March and, perhaps more importantly, by what we continue to learn as we move through each phase of the pandemic. DCU's constituent teaching and learning strategy (2017), a key component of the strategic plan, articulates the university's commitment to innovating pedagogical design and providing flexibility in programme delivery. The experience of staff and students outlined in this study confirms the importance

and appropriateness of that commitment and should go a long way to informing related decisions and practices, to ensure that commitment is delivered effectively.

It is important that DCU specifically, and the field of HE generally, should guard against returning to "normal" without learning from, and acting upon, the opportunities presented by pandemic pedagogy (Smith and Hornsby, 2020). During the course of this academic year (and probably beyond), we have a little more time to consider how we transition modules and programmes online. While it is still not the same as designing an online or blended learning course from the outset, nor is it the same as the situation on 12 March. This phase will allow HE to consolidate some of the learning from the first phase, while also providing opportunities for new learning. Already, the scholarship of HE pedagogy seems to be increasing and hopefully, over time, the dual role of the academic (i.e., teacher and researcher) might align a little more, rather than being viewed as competing binary elements of an academic's identity.

Specifically, it is clear that the pedagogical assumptions and challenges associated with large classes are also associated with online pedagogy. Indeed, it is probably correct to say that the pedagogical challenges and assumptions associated with any teaching and learning context are very similar and are often in the eye of the beholder, rather than within the context per se. Teaching challenges are often created by how we react to a context and are rooted in our beliefs, which are often subconscious. Teaching and learning contexts have far more commonalities than differences. In the context of the pandemic, both staff and students were (and still are) operating in an ever-changing, threatening environment, where the usual social supports have been removed or severely curtailed, which inevitably impacts on an individual's ability to swiftly and effectively react to challenge. In that context, the overall, general positivity of the respondents to the survey is remarkable.

This study grew from a desire to shine a light on the innovation of moving large classes online on 12 March 2020: a necessary innovation in response to the Covid-19 pandemic. When we began this project in May, we thought about it as an illuminative evaluation (Parlett & Hamilton, 1972) of the emergency transition from face-to-face to the online context. As our study developed, so did the pandemic, and it is evident to us now that this study is just the first milestone in examining DCU's pedagogical practice in light of this emergency. We are now into the next phase of that emergency, which is nuanced differently because of the availability of more time, opportunity to talk about our teaching formally and informally with each other, and a collective, growing understanding of what does and does not work as a result of our experiences over the last months – experiences that we did not have in March, when we were making major decisions about online (or remote) teaching, learning and assessment for our large-class cohorts.

NOTES, REFERENCES AND APPENDICES

A note from the authors

As mentioned in the introduction to this report, we embarked on this project because of our personal interest and experience in the area from a range of perspectives. We met as a team, almost every Friday at 10am from the first week in May until mid-December. Our overall experience of this research journey has been positive, collegial, interesting, motivational and enjoyable. This project was about more than just carrying out research: it was intrinsically about pedagogy, the aspect of university work that each person on the team views as central to the life of our university. Five of the six members of the team are students: one in the final year of a full-time, undergraduate programme (Seán) and four engaged in part-time doctoral studies (Ann Marie, Karen, Rob and Suzanne). We worked throughout the summer and into the first semester, when our pace of output slowed a little, as our work and our studies placed increased demands on time and energy. While we did outsource a key element of the project (data analysis), the rest of the project was carried out directly by the team members. Over the course of the project, the context of the pandemic changed and morphed, as did our responses to it, while we dealt with the implications arising for our work and studies. In that context, each of the team members has provided a short commentary below.

Ann Marie

I have taught large classes for many years and I love them. They challenge me as a teacher in terms of how to present concepts and engage learners. However, they also provide me with a great opportunity for drawing on the knowledge and experience of the student cohort. Also, there is an inherent energy in a large class, which is almost tangible when a session goes well … and when it flops! When Covid-19 hit, I was very concerned that moving my large classes online would result in the loss of that energy, and initially that is exactly what happened. In March, I was teaching a large, first-year class (450 approximately). I had met with them face-to-face for five weeks and then had to move the module online for the next five teaching weeks. Initially, I planned all engagement to be asynchronous because Zoom Meetings could not host more than 300 participants. However, I then learned how to livestream a Zoom session on YouTube (thanks to support from the TEU), which allowed me to host one synchronous session on 24 April. This was also the day the call for proposals for the DCU Covid-19 Innovation Hub was due. Following the synchronous session, I floated the idea of this project to those who subsequently comprised the team; we completed the proposal collaboratively over three hours and submitted with minutes to spare. Since embarking on this project, I have experienced moving a second, very large group to the online context and that has demanded other considerations because of the nature of the group and the focus of the module. My own understanding of online pedagogy has grown and changed and will continue to do so, I believe, as each phase of this pandemic demands different considerations, and as my own understanding evolves. I now have access to Zoom Webinar, so I can host all students in the same "classroom", which has really enhanced the creation of a classroom community. Next semester, I will be teaching the same first-year module again but with new challenges this time around; this group of students has had limited access to each other

compared to the cohort which pivoted online in March, so how that module is conceptualised for the online environment will need to be different. The situation that was forced on me in March has led to me completely rethinking my pedagogical approaches with these large groups in the immediate future and has highlighted possibilities for long-term changes going forward.

Mark

I am very fortunate to lead a team of eight people charged with academic staff development with respect to new approaches to teaching and learning, educational research, and the support of a wide variety of educational technologies. I provide leadership in the areas of curriculum design, cutting-edge innovative teaching techniques and learning technologies that are being implemented throughout the university and across the sector.

I continue to play a lead role in the university's response to Covid-19: moving all courses online, designing and implementing hybrid classrooms, providing expertise to staff with regard to alternative assessments, and managing the various learning technology platforms. This project particularly interested me because I firmly believe that while online teaching is different from learning face to face, good teaching is still good teaching. Large-class teaching, when done right, can be a very effective learning experience and I believe that with proper planning and structure, large-class teaching online can also be effective.

Seán

In March 2019, I was elected to be the 2019/20 Institute of Education Faculty Representative for the DCU SU. In this position, I represented over 2,500 undergraduate and postgraduate students at faculty level. I was also given the opportunity to listen to students' concerns regarding HE and the large-class experience and to voice these concerns to staff in the Institute of Education.

My work as faculty representative heightened one year after being elected, during the first stage of the Covid-19 pandemic. In the weeks following the emergency transition to online learning, I was having daily meetings with the SU executive committee, Institute of Education class representatives, and university staff. It was also during this time that Ann Marie asked me to join this research project. I sincerely thank her and the team for asking me to be a part of this project and for guiding me through the research process (something that was entirely new for me). It has been fantastic to share my insights of large-class, remote teaching and learning and to represent the DCU SU on a university-funded research project.
I am now working my way through my final year of the Bachelor of Education in DCU. This experience has shown me the important role this research project has played in informing teaching and learning for this academic year. The success of university staff in following this research project's interim guidelines to provide an accessible, engaging, large-class online learning environment has not gone unnoticed or unappreciated by myself and my peers. Long may it continue!

Suzanne

My role as learning technologist placed me on the "front line" of supporting staff to move, at pace, from face-to-face teaching, learning and assessment to the online space. The last few months have been challenging to all of us in HE but have also offered us an unprecedented context to grasp the opportunities of online learning. Learning technologists have engaged with staff who would never usually use learning technologies beyond the basic repository functionality of the VLE. We have supported staff to redesign assessments and to move beyond the traditional assessment formats through technology. This work has been demanding for all involved, both in terms of time and energy, but it has also been a very creative experience. Covid-19 and the pivot online have pushed us all out of our respective comfort zones and in doing so have challenged us all to develop new skills and reflect deeply on teaching and learning practices. There was no context as challenging as moving large-cohort teaching and learning online and I welcomed the opportunity to collaborate with colleagues on this research study, to examine these challenges and to consider how they might be addressed. My involvement with this project has challenged me to reflect deeply on how best I can support staff to move large-cohort teaching online in a meaningful and considered way and I expect to draw on the findings to inform my practice for the duration of, and beyond, the Covid-19 crisis.

Rob

As a learning technologist, I believe strongly in the power of digital technologies to support and enhance learning and to give opportunities to those who have traditionally been excluded from education. As we know, large classes are becoming more prevalent in HE worldwide, and in my conversations with lecturers, both in DCU and in previous institutions I have worked in, I have often got a sense of almost resignation from them that digital learning initiatives, digital technologies and so on "wouldn't work" for their large classes because of scale. It is difficult to counter that deficit language when the systems and structures of HE facilitates teacher-centred, transmission-learning, real-time, in-person classes in large lecture halls. That is what drew me to this research project. In the Covid emergency, when the physical campus and traditional structures are suddenly ripped away from large-class teachers, what digital learning approaches can they employ to continue teaching or indeed enhance their teaching? These approaches need to be feasible as well as practical, which can be seen from our report. It has been illuminating to explore the various aspects of large-class pedagogy and to work with the team over the past few months. Not only have I learned more about the subject matter at hand, but I have also learned from the team about how to manage and implement such a research project. In the midst of all this, I also commenced doctoral studies, the taught element of which pivoted entirely online during summer/autumn 2020. The findings and recommendations from our report are clear to me but I have a newfound appreciation for them, as I am now living them as a student. Experiencing student life, as well as being a learning technologist supporting lecturers during these unprecedented times, has helped me to appreciate the needs of both parties in HE, which (I hope) can only help improve my own practice.

Karen

During these last months of exploring the transition of large classes online, I have experienced my own professional transition. I was fortunate to work as an Academic Developer in the TEU in DCU for the early stages of this research project and in August 2020, I transitioned to the role of Assistant Professor in the School of Inclusive and Special Education at the Institute of Education. Over the last eight months, one of the few constants in my professional life has been attending our weekly research team meetings. On reflection, this was a grounding experience for me – working towards a shared goal, uplifted by the enthusiasm and passion among our team and rediscovering parts of my professional practice that I truly value. Participating in this research project has revitalised and refined my knowledge, skills and competencies for developing effective pedagogy to reach my most marginalised learners. The "Covid slide" has yet to be fully understood and, in the coming years we, as educators, will unpack and examine the full effects of the global pandemic on our lives.

For now, I am more cognisant of my own teaching and the pedagogical tenets behind decisions I make in the planning, design and delivery of my large classes online. Gaining these valuable insights from staff and students at DCU and researching their experiences of the swift move to online delivery, has been a privilege and has opened my eyes to the world of possibilities in HE.

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Appendices

Appendix A: List of Tables

Appendix B: List of Figures

Ollscoil Chathair
Bhaile Átha Cliath
Dublin City University