

Assessing Student Engagement in Small and Large Classes

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1. Abstract:

In higher education, instructors tend to adopt pedagogical classroom approaches according to the number of students attending the class. In small size classes, for example, teachers tend to adopt an interactive approach in which students are actively involved in discussing the content of the lessons within the familiarity of a classroom community. On the other hand, in large size classes, for various management and traditional reasons, instructors tend to rely on lecture and question formats in which students are often required (but not always) individually to ask and respond to questions in order to clarify specific issues and achieve predetermined learning objectives. However, despite these widely held beliefs about pedagogical classroom approaches within higher education, there is very little evidence about the impact of class size on student interaction and achievement of learning objectives. In this study, action research methodology was employed to investigate the impact of class size on the student interaction and the achievement of learning objectives. We compared the outcomes in both large and small class teaching settings in which the same instructor employed similar pedagogical approaches. Data suggest that a large size class inhibits the spontaneous amount of time students spend discussing and interacting compared to the amount of time students spend interacting in a small size class. Predetermined learning objectives, however, were met in both large and small classes although the degree of student interaction is likely to affect the quality of learning. These findings suggest that in large size classes students are less willing to interact spontaneously during the class, unlike that in small size classes. Recommendations are made to enhance classroom communities and interaction in large classes, as well as implications for the strategic use of large size classes in final, rather than introductory, courses in the undergraduate experience.

Key Words:

Academia, interaction; lecture; students, teacher, teaching approaches

2. Introduction

Fiscal constraints and administrative policies have resulted in an increasing use of large class teaching in higher education, particularly with introductory courses at the undergraduate level. Despite a long-running debate over class size differences in public school settings, very few studies have assessed the impact of class size on the student learning experience in academic contexts (e.g. Arias, & Walker, 2004; Blatchford, Edmonds & Marin, 2003; Karakaya, Ainscough, & Chopporian, 2001). The studies performed at the university level have mainly focus on the relationship between class sizes and students' performance as means of predictor for effortful study behaviour

(Fenollar, Roman, & Cuesta, 2007). These studies suggest that in small classes students perform better in terms of learning achievements, whereas in large classes students are more prone to distraction and feelings of anonymity, which can negatively affect student achievement. Despite these pedagogical concerns, instructors tend to adopt traditional classroom teaching practices according to the number of students attending the class. In small size classes (from approximately 20 up to 50 students), for example, interactive discussions are often used to facilitate optimal learning environments and critical thinking (McKeachie, 1990; National Survey of Student Engagement 2005; Raimondo, Esposito, & Gershenberg, 1990; Shavelson & Huang, 2003). Indeed, smaller classes allow for more personalized instructions regarding the expectations that teachers have for and from students and how they can achieve learning goals (Scheck, Kinicky, & Webster, 1994). Furthermore, small classroom community contexts often foster positive teacher-student and student-student relationships that are more likely to enhance mutual responsibilities for achieving learning objectives.

In contrast, for various management and traditional reasons, instructors of large size classes (from approximately 50 to 1000 students) tend to rely on lecture and question formats in which students are often required (but not always) individually to ask and respond to questions in order to clarify specific issues and achieve predetermined learning objectives. In large size classes, therefore, students are more likely to experience a sense of anonymity, passive learning and distraction which can have negative impacts on student learning, attrition and motivation for further learning. Although some evidence is provided with respect to the benefits of specific teaching approaches according to class size (Arias, & Walker, 2004; Fenollar, Roman, & Cuesta, 2007; Karakaya, Ainscough, & Chopporian, 2001), in most cases teachers adopt different teaching approaches based on limited pedagogical assumptions and evidence about the impact of class size on student interaction and achievement of learning objectives.

In this study, action research methodology was employed to investigate the impact of class size on student interaction and achievement of learning objectives. Outcomes were compared in both large and small class teaching settings during which the same instructor using similar pedagogical approaches were employed.

3. Method

Two different classes were employed in this study. The first class involved approximately 150 attendees and took place in a large Auditorium room. The attendees were different professionals and experts all affiliated with the Faculty of Medicine of the University of British Columbia, referred to as a "large size class". The second class included 17 attendees, and took place in a small boardroom that has a maximum capacity of 25 people, referred to as "small size class". Similarly to the large size class, the people attending the small size class included professionals (i.e. occupational therapists) affiliated with the same Faculty of Medicine.

With the same instructor, the content and pedagogical approaches were kept similar for both the large and small size classes. The topic of the classes for the medical professionals focused on "orientation abilities within the environment, the different

strategies used for orienting, the neural mechanisms supporting this ability, and the effect of brain damages on orientation”.

A 2-hour lecture plan was developed for each class that included approximately 20 slides, with an interactive introduction (e.g., prior learning assessment question and answer period), new material (e.g., 45-minutes of traditional lecture, slides and questions), participatory phase (e.g. group problem-task below) and closure phase for each class. The lecture plan was developed by focusing on students' specific knowledge, abilities and skills. For example, students were expected to be able to (1) think critically about the neural mechanisms underlying orientation skills (2) assess case-specific studies of brain-damaged patients with orientation disorders, and (3) to reflect on their own strategies and identify alternative strategies useful for orientation. The participatory phase of the lecture involved a group problem-task ($n=3$'s) for the audience that required participants to share within a small group their personal feelings about 'orientation abilities' (e.g., “ How good or bad is your sense of direction?”). For the purpose of analysis, this time is referred to as “Direct-Question-Time” (DQT). In addition, the new material was intentionally divided into three sections. At the end of each sub-section there was a slide reporting the summary of the section followed by prompts for attendees to ask or respond to questions. Thus, attendees had chance to ask questions as “Question-Time1” (QT1), “Question-Time2” (QT2), and “Question-Time3” (QT3) respectively. The difference between DQT and the three QT1, 2, 3 refers to the active involvement in the lecture (i.e. DQT), or having the opportunity to do so by spontaneously deciding whether or not to interact and discuss the content of the lecture (i.e. QT1, QT2, QT3). The amount of time attendees spent in commenting, discussing or asking questions during the DQT, as well as during the QT1, QT2 and QT3 were monitored using classroom video recordings, frequency count of the number of students interacting during the classes, and a stopwatch.

The impact of class size on learning objectives was assessed at the end of the lesson by asking students to complete a 1-page self-reflective evaluation form. The evaluation form included five different statements to which attendees respond subjectively by using a Likhert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). The statements were the following: 1) Objectives were met; 2) Knowledge of the subject was comprehensive; 3) Relevance/practice applications were highlighted; 4) This information will influence my practice and lead to change; 5) My interest in learning more about the subject has increased. For each statement, score-differences between classes were analyzed by means of t-test comparisons.

Learning objectives for both the small and large classes were assessed during and at the end of the classes through a question and answer period, recorded group problem-tasks, analysis of classroom video recordings, and the 1-page student evaluation forms (Angelo & Cross, 1993).

4. Results

Spontaneous interactive discussion

In the large class size, three out of 150 students responded to the DQT by sharing their sense of direction. The interaction between these students lasted 2 minutes and 30 seconds. None of the students responded to interactive prompts at QT1, QT2 and QT3.

In the small class size, 11 out of 17 students responded to the DQT. Their interaction lasted 13 minutes and 30 seconds. Students were actively involved in sharing their experience regarding their own topographical orientation skills. At the QT1, QT2 and QT3, 15 students interacted among each other and with the instructor for a total of 37 minutes and 30 seconds. In figure 1, the amount of time that the students spent in interacting in both large and small size classes is reported.

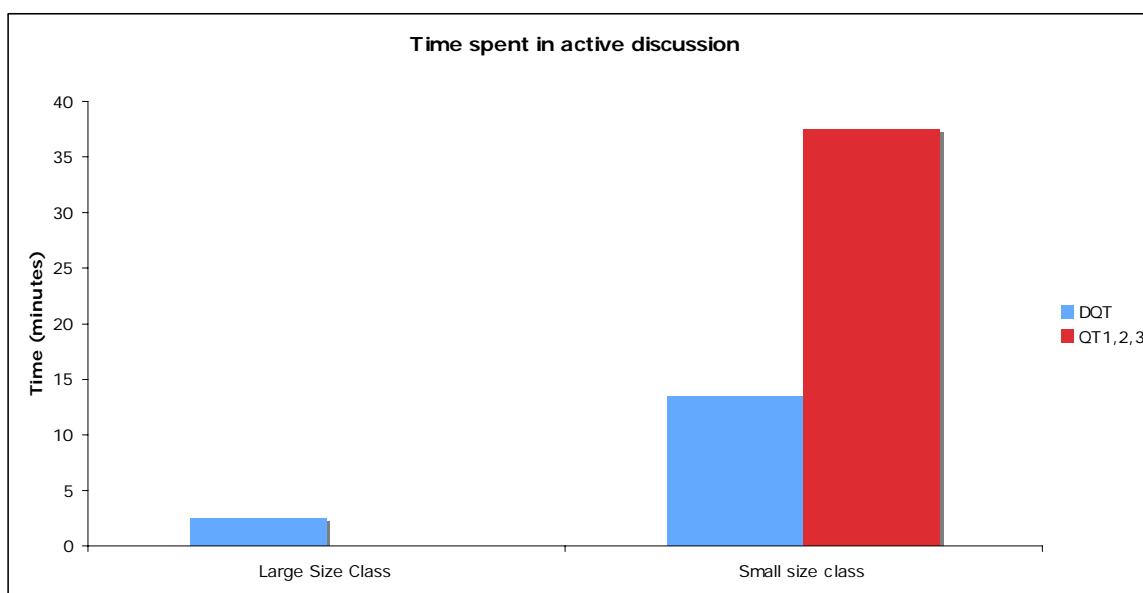


Figure 1. The diagram shows the amount of time that students spent in active discussion at DQT and QT1, 2, 3 according to the class size. No time spent at QT1, 2, 3 in the large size class.

Learning objectives

According to the students' self-reports, in both large and small classes the learning objectives and other factors related to the learning experience were achieved in a similar way. Significant differences between classes were revealed from the statement "This information will influence my practice and lead to change" ($t= 4.45$, $p= 0.0006$). From this statement, the small size class reported higher scores (mean= 4.75) compared to the large class (mean= 3.27), most likely because of the more homogeneity of the students attending the small class. Indeed, occupational therapists (small class) may benefit more than any other professionals in learning about topographical orientation and memory impairments occurring in patients with brain damage (which was an integral component of the lesson). Figure 2 displays, for each statement, the mean scores reported by the students while attending both the large and small size classes.

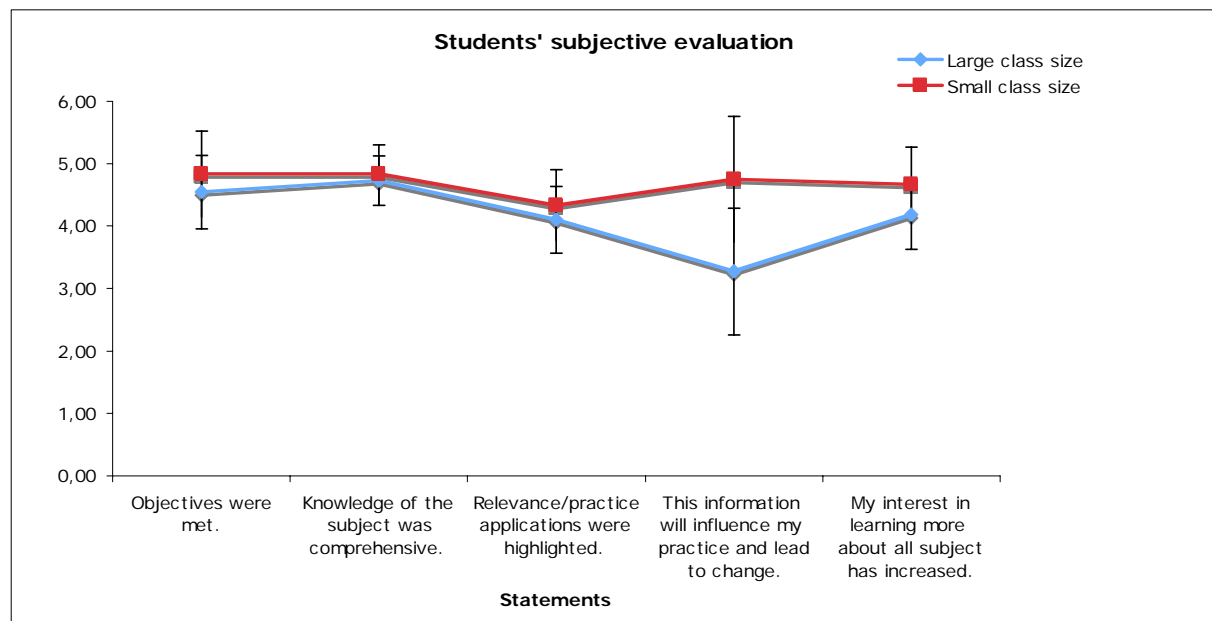


Figure 2. The diagram shows the mean scores (and standard deviations) reported by the students while answering the five statements of the evaluation form.

5. Conclusions

In this study we investigated the effect of class size with respect to three issues: (1) the occurrence of spontaneous interactive discussion, (2) the accomplishment of learning objectives, and (3) whether or not the size of the class has an effect on other important factors contributing to the achievement of a learning experience such as its influence on the students practice, or the students' increasing interest regarding the material acquired in the class.

The findings from this action research study suggest that in a large size class students are not keen to participate in spontaneous interactive discussion during the lecture format. Only three out of about 150 students actively participated in discussing the topic of the lesson during the class, spending a total of 2.5 minutes doing so. On the other hand, in the small size class, 15 out of 17 students were engaged in active discussion throughout the entire duration of the class, spending a total time of more than 50 minutes in doing so. One may note that in this study, students in both large and small size classes were given the same opportunities to be involved in active discussion, and in an identical manner. In addition, in order to focus on the interactive discussion occurring during the class, discussion and interaction that occurred at the end of the class was excluded from the analyses. Thus, the differences among classes in both the number of students engaged in spontaneous interaction and the amount of time spent in discussing the content of the class (which are surely related) clearly show that small size classes provide more optimal learning conditions to trigger spontaneous active discussion among students (Scheck, Kinicky, & Webster, 1994), either when a direct involvement is required (DQT) or when students are only given opportunities for a spontaneous active participation (QT1, QT2, QT3). This effect could be also explained by the different approaches that students may take while attending a large or small

class size. Indeed, students may feel that in a large size class, an active discussion and interaction during the lesson is inappropriate, or they may feel embarrassed to do so in front of so many colleagues. On the other hand, in a small size class, the environment is very different (less intimidating), students may feel more protected and free to interact with the instructor and among themselves, most likely because they already know each other, resulting in positive short and long-term study outcomes. These insights have important implications for curriculum design in which senior undergraduate students may be better positioned to participate in large size classes, while enabling first and second year students to strategically participate in small size class introductory courses, particularly when academic units are facing decreasing budgets (Hubball, Mighty, Britnell, & Gold, 2007; Hubball, & Gold, 2007; Fenollar, Roman, & Cuesta, 2007). There are many suggestions in the literature for enhancing active learning in large size classes (Geldoff, 1998). For example, creating a classroom community in large classes is key to active discussion and interaction. This occurs by organizing and using small group work, cluster groupings within the lecture hall, as well as addressing problems and questions at the large class level, rather than simply relying on responses from single students. These strategies are intended to foster a sense of course/classroom identity, as well as enhance student motivation and attention to learning material.

Interestingly, scores reported in the self-evaluation form revealed that in both large and small size classes, students reported similar scores regarding the perceived achievement of learning objectives. These data corroborated with the instructor's reflection notes pertaining to the classroom question and answer periods, recorded group problem-tasks, analysis of classroom video recordings, and the 1-page student evaluation forms. These data suggest that learning objectives can be adequately addressed in both small and large classes, depending on the employment of learning-centred teaching methods, however, the extent and quality of learning objectives are likely to differ based on student engagement conditions for each class size.

Other reflective statements presented in the student evaluation forms were highly rated irrespective of class size (Raimondo, Esposito, & Gershenberg, 1990), suggesting that, from a student's perspective, learning in large classes can be effective, depending on the employment of learning-centred teaching methods. However, the quality of the learning experience (e.g., direct personal experience and student interaction), the long-term benefits, and the readiness of learners to effectively cope and thrive in large size class sizes are critical factors that are more likely to occur in small size classes. Future studies are necessary to provide evidence about the impact of class size on the quality of learning.

In summary, this study provides evidence that interactive discussion may occur easily in small size classes compared to large size ones. Data suggest that a large size class tends to inhibit the spontaneous amount of time students spend discussing and interacting compared to the amount of time students spend interacting in a small size class. These findings suggest that in large size classes students are less willing to interact spontaneously during the class, unlike that in small size classes. Predetermined learning objectives, however, can be met in both large and small classes although the degree of student interaction may affect the quality of learning. Recommendations are made to enhance classroom communities and interaction in large classes, as well as

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