

## Classrooms Without Walls: A Comparison of Instructor Performance in online Courses Differing in Class Size

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### Abstract

It is difficult to deny that online learning has had steady growth in recent years. A benefit to any institution implementing online courses is not needing a physical space for a group of students. In an online classroom, there are no physical barriers limiting the number of desks that can be placed in the classroom. With the potential to have larger class sizes, how might that affect instructors' ability to perform their teaching duties? The purpose of this study was to look at instructors' performance while teaching online courses and how class size might influence their performance. The results of this study suggest that there may be some negative consequences in terms of instructor performance and the quality of instruction in online courses with larger class sizes.

**Key Words:** Online Learning, Instructor Expertise, Instructor Feedback, Quality Instruction, Higher Education

### Introduction

With no restrictions on physical space, online classrooms offer a prime opportunity to fit a large number of students into a single class. What might this mean for the quality of instruction? If you were to ask someone which situation would result in a higher quality of instruction: a class with one instructor and 10 students, or, a class with one instructor and 50 students, it probably would not be a surprise if the answer is the former. Typically, the thought is that smaller class sizes allow for more meaningful student-to-instructor interaction and a higher quality of instruction. Despite its growth, there is still skepticism when it comes to online learning. Whether it is the quality of the course, lack of interaction (Maguire, 2005), the quality of the students enrolling (O'Quinn & Corry, 2002), or the quality of learning and/or instruction, online courses have been under scrutiny. In relation to class size, some instructors feel that the quality of instruction is questionable in online courses with larger class sizes (Parker, 2003; University of Illinois, 1999 as cited in Orellana, 2006).

The purpose of this study was to examine instructor performance, which might reflect the quality of instruction in regards to online class size. Instructor performance was measured through peer reviews of online faculty in the areas of: fostering critical thinking, providing instructive feedback, maintaining high expectations, establishing relationships, and exemplifying instructor expertise. Class size was defined as the number of students still enrolled at the end of the course.

### Research Questions

The following will serve as the research question for this study:

1. What differences, if any, exist between class size and instructor performance as measured by fostering critical thinking, providing instructive feedback, maintaining high expectations, establishing relationships, exemplifying instructor expertise, and average peer review score?

### Literature Review

Literature has suggested that teaching an online course takes more time when compared to a face-to-face course (Berge & Muilenburg, 2001; Cho & Berge, 2002; Mupinga & Maughan, 2008). Furthermore,

multiple studies have found that instructors view the increased time needed to teach an online course as an obstacle of online teaching (Betts 1998 as cited in Cook et al, 2009; DiBiase, 2004; O'Quinn & Corry, 2002; Rockwell et al, 1999; Wolcott & Betts, 1999). In a study conducted by Bender, Wood, and Vredevoogd (2004), time-on-task for teaching a face-to-face (f2f) course versus teaching the same course online was compared. The f2f course consisted of 111 students who were facilitated by 38 teaching assistants, while the online course consisted of 18 students who were facilitated by five teaching assistants. Results from this comparison showed that although more time was spent in the f2f course due to the higher number of students, when examined on a per student basis, more time-on-task was seen in the online course. The more time required per student in the online course as seen in by Bender, Wood, and Vredevoogd (2004) might suggest that class size could further influence the amount of time needed to teach an online course. Although research has suggested more time is needed to teach an online course, Maguire (2005) notes that time devoted to teaching or developing online courses is not as highly regarded by some administrations as is time spent on research or teaching face-to-face courses.

Online class size in relation to various factors in the online classroom has been a focus of some research in the past. One factor that was examined was interaction. Upon surveying 131 instructors, Orellana (2006) found that on average, a class size of 15.9 students was seen as optimal by instructors to achieve a high level of interaction. The average class size in this study conducted by Orellana (2006) was 22.8. Reonieri (2006) examined various issues in regards to effective online discussions. Among the issues discovered was class size. Reonieri (2006) defined an online class containing 5-10 students as "small" and an online class containing 15 or more students as "large." When surveyed on their perception of participating in online discussions in a class labeled as "too small," 60% of students and 78% of faculty stated there were negative effects such as a limited number of perspectives or too few interactions in the discussion. When surveyed on their perception of participating in online discussions in a class labeled "too large," 94% of students and 94% of faculty stated there were negative effects such as being overwhelmed by the number of responses or having difficulty following the posts made in the discussions.

Attempts to discover what is an optimal class size in online courses has been carried out, but the results of past studies appear to be mixed. Taft et al (2011) present a summary of studies examining online class size recommendations. Some suggest smaller class sizes ranging from 4-12 students (Berry, 2008; Blood-Siegfried et al., 2008; Buckingham, 2003; Rovai, 2002; Schellens and Valcke, 2006). Others suggest slightly larger class sizes ranging from 20-30 students (Arbaugh and Benbunan-Fich, 2005; Arbaugh, 2005; Dykman and Davis, 2008; Keeton, 2004). Furthermore, some offer no recommendations (Andersen and Avery, 2008; DiBiase and Rademacher, 2005).

## Methods

This study was conducted using data collected during the 2013 Peer Reviews of 380 part-time online instructors within the College of Education (COE) at a large for-profit University. The courses reviewed consisted of both undergraduate and graduate courses (217 and 163 respectively). A minimum of a Master's degree was required to teach undergraduate courses and a Doctorate to teach graduate courses. Upon being hired by the university, the part-time instructors were approved to teach courses in the COE that best aligned to their area of expertise within the field of education, their educational degree, and their professional experience. In addition, most of the part-time instructors who were reviewed had taught a minimum of five courses within the COE at the university. The following presents the major steps in the peer review process and method of calculating peer review scores:

**Step 1:** There were 24 full-time faculty members involved in the 2013 COE Peer Reviews. For each part-time instructor being reviewed, two full-time faculty members were assigned to review a course that they had recently taught.

**Step 2:** Individually, each full-time faculty member reviewed the part-time instructor's course. Using the COE Peer Review Rubric, each full-time faculty member assigned a score in the following areas: Fostering Critical Thinking, Providing Instructive Feedback, Maintaining High Expectations, Establishing Relationships, and Exemplifying Instructor Expertise. Each area could be awarded a score from 0 to 4 (0= *Not Observed*, 1= *Beginning*, 2= *Developing*, 3= *Proficient*, and 4= *Distinguished*).

**Step 3:** Upon finishing their reviews, the two full-time faculty members met to discuss their scores. The outcome was a single agreed upon score for each of the five areas on the peer review rubric. Averages were not calculated except for the final overall peer review score. For example, if one full-time faculty member scored Instructive Feedback at a 3 and the other scored Instructive Feedback at a 4, they would agree on either 3 or 4, not 3.5.

**Step 4:** Once a single score was calculated in each of the five areas on the rubric, the five scores were averaged to create a single overall peer review score.

Table 1 presents the definitions for each of the five areas on the peer review rubric at the *Distinguished* level (Wardlow et al, 2011):

Table 1.

*Distinguished Definitions for the Peer Review Criteria*

Areas	Definition
Fostering Critical Thinking	Challenging students to elaborate on their thoughts, question their assumptions, examine biases, communicate in a clear and concise manner, and defend their positions throughout the course.
Instructive Feedback	Providing feedback that challenges and inspires students, while providing specific suggestions to improve the quality of their work and thinking.
High Expectations	Demonstrating high expectations throughout the course, while holding students accountable for insightful exchanges and high quality performance on assignments, and promoting active engagement in their own learning.
Establishing Relationships	Creatively uses available tools (Announcements, Instructor Guidance, Faculty Expectations, Ask Your Instructor, Emails, Discussion Forum) and strategies to enhance relationships, creating a community of learners willing to take risks and actively engage with one another.
Instructor Expertise	Effectively and consistently utilizes expertise in subject matter by providing personal experiences, connecting course knowledge to real-world examples. Enhances course content and resources to encourage student comprehension and application of course learning outcomes.

Once the individual peer review scores were calculated, the researcher went into each of the courses to record the number of students within each class. Using previous research as a guide, as well as the class size cap of 30 students at the University where the study was conducted, the researcher categorized the class sizes into three groups: 1= classes with 10 students or less, 2= classes with 11 to 19 students, and 3= classes with 20 to 30 students. For the purpose of this study, group 1 was labeled as a small class size, group 2 was a medium class size, and group 3 was a large class size.

## Results

The following statistical analyses were used to answer the research question: descriptive statistics and a MANOVA with post hoc follow-up comparisons tests. The MANOVA compared the part-time instructors' peer review scores between the three groups. Group 1 representing a small class size (1-10 students), Group 2 a medium class size (11-19 students), and Group 3 a large class size (20-30 students). For the purpose of data analysis, the following abbreviations were used for each of the dependent variables: CT (fostering critical thinking), IF (instructive feedback), HE (high expectations), ER (establishing relationships), IE (instructor expertise), and Avg (overall average peer review score). Table 2 presents the average peer review scores (based on the scale of 0 to 4 as presented in the methods section) for each group on each of the variables being examined.

Table 2.

*Descriptive Statistics for each Dependent Variable by Group*

Variables and Groups	n	M (SD)
CT		
Group 1	94	2.54 (.771)
Group 2	166	2.53 (.728)
Group 3	120	2.48 (.746)
IF		
Group 1	94	2.56 (.784)
Group 2	166	2.47 (.814)
Group 3	120	2.42 (.805)
HE		
Group 1	94	2.69 (.762)
Group 2	166	2.69 (.760)
Group 3	120	2.68 (.763)
ER		
Group 1	94	2.72 (.709)
Group 2	166	2.80 (.783)
Group 3	120	2.71 (.793)
IE		
Group 1	94	2.86 (.742)
Group 2	166	2.75 (.814)
Group 3	120	2.64 (.719)
Avg		
Group 1	94	2.68 (.604)
Group 2	166	2.65 (.637)
Group 3	120	2.58 (.636)

**MANOVA Results**

Results from the MANOVA showed no statistically significant differences between the three groups and the six dependent variable,  $F(10, 746) = .944$ ; Wilk's  $\Lambda = .975$ , partial  $\eta^2 = .012$ . Following the MANOVA, post hoc LSD comparison tests were performed which revealed a significant difference between groups 1 and 3 on the IE variable,  $p = .03$ . Table 3 presents the top five greatest differences in means between the groups being compared and the variable in which the groups differ on:

Table 3.

*Top five greatest differences in means between groups based on class size*

Groups Being Compared	Variable	Difference in Means
1 and 3	IE	.22*

1 and 3	IF	.15
2 and 3	IE	.11
1 and 3	Avg	.09
2 and 3	ER	.09
1 and 2	IF	.09
1 and 2	ER	.07

Note: \*Statistically significant at the .05 level

## Discussion

When examining the means between the groups on each of the six dependent variables, it is seen in Table 2 that Group 3 has a smaller mean when compared to the other two groups on each dependent variable. Based on visual inspection only, one might conclude that a larger class size negatively affects an instructor's ability to perform in the online classroom. Upon conducting a MANOVA to examine statistical significance, results indicated overall, no statistically significant difference between the three groups and the six dependent variables at an alpha level of .05. A post hoc power analysis revealed an observed power of .51, which would indicate a less than desired level of power to detect a statistically significant difference if such a difference does in fact exist within the population.

A more in depth examination through follow-up comparison tests did show a statistically significant difference between groups 1 and 3 on the IE variable with group 1 having a higher mean. This suggests that in courses with a smaller class size, instructors may use their expertise, knowledge of subject matter, and experience more effectively and consistently than in courses with larger class sizes. The top five differences in means between the groups are presented in Table 3. The IE variable, although not statistically significant, was also seen as one of the top five differences between groups 2 and 3, with the mean of group 2 being greater. This may allude to a trend for the IE variable indicating that as class size increases, instructors use their expertise, knowledge of subject matter, and experience less effectively and consistently to support student learning.

The second greatest difference between means was found between groups 1 and 3 on the IF variable with group 1 having a higher mean. Furthermore, the IF variable is seen again within the top five differences, between groups 1 and 2 with group 1 having a higher mean. In addition, although not in the top five differences, Table 2 also shows group 2 having a slightly higher mean than group 3 on the IF variable. So in summary, when looking at the average IF scores based on group size: group 1 > group 2 > group 3. Like IE, this may suggest a trend for IF indicating that as class size increases, instructors provide less quality feedback. One possible explanation for the negative trend seen with IE and IF as class size increased is that the online instructors may not have the time to provide quality instruction to a higher number of students. As a result, an instructor focuses more on "getting through all of the discussions or grading" as opposed to providing higher quality interactions and feedback. This explanation may be supported by previous research which suggests that teaching an online course takes more time (Berge & Muilenburg, 2001; Cho & Berge, 2002; Mupinga & Maughan, 2008). The ER variable is also seen multiple times within the top 5 differences in means, but the trend is a little different as compared to IE and IF. When the group means for ER are examined, there is an increase from group 1 to group 2, but then a decrease from groups 2 to group 3. The means of groups 1 and 3 are essentially the same. This suggests that instructors may be more effective at establishing relationships with their students in courses with medium class sizes (11-19 students).

The courses in the COE at the institution where the peer reviews were conducted are designed to include activities that encourage faculty engagement with the students. In fact, faculty engagement is an expectation. Specific activities that involved more faculty engagement were discussion forums and the grading of assignments. In these areas, faculty members are expected to do more than just provide comments such as "Great job!" or "A good attempt, but details were lacking." As it can be seen in the descriptions for the peer review criteria in Table 1, faculty are expected to challenge students' thinking, encourage students to elaborate on their thoughts, help students make connections between course content and the real world, and share their own relevant experiences. When course design and faculty

engagement are looked at in relation to the results of this study, it may be reasonable to think that areas such as IE and IF could be impacted by the combination of course design and class size. If the courses are designed to encourage faculty engagement with students, then the more students there are in a course, the more difficult it may be for an instructor to be seen as engaging with all of them. As a result, the instructor may be viewed as a low performer.

### **Limitations**

The following may be view as limitation to this study:

1. All the instructors reviewed were part-time. As a result, they may have been employed elsewhere, thus having limited time to devote to teaching their online class.
2. Because the value for class size represents the number of students in the class at the end of the course, it does not necessarily take into consideration students who may have dropped at any point or stayed in the course but stopped participating.
3. There may be other variables that were not examined in detail, such as course design, that when combined with increasing class sizes have the ability to negatively impact instructor performance.

### **Conclusion**

This study sought to identify the differences, if any, that exist between class size and instructor performance as measured by five peer review variables and an average peer review score. The statistically significant results from this study revealed that class size potentially has the most effect on instructors' ability to use their expertise, knowledge of subject matter, and experience. It seems that with larger class sizes, instructors use their expertise less effectively and consistently to support student learning. Furthermore, although there was no evidence of statistical significance, a negative trend was seen in the differences in means for the IF scores between groups differing in class size. It also appears that instructors in this sample may provide less quality feedback as class size increases. With the quality of online learning still being questioned, what was found in regards to expertise and feedback could be concerning. The sharing of expertise and the use of feedback are two key areas that support student learning. In an online learning environment, students rely on an instructor expertise and feedback to help them acquire new knowledge and address potential misunderstanding in course work. The researcher acknowledges that there are other variables that may have the potential to negatively influence an online instructor's performance. This study specifically examined class size. With the rapid and consistent growth of online learning, we will see more students seek out online courses and programs. As tempting as it may be to take advantage of the limitless space an online classroom offers, it is important to consider how a large online class size could affect an instructor's performance and influence the quality of the learning experience for each student.

### **Recommendations for Future Studies**

1. Conduct similar studies with larger sample sizes to increase power and thus, the likelihood of detecting statistically significant results if in fact they do exist.
2. Conduct similar studies including courses that exceed the 30 student cap which was implemented by the University where this study was conducted.
3. Conduct similar studies that look at the peer review variables and instructor performance in relationship to course design.

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