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Large Online Courses: A Constraint on Instructor Presence and Higher-Level Thinking

ABSTRACT

A growing body of literature claims instructor presence is crucial in an online course learning environment. In this paper, the authors contribute to this literature with empirical research related to instructor presence and how class size influences it. This study investigated whether class size was predictive of students' ratings of instructor presence. The findings of this study suggest that in courses with higher-level skills as learning objectives, as the class size increased, students rated instructor presence lower. This result affirms existing research that explains courses that encompass constructivist skills or higher-level thinking benefit from the community of inquiry model. This model makes clear that instructor presence is imperative for effective student learning, and the implication of this directive is that class size needs to be adjusted (in many cases, it needs to be lowered) to provide a teaching and learning environment adequate for strong instructor presence. The ripple effect of this yields positive student satisfaction and student success online.

KEYWORDS

instructor presence, class size, online learning, higher-level thinking, learning objectives

INTRODUCTION

Social distancing measures during the COVID-19 pandemic forced instructors and learners in higher education to adapt to e-learning throughout parts of 2020, 2021, and even 2022, in some cases. Since higher education institutions delivered remote teaching during a global health crisis, many employed a "caring" approach to teaching and learning during this time, emphasizing student-centered pedagogy (Ba 2022; Bozkurt and Sharma 2021; Mehrotra 2021). Within this context, we undertook a study to research and reflect on online pedagogy during this unique period of teaching and learning and what it could offer online courses moving forward.

Student-centered learning is described and theorized under various pedagogical approaches (e.g., active learning or project-based learning); however, for our purposes, we assume a broader description. In a student-centered approach to learning, an instructor provides students with opportunities to learn independently (Collins and O'Brien 2003). Rather than employing an approach where knowledge is imparted from instructor to student, a student-centered approach guides students to learn the course material through their own discovery process (Barr and Tagg 1995). In an online course, especially an asynchronous course where a student's autonomy in their own learning journey is necessary, this is crucial for online learners as it can influence student motivation and have a direct impact on student success. Instructor presence is one of several student-centered pedagogical approaches that rely on the notion that a sense of care within online courses can facilitate a positive and successful learning experience for students (Darby and Lang 2019; Garrison, Anderson, and Archer 2000). To conduct this formative study, we distributed a questionnaire that explored whether class size was predictive of students' ratings of instructor presence. Given varied course sizes and learning objectives across online learning environments, students' perception of instructor presence is important. It is particularly concerning as administrative bodies continue to enlarge online courses—sometimes relying on neither empirical evidence nor educational theory when justifying higher online course enrollments (Taft, Kesten, and El-Banna 2019, 192). We argue that the findings in this study are a reminder of what is at stake in higher education if online courses are super-sized in some institutions.

LITERATURE REVIEW

Online class size

Teaching and learning online—before the pandemic and especially during the worldwide emergency of remote courses during the pandemic—has proven advantageous for many reasons: it's time-saving, allows for flexibility and control over one's schedule and geographical location, and in some instances, it is even cost-saving (Zaki 2022, 4–5). Past studies, however, have demonstrated issues related to technological, pedagogical, and social obstacles to successful online learning (Ferri, Grifoni, and Guzzo 2020). In addition, the literature from the last decade reveals a growing concern among educators and researchers about the pedagogical effectiveness of online courses, especially as class sizes have gradually and steadily increased (Jones 2015; Ravenna 2012; Seethamraju 2014; Smith et al. 2015; Snowball 2014; Sorensen 2015). Taft, Kesten, and El-Banna (2019) conducted a qualitative research synthesis of 58 evidence-based articles from 43 journals (dated between 2012 to 2017) about online learning that included guidelines for determining appropriate class sizes. The scholars qualitatively annotated each article and then used inductive reasoning methods to thematically analyze the content (Taft, Kesteon, and El-Banna 2019, 212). While faculty tend to believe that smaller class sizes are better for student learning (Darby and Lang 2019; Lowenthal et al. 2019, 10), Taft, Kesten, and El-Banna (2019) reported that there was no consensus on how class size affects learning in online courses. More recently, for example, Iglesias-Pradas et al. (2021) found that class size had no impact on student performance in virtual courses. Furthermore, Taft, Kesten, and El-Banna found that large class sizes are effective for courses that disseminate factual knowledge and characterize such courses as "foundational" learning courses, whereas small class sizes are effective for courses where students are practicing higher-level thinking and more complex skills development. Sorensen (2014) observed, "that with larger class sizes, instructors use their expertise less effectively and consistently to support student learning" and "that instructors . . . may provide less quality feedback" (574). If this is an accurate portrayal of instructors in larger class sizes, then there may inevitably be students in particular courses who are negatively affected, especially if they require instructor feedback for their learning trajectories.

Significantly, what constitutes a "small" versus "large" class is not defined consistently and Taft, Kesten, and El-Banna (2019) report that in many studies 30–40 students were considered a "large" class (220). They recommend that the following delineation be adopted: ≤ 15 students is a small class; 16–32 students is a small/medium class; 33–40 students is a medium/large class; and 40 or more students is a large class (222). However, this terminology makes no distinction between a class of 45 students and one with 90 students, a 100% increase from the smallest "large" class. Except for Nagel and Kotzé (2010), "very large" classes with 90–100 students and "super-sized" classes with more than 100 students are not usually studied. At most institutions, lower-level classes tend to be the largest and upper-level and graduate classes the smallest (Taft, Kesten, and El-Banna 2019, 191; Thomas and Dello Stritto 2021, 4). As the learning complexity required for the subject matter increases, class size often diminishes as well.

It is worth noting that Taft, Kesten, and El-Banna (2019) state that the lack of consensus about the effect of class size on online learning may derive from many factors that influence learning, such as course level, subject matter complexity, student diversity in courses, nature of graded assignments, faculty experience, faculty workload, technological assistance, and the usability of learning management systems (191). Iglesias-Pradas et al. (2021) explain that even though they found that class size had no impact on student achievement in the engineering courses they sampled, they did not take into consideration student learning outcomes (16). Similarly, Ake-Little, von der Embse, and Dawson (2020) suggest that research on class size may be inconclusive because the effects of class size on student outcomes have not considered variables such as race and gender (8). Thus, to repeat and reaffirm Taft, Kesten, and El-Banna (2019), the inconsistencies in findings when it comes to class size may be related to what attributes of online teaching and learning a researcher chooses to focus on in a specific study; without uniformity to this end, the results may not be comparable.

The consideration of pedagogical frameworks in online courses

Two pedagogical frameworks that contribute significantly to the design and delivery of different online course sizes are the objectivist-constructivist theory and Bloom's taxonomy for categorizing learning objectives. The objectivist-constructivist theory posits a pedagogical continuum—at one extreme is objectivist or teacher-centered pedagogy in which students passively receive knowledge communicated by the instructor. At the other end is the constructivist theory which focuses on student-centered pedagogy that relies on dialogue and critical thinking. Constructivist learning objectives increase an instructor's role and responsibilities. Taft, Kesten, and El-Banna (2019) state that when class sizes exceed 20 students, faculty may switch from constructivist to more objectivist course frameworks (206). For example, in large classes, faculty may choose assessments that mitigate the increased workload related to grading and providing student feedback. An example of such a change is using a multiple choice test instead of a written assignment to assess the application of critical thinking skills. In the former assessment, the test can be graded automatically by the learning management system. Students receive a grade and sometimes built-in comments that relate to particular questions or the overall score earned. The written assignment requires manual grading by the instructor or another grader, and individualized feedback for each student is typically the expectation. As class sizes increase, personalized feedback on student work presents challenges.

Bloom's taxonomy classifies several levels of learning into a pyramid from lower to higher-level thinking (Bloom et al. 1956). These are knowledge, comprehension, application, analysis, synthesis, evaluation, and creation. Typically, but not always, lower-level courses focus on the thinking that forms the base of Bloom's pyramid, knowledge and comprehension, while upper-level courses promote thinking from evaluation and creation, the top of the pyramid. Lower-level courses are typically large, and students are prompted to showcase knowledge learned in a specific discipline (e.g., history or psychology). Upper-level courses are typically smaller, and students are expected to be more active (e.g., active participation in a seminar) and complete assessments in addition to tests or exams. The analysis and evaluation of knowledge, and possibly the creation of knowledge, are expected learning objectives in these higher-level courses. Taft, Kesten, and El-Banna (2019) note that courses that promote higher-level thinking require more instructor-student contact (i.e., for feedback and guidance) and that this realistically requires smaller class sizes to be feasible (209). If class sizes are increased, to mitigate the increased workload that arises with necessary student feedback, course assessments may be altered so that feedback is more expedient, even if it is less comprehensive (e.g., electronic assessment of testing; pass/fail grades; etc.).

Instructor presence

As e-learning has grown in the twenty-first century, instructor presence has emerged as an area of research and is often perceived as crucial in an online learning environment (Darby and Lang 2019; Garrison, Anderson, and Archer 2000, 2010; Shea, Li, and Pickett 2006). Succinctly defined, instructor presence captures an instructor's interaction and communication style and the frequency of the instructor's input into online class discussions and communications. Anderson et al. (2001) stated that establishing instructor presence during online instruction includes presenting content and questions, focusing discussions on specific issues, summarizing discussions, confirming students' understanding of course ideas, pointing out students' misperceptions, making connections with course content from diverse sources, and responding to students' technological issues. Palloff and Pratt (2003) reiterated this description of instructor presence, stating that instructor presence entails generally modelling to students how to engage online through their communication and interactions (118). Other scholars have also supported this notion of instructor presence (e.g., Brinkerhoff and Koroghlanian 2007, 386; Martin and Bollinger 2018, 208, 213; Richardson et al. 2015, 259). These descriptions of instructor presence are important, as the interaction and clear communication from the instructor to and with students can be time-consuming, and as a result, their facilitation may be delayed as the number of students who have queries potentially increases with larger classes.

Baker (2010) conducted one of the first empirical studies on the importance of instructor presence (2010), finding that instructor presence was a statistically significant predictor of student affective learning, cognition, and motivation. Baker (2010) also found that synchronous online courses reported significantly higher instructor presence than asynchronous courses. Baker concluded that instructor presence can be established in online courses via instructional design, facilitating productive discourse and direct instruction (23–24).

Researchers at Columbia University studied why instructor presence mattered significantly in online courses (Jaggars, Edgecombe, and West 2013b). They investigated instructor presence because their earlier study (2013a) showed that community college students who took online courses were more likely to withdraw from courses and those who completed online courses performed poorly compared to those who took the same course in-person. Increasing instructor presence positively influenced student success and lowered the attrition rate in online courses. What the researchers found in their investigation was that i) students want to feel that their instructor cares about them, ii) interpersonal communication in online courses is important, and iii) online instructors make minimal use of interactive technologies to achieve these ends. Richardson et al. (2015) suggested that instructor presence positively affects student satisfaction, which coincides with earlier findings about the importance of interpersonal communication and students' desire to feel like their instructor cares about them (see Boling et al. 2012, 123; Liaw 2008).

In addition, in online courses, even those designated as asynchronous, students expect opportunities for enhanced interaction with the instructor using interactive chat platforms (Park and Kim 2020) or synchronous meetings (on videotelephony software programs) for lectures, optional webinars, class discussions, and group or individual office hours. Because students engage with online course material at all hours of the day and on all days of the week, instructors are expected to provide prompt and frequent communication with students not only within, but also outside, normal college and university hours (Stone and Springer 2019). Instructors are also encouraged to maintain a video presence in their courses (Bialowis and Steimel 2019) and to include eye-level recordings of themselves in their pre-recorded videos where they maintain eye contact with their audience (Ramlatchan and Watson 2020; Wong et al. 2021). Because online courses can include assignment scaffolding and weekly graded tasks, instructors must provide ongoing assessments to maintain their instructor presence. They need to provide feedback regularly throughout the course and feedback "should be constructive, actionable, and highly personalized" (McCleskey and Melton 2022, 310). Glazier and Skurat Harris (2021) conducted a study on undergraduate students and found that developing relationships with their instructors mattered more for in-person courses than online classes, whereas online students thought the types of assignments were critical. The development of assignments is undoubtedly connected to a course's learning objectives and class size considerations.

METHOD

Participants

We invited students enrolled in one of several online philosophy courses at a large Canadian metropolitan university to participate in this study. We collected data over several academic terms from September 2020 through to August 2021. We didn't introduce the study to students before the end of their course, when we sent invitations to participate in this study. The 398 students participating in this study were from different faculties and were at different stages of their degree completion, so they were quite diverse. All courses were remote with an asynchronous online delivery due to COVID-19 pandemic emergency measures enacted by the institution. We invited students in courses where the instructor implemented multiple online learning delivery strategies (e.g., providing a combination of lecture notes, pre-recorded lecture videos, optional live webinars, external web links, etc.) to participate in this study. Courses where an instructor only conducted synchronous lectures or where an instructor only provided copies of their written lecture notes, for example, were not candidates for this study. Instructors who had experience teaching online before the pandemic taught the courses under investigation. See Table 1 for a summary of the participants involved in the study.

Courses

Participants from 10 sections of three different courses joined this study. In the first of the three courses, a first-year introductory philosophy course, 131 of the 200 students at the beginning of the term opted to participate. In this course, the instructor expected students to be able to identify and describe the content they were learning and analyze and create arguments. The course offered all required course materials and activities asynchronously. In addition, the instructor divided students into eight tutorial groups— each with a designated tutorial leader—and invited each group to attend an optional, but strongly encouraged, synchronous hour-long weekly tutorial via Zoom. The instructor facilitated three optional synchronous Q&A Zoom sessions in weeks one, five, and 12 of the 12-week course. This was the only course in the study that included weekly tutorials facilitated by teaching assistants. Tutorials provided real-time communication between a member of the teaching team and students.

From the second course, a second-year philosophy course on logic, there were 41 participants, recruited from the 90 students enrolled at the beginning of the course. This instructor expected students to understand and apply knowledge learned and analyze, evaluate, and create arguments by the end of the course. This course had an instructor and one grader. The instructor delivered course content asynchronously with optional hour-long weekly instructor-led webinars. In addition, forum announcements and responses to students' forum queries and via instructional videos by the instructor related instructor presence to students. For the students who emailed the instructor or grader directly, or who made a virtual office appointment, these interactions also constituted instructor presence.

The remaining participants in our study all enrolled in a section of a first-year general education course that was interdisciplinary and had a concentration on critical reasoning and critical thinking. The instructor expected students to understand concepts, as well as apply knowledge learned and analyze, evaluate, and create arguments. Most of these courses were capped at 50 students, and all sections were at maximum capacity at the beginning of the term. For class size at the time of study for each section, see Table 1. There was one smaller course that began with 25 students and a larger course that had graders and 150 students. These courses were all asynchronously delivered with optional hour-long weekly synchronous webinars. Instructor presence was also relayed through forum posts and instructional videos by the instructor. For the students who emailed the instructor or grader directly, or who made a virtual office appointment, that would have also constituted instructor presence. Table 1 provides a summary of the courses under study.

Table 1. Summary of courses and student participants

Term	**Course** **- Year level** **- Type**	**Summary of categories of learning objectives**	**- Delivery** **- Mode**	**Class size:** **- at beginning of term** **- at time of study**	**Number of student participants**	**Percentage of participants**
Fall 2020	- First year - General education	Create, evaluate, analyze, apply, understand	- Accelerated - Asynchronous	Beginning: 50 Study: 45	33	73.3%
Fall 2020	- First year - General education	Create, evaluate, analyze, apply, understand	- Accelerated - Asynchronous	Beginning: 50 Study: 47	21	44.7%
Year 2020-21	- First year - General education	Create, evaluate, analyze, apply, understand	- Sept. to April - Asynchronous	Beginning: 50 Study: 28	12	42.9%
Year 2020-21	- First year - General education	Create, evaluate, analyze, apply, understand	- Sept. to April - Asynchronous	Beginning: 50 Study: 44	24	54.5%
Year 2020-21	- First year - General education	Create, evaluate, analyze, apply, understand	- Sept. to April - Asynchronous	Beginning: 25 Study: 15	11	73.3%
Winter 2021	- First year - General education	Create, evaluate, analyze, apply, understand	- Accelerated - Asynchronous	Beginning: 50 Study: 37	24	64.9%

Winter 2021	- First year - General education	Create, evaluate, analyze, apply, understand	- Accelerated - Asynchronous	Beginning: 50 Study: 46	23	50%
Winter 2021	- First year - Philosophy major or elective	Create, analyze, understand	- Jan. to April - Asynchronous - Eight tutorial groups with a tutorial leader, with optional synchronous weekly meetings	Beginning: 200 Study: 190	131	68.9%
Summer 2021	- First year - General education	Create, evaluate, analyze, apply, understand	- Accelerated - Asynchronous - Four graders	Beginning: 150 Study: 115	78	67.8%
Summer 2021	- Second year - Philosophy major or elective	Create, evaluate, analyze, apply, understand	- Accelerated - Asynchronous - One grader	Beginning: 90 Study: 66	41	62.1%

Materials

Given the universal pivot to online learning at the time, we developed this study as a formative exploration and utilized an online questionnaire with multiple-choice questions. The first nine questions sought general information about the participant (e.g., demographic, student level, etc.) and their experience with e-learning. Questions that investigated the participants' experiences related to instructor presence within the course followed. Three senior researchers reviewed the literature and agreed on the questions to capture instructor presence in asynchronous courses. The phrasing and content of the questions stemmed from the important attributes of instructor presence, which include instructor interaction and communication style and the frequency of the instructor's input into online class discussions and communications, as commonly defined by Anderson et al. (2001) and Palloff and Pratt (2003). The questions explored the various ways instructor presence took form in an online learning environment (e.g., quality of feedback; timeliness to student queries; contact between a member of the teaching team and student; etc.). We cannot ensure reliability and validity with this questionnaire. Even so, we demonstrate that the results support others' findings concerning instructor presence and class size. This is discussed further in the section below on limitations. See Table 2 for the survey questions.

Table 2. Questionnaire

Question	**Response Type**
1. What is your gender?	Multiple choice, closed-ended
2. How many years have you been a post-secondary student?	Multiple choice, closed-ended
3. What is your experience with online courses (excluding the last month of the winter 2020 term)?	Multiple choice, closed-ended
4. Is this six-credit course offered in a 12 or 24 week-format?	Multiple choice, closed-ended

5. What was your primary device for accessing Moodle and course content (choose as may answers as apply)	Multiple choice, multiple response
6. I had a back-up device for accessing Moodle and course content if my primary device was broken or unavailable.	Multiple choice, closed-ended
7. I could use my device easily to access all required course content provided on Moodle.	Multiple choice, closed-ended
8. I could easily access electronic textbooks and course readings on my primary device.	Multiple choice, closed-ended
9. My primary device supported my participating in this course both synchronously (e.g. Zoom, Moodle chat room, etc. . .) and asynchronously (e.g. Moodle forums and discussion groups).	Multiple choice, closed-ended
10. The course instructor/teaching team provided prompt feedback on my assignments.	Likert
11. I was able to get course help when I needed it.	Likert
12. The course instructor/teaching assistant responded to my emails and/or other queries.	Likert
13. It was easy to schedule a virtual appointment (e.g. Zoom, Moodle chat room, etc.) with the course instructor/teaching assistant.	Likert
14. The course instructor seemed to care about students, our progress, and our successful course completion.	Likert
15. The course instructor created a welcoming learning environment.	Likert
16. If I had problems with Moodle, or accessing course content, help from my course instructor was available when I needed them.	Likert
17. The course instructor created an inclusive classroom atmosphere.	Likert

Procedure

We invited students from all 10 courses to participate in the study near the end of their respective semesters. We made the relevant information and link to the password-protected online survey available on each course's learning management system. The study was not introduced to students before this invitation to participate. All students who participated in the study gave consent to have their answers to the questionnaire studied, following procedures approved by the Human Participants Review Sub-Committee of our institution's Ethical Review Board.

Data analysis and results

We used SPSS statistical package software to analyze the data. Using the enter method to assess whether class size was predictive of students' ratings of instructor presence, we conducted a regression analysis. Online constructs that contributed to instructor presence helped determine the "instructor presence" variable. In this study, these included various forms of communication and interaction with the instructor (e.g., assignment feedback, assistance, response to emails, availability for synchronous meetings on Zoom, etc.).

Regression analyses

An analysis of standard residuals revealed that the data contained 10 outliers (we considered values less than -3.29 or greater than 3.29 as outliers). The outliers were removed resulting in a standard residual minimum value of -3.216, and a standard residual maximum value of 1.237. Multicollinearity was not a concern (Tolerance = 1.00, VIF = 1), and the data met the assumption of independent errors (Durbin-Watson value = 1.907). The data contained approximately normally distributed errors, as demonstrated by the histogram of standardized residuals and the normal P-P plot of standardized residuals, which showed points that were close to being on the line. The scatterplot of standardized predicted values indicated that the data also met the assumptions of homogeneity of variance and linearity. The data also met the assumption of non-zero variances (Instructor Presence, Variance = 10.690; Class Size, Variance = 65.427). Using the enter method, we found a significant regression equation ($F_{(1, 386)} = 25.069$, $p < .001$), with an R2 of .06. Students' predicted rating of instructor presence is equal to 95.279 - .040 (Class Size). Participants' predicted rating of instructor presence decreased by .040 percent for each additional student enrolled in the course ($\beta = -.247$, $t(386) = -5.007$, $p <.001$).

Results

Survey responses showed that the number of students enrolled in a course impacted instructor presence. Students rated their instructor (or the teaching team where applicable) as less successful in facilitating overall instructor presence as the class size increased. In the discussion below, we discuss how results from questions suggest that smaller class sizes with higher-order thinking learning objectives yield more satisfied students. Here we summarize some key results.

Question 10, "I was able to get course help when I needed it," showed that 91% of students (n = 136) in a class size of 50 students agreed they could always or often seek assistance, while 69% of students (n = 127) in a class size of 200 students agreed. Question 11, "The course instructor/teaching assistant responded to my emails and/or other queries," revealed that 69% of students (n = 127) in a class size of 50 students agreed that they always received responses from the instructor or teaching team, whereas only 38% (n = 115) in a class size of 200 students reported always getting a response to their queries.

Questions that related to i) an instructor's care for students and/or ii) whether the instructor provided a welcoming course environment yielded the following results. Question 13, "The course instructor seemed to care about students, their progress, and their successful course completion," showed that 78% of students (n = 81) in a class size of 50 students agreed that this was always the case, but in a course of 200 students this dropped down to only 54% (n = 78). While 74% of students (n = 133) in a class size of 50 students strongly agreed that "The course instructor created a welcoming learning environment" in question 14, this dropped to 53% (n = 122) in a class size of 200 students. This trend is consistent across all questions in the survey.

Results from a question that asked whether students were able to receive technological assistance related to the learning management system when they sought such help demonstrated a stark difference between smaller and large class sizes. 80 to 85% of students (n = 135, 41, 78) in courses with 50 to 150 students strongly agreed that they could receive help (see Table 3 for details per course size). In a course of 200 students (n = 126), this number dropped to 60% of students. Technological hurdles usually get directed to the instructor, before being triaged to campus technological assistance. If there was a failure to address students' technological concerns promptly, this could contribute to student dissatisfaction with the learning environment itself as well as the efficacy of instructor presence. See Table 3 for all data collected.

Table 3. Summary of data

Class size: 25

Question	Always	Often	Sometimes	Seldom	Never	Total responses
10	63.6	36.4	0	0	0	11
11	90.9	0	9.1	0	0	11
12	100	0	0	0	0	11
13	100	0	0	0	0	10
14	90.9	0	9.1	0	0	11
15	81.8	9.1	9.1	0	0	11
16	66.7	33.3	0	0	0	9
17	90	10	0	0	0	10

Class size: 50

Question	Always	Often	Sometimes	Seldom	Never	Total responses
10	54.4	36.8	5.9	2.9	0	136
11	68.5	17.3	11.0	0.8	2.4	127
12	78.6	17.1	2.6	0.00	1.7	117
13	77.8	16.1	3.7	1.2	1.2	81
14	73.7	16.5	5.3	2.3	2.3	133
15	80.0	14.1	3.7	0.7	1.5	135
16	61.0	27.0	10	1.0	1.00	100
17	67.9	26.7	2.3	1.5	1.5	131

Class size: 90

Question	Always	Often	Sometimes	Seldom	Never	Total responses
10	29.3	46.3	19.5	4.9	0	41
11	44.4	38.9	13.9	2.8	0	36
12	83.3	10	6.7	0	0	30
13	60.7	39.3	0	0	0	28
14	63.4	29.3	7.3	0	0	41
15	80.5	12.2	7.3	0	0	41
16	70.6	23.5	5.9	0	0	17
17	68.4	23.7	5.2	2.6	0	38

Class size: 150

Question	Always	Often	Sometimes	Seldom	Never	Total responses
10	52.1	35.6	9.6	1.4	1.4	73
11	75.8	16.7	4.6	3.0	0	66
12	88.5	8.2	1.6	1.6	0	61
13	70.4	16.7	13	0	0	54

14	79.5	16.7	3.9	0	0	78
15	84.6	14.1	1.3	0	0	78
16	76.7	16.7	5	1.7	0	60
17	69.3	22.7	8.00	0	0	75
Class size: 200						
Question	Always	Often	Sometimes	Seldom	Never	Total responses
10	37.0	32.3	24.4	4.7	1.6	127
11	38.3	37.4	20.9	3.5	0	115
12	68.8	24	5.2	0	2.1	96
13	53.9	28.2	11.5	5.1	1.3	78
14	52.5	27.1	12.3	5.7	2.5	122
15	59.5	24.6	11.1	4	0.8	126
16	45.7	33.3	11.1	7.4	2.5	81
17	57	24.6	11.4	2.6	4.4	114

Breakdown of responses to the questionnaire based on class size. Figures are percentages and questions are shared in Table 2.

DISCUSSION

All courses surveyed in this study were lower-level courses, designed to teach thinking and reasoning skills. However, even though these were lower-level courses, their learning outcomes aligned more closely with constructivist theories and the upper levels of Bloom's taxonomy (Bloom et al. 1956). On Bloom's taxonomy of cognitive skills, the skill types relevant to the courses were: applying, interpreting, evaluating, analyzing, arguing, defending, supporting, constructing, investigating, and others (Krathwohl 2002, 215). These cognitive skills contrast with those related to remembering or understanding knowledge (objectivist knowledge). The knowledge was constructivist in nature, as students developed evaluations and analyses of discourse as well as created arguments and ideas of their own. This type of skills-based learning requires continued practice and feedback to successfully apply and augment the skill in question. Receiving similar formative feedback is also important for students who are practicing textbook exercises or homework assignments in critical thinking or informal logic, engaging in class discussions, and completing low-stakes formative assessments before major assessments (e.g., participation tasks). Ongoing formative feedback can assist in providing a meaningful and engaging active learning experience (Owen 2016). This type of consistent and timely feedback is important for both student learning and continued motivation, which is crucial for students learning independently in the online environment. The results of the study, coupled with the learning objectives and instructional strategies of the courses studied, suggest that smaller class sizes would be more appropriate for these types of courses.

Two survey questions that specifically focused on students' ability to receive feedback were questions 10 (I was able to get course help when I needed it) and 11 (The course instructor/teaching assistant responded to my emails and/or other queries). This type of feedback requires a relationship between the instructor or teaching team and the students seeking clarifications and guidance about the course. 91% of students in a class size of 50 students reported that they were able to get course help when needed; this percentage dropped to 69% of students in a class of 200 students. Because the sample size is quite small, we did not mention the results from a course with 25 students (n = 11); however, 100% of students reported that they always or often received assistance and guidance when requested. Furthermore, we stated that 68% of students in a class size of 50 students strongly agreed that instructors responded to their emails or other queries (e.g., Q&A forum on the Learning Management System), whereas 38% in a class size of 200 students strongly agreed. This jumped up to 91% in a class with 25 students (n = 11). In these instances, the data demonstrates the challenges that students in larger online courses face when accessing experts in the course material for assistance, guidance, clarification, validation, and so on. This also results in poor modelling strategies by the instructor and/or teaching team, making it challenging for students to apprehend online etiquette or learning strategies.

This brings us to two main misconceptions when it comes to the literature on class size. First, class size is assumed to be relative—there is no agreement on what constitutes small, medium, and large online classes. A large university's small class size (50–75 students) is a different institution's large class size (e.g., a small liberal arts college, or an institution that values a small teacher-student ratio). It is also not always clear how departments, faculties, or institutions make decisions about appropriate class sizes in the online environment. There are various factors to weigh in making such decisions; for example, budgets or faculty availability are physical constraints that could trump course learning goals or student needs. The second misconception is that lower-level courses are usually on the objectivist end of the continuum. Following this assumption, lower-level online courses may be larger in scale because they are assumed to have learning objectives that are lower in Bloom et al.'s (1956) taxonomy (e.g., memorizing, repeating, or reporting knowledge learned). However, the courses we studied defy this assumption, as they all teach critical thinking and reasoning skills which require higher-order thinking.

The implications of these misconceptions for philosophy or critical thinking courses, generally, correspond directly with the findings in our study. We can make the case that philosophy courses should not be super-sized—even if they are lower-level courses and especially if they are online courses. These courses teach important skills that students utilize in their other academic courses and their lives outside of the academy. Critical thinking courses, even at the introductory level, always fall on the constructivist end of the continuum as students are asked to deconstruct, restructure, and transform the course content to contribute critical insights and create original arguments. To make our point with an analogy, very few of us become excellent musicians, athletes, carpenters, and so on without coaching and guidance, whereas many of us can repeat the weather forecast or report what we heard in a podcast without assistance. If students in these types of (large) online courses are experiencing diminished instructor presence, or they cannot access their instructor or someone from the teaching team, the trickle-down effect impacts their ability to master the skills promised in the course's learning objectives.

Limitations and future research

Several limitations challenge the ability to derive concrete conclusions regarding appropriate class size in online courses. We know that smaller online class sizes are linked to student development and engagement with challenging material: higher-order thinking, deeper levels of personal interactions, participation, and connectedness, socially constructed understandings, individualized faculty feedback, creative assignments, full access to faculty expertise, and positive reviews of faculty (Taft, Kesten, and El-Banna 2019, 217). However, there is no consistency in determining what constitutes a small, medium, and large class size. This is compounded by the delivery of courses with an instructor versus an instructor and teaching assistants. The types of student support offered in a course where a teaching team offers a lower teacher-student ratio do not imply that the expectations regarding instructor presence are automatically fulfilled. A further study that investigates online courses taught by a teaching team could potentially challenge the assumption that large courses with tutorial groups fulfill the important role of instructor presence.

In this study, 88.5% of student participants enrolled in courses where the "first-year experience" (FYE) was paramount. Literature discussing FYE emphasizes the importance of teaching students' resilience and that institutional student retention rates can be impacted for the better when FYE courses are successful (Brewer et al. 2019; Wilcox, Winn, and Fyvie-Gauld 2005; Yan and Sendall 2016). One could argue that a course delivery with its focus on student-centered learning and a sense of community would benefit many lower-level online courses (Darby and Lang 2019; Felten and Lambert 2020).

There are limitations to our empirical research. In terms of the students surveyed, philosophy course enrollment ranged from 25 to 200 students. In pedagogical scholarship, more researchers should perform studies like this, looking at courses that span different sizes, within different disciplines, and with varying learning objectives. This, at the very least, will further confirm the findings from Taft, Kesten, and El-Banna (2019) and our study's formative results that align with the research. In addition, if student participants are categorized as beginner, experienced, and expert online learners, data can then be compared between groups to determine potential trends.

We recognize that it is challenging to discuss successful instructor presence in online courses without looking at an instructor's cognitive load. If an instructor has three courses with 50 students in each class, for example, that load will impact instructor presence (e.g., providing timely and substantive feedback for all students across those courses). The cognitive load associated with teaching different courses is a concern to factor into an instructor's ability to expand their online instructor presence. These concerns related to instructor capacity can directly affect students' evaluations of both instructors and the corresponding course, as the literature reports that positive student evaluations of instructors and course satisfaction are associated with smaller class sizes (Taft, Kesten, and El-Banna 2019, 216).

We have limited the discussion in this paper to mainly focus on instructor presence, online course learning objectives, and online class size. In addition to investigating instructor cognitive load, we see another avenue of study to traverse related to online communities. The community of inquiry model sets the framework for a sense of community in the online classroom (Anderson et al. 2001; Garrison, Anderson, and Archer 2000). There are benefits to an online community—from student motivation to student engagement (Trespalacios et al. 2021). Online communities require, to varying degrees, implementing care pedagogy— something implied in discussions related to student-centered pedagogy. Whether and how instructor cognitive load and care pedagogy impact (or are impacted by) online instructor presence and online class size would also benefit from future study.

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ETHICS

The York University institutional ethical review board approved this research.

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