Class Size and Student Learning: Literature Overview


Abstract (Overview)

Over the last decade, with advances in technology and an increasing number of students seeking college degrees, online courses have become increasingly popular. With these changes, questions have arisen about appropriate class size to optimize student learning in an online environment. Although a review of the literature suggests class sizes between 12 and 21 are appropriate, the research also shows that a variety of variables besides class size affects student learning as well as student and instructor satisfaction with a course. These factors include the instructor’s experience and comfort teaching online, the qualities of technology employed, and the nature and experience of students enrolled in the course. For instance, a student’s level of education (undergraduate or graduate) and degree sought (associate, bachelor, master, or doctoral) is another consideration. Overall, the literature reveals a wide scale of variables in determining the success of an online class in terms of student outcomes.

Conclusion

To conclude, given this report was an investigation of class size and online learning classes, based on the data collected, it can be asserted that online classes for undergraduate programs can run reasonably well with enrollments between 15 and 22 (assuming a degree of healthy interactions among students, with the instructor, and with the very content are expected), whereas graduate courses probably fare better with slightly less enrollment, with approximately 15 students considered suitable (to facilitate in-depth discussion and some degree of instructor-to-student mentoring and professional counseling). Moreover, a few sources suggested that neophytes to teaching online might start with smaller classes of 12 enrolled students, though this number could increase in subsequent semesters.

The literature reviewed did not address the intersection of class size and duration of course (e.g., standard 15-week semester or another variation); the relationship between forms of media delivery and class size (e.g., video lecture capture, podcasts, videoconferencing, Skype, platform—i.e., Blackboard, Moodle, Mahara); and, specifically the number of instructors teaching the course (e.g., single instructor, team-taught, teaching assistant-linked to instructor), though it might be assumed that in most cases one professor taught the course. Assuming this was the case, reasonable questions about course load and working conditions are not unexpected, thereby suggesting concerns about class size. Moreover, the standard formula used for face-to-face instruction of students devoting two hours outside of class time for every hour in class was not addressed as to how this translates into online learning and the implications therefore for the instructor or class size. The issue of learning style—-independent versus collaborative—though was raised, and it would seem that a class size conducive to learning online might also be affected by how much time students are willing to devote to their learning.

Still, as we examine the relationship between online learning and class size, we also must be mindful that as the technology evolves and as both students and instructors become more technologically savvy—including students at a younger and younger age adapting to working online—and more and more courses are offered online, the complexion of online learning in the future is a moving target. Mindful of a learning process in motion, institutions should examine their practices periodically and make adjustments accordingly and continue to keep abreast of the research in the field. Lastly, the nature of the curriculum and desired learning outcomes, as is the case for any wise educational decision-making, should be kept paramount. There is no magic, uniform, ideal number for a minimum or maximum number of students in a class. An institution needs to consider what is best for its students in keeping with best professional and educational practices. At this point, only tentative recommendations can be made, and those need to consider class size in light of an array of pertinent variables, only some of which have been identified in this report.
College students who interact with professors and peers about academic matters have better college outcomes. Although institutional factors influence engagement, prior scholarship has not systematically examined whether class sizes affect students’ academic interactions, nor whether race or first-generation status moderate such effects. We conceptualized academic interactions as forms of social capital that are sensitive to institutional characteristics. We analyzed survey data from a random sample of 346 students enrolled at a public research university linked with institutional data on student class size. We employed logistic regression on six dependent variables capturing academic interactions with professors and peers and controlled for precollege characteristics. Compared to students enrolled in smaller classes, students enrolled in larger classes had significantly fewer interactions with professors about course material and with peers about course-related ideas. Social group also moderated some effects of class size. Class size negatively influenced first-generation (but not continuing generation) students’ likelihood of talking to professors or TAs about ideas. For discussions about future careers, larger classes had profound negative effects on Black students (for interactions with professors) and Latino students (for interactions with peers), but no effect on other groups. We discuss implications for theory and practice.

Discussion and Conclusion [abridged]

We conceptualize student interactions with professors and peers about course and career matters as a form of academic social capital. Although such interactions are central to student success in college, this research is the first we know of that systematically analyzes how college class size shapes academic social capital among a random sample of students, and considers how race and first-generation status moderate this association. Our results indicate that the recent widespread expansion of class sizes on public university campuses is likely linked with significant reductions in student interactions with professors and peers, and that Black, Latino, and first-generation students may shoulder an undue proportion of these negative effects. For example, cohorts of students who progress through similar courses in their major may have more opportunities to develop reciprocal relationships (Deil-Amor, 2011), especially in smaller classes. Given our findings that career networking opportunities between Black and Latino students and their professors and peers were especially sensitive to class size variation, additional research should examine whether other facets of classroom organization are also linked with such racial variation. Effect sizes in our study were stronger for predicting interactions with peers than professors, suggesting that student-peer academic social capital may be especially sensitive to class sizes, even on a four-year residential campus where students have other opportunities to foster connections with one another.

Why might Black and Latino students be more sensitive to class size variation for discussions about future careers? First, large classes might magnify preexisting racial marginalization in important ways that undermine opportunities to interact with professors and peers (and small classes might especially diminish the effect of these processes). Differential effects of class size for underrepresented minorities may thus vary depending on campus racial climate and other institutional factors (Cole, 2007). In particular, the effects of class sizes may differ for minority students at predominantly white institutions: the experience of tokenism in small classes in such settings may make them less beneficial for fostering student-peer academic interactions than at the Hispanic-Serving Institution which served as the setting for our study. In such settings, underrepresented racial/ethnic groups could experience some benefits to forming relationships in larger classes with same-race peers.

Career discussions may be less common in Engineering due to a more well-defined career path. Further, the organization of instruction may systematically differ across fields in ways that especially affect minority students, such as more classroom discussions in the social sciences or more competition in sciences or engineering. Also, if certain academic programs that provide more small classes attract particularly interactive students, this could drive the findings. These factors may help explain why Black and Latino students have significantly greater probabilities of discussing careers in smaller classes, but significantly lower probabilities in larger classes.
Our findings identify class size as a key mechanism through which institutional-level variables investigated in prior research—like lower student-teacher ratios, private, and liberal arts colleges—positively influence student academic interactions (Astin, 1993; Kuh & Hu, 2001). The organizational features of student classroom experiences thus deserve greater attention, especially for shaping stratification in access to academic social capital. Notably, our study demonstrates that a student's average class size across their full schedule significantly influences their overall propensity for engaging in academic interactions, not only those confined to a single class. Thus, effects of classroom organization should be conceptualized in terms of how they relate to student experiences writ large.…

Recent funding constraints have reshaped classroom experiences for students enrolled in public research universities, leading to a vast and rapid expansion in class sizes (Capaldi, 2011). This pervasive trend has emerged with little consideration of the consequences to students. Our study demonstrates that students in larger classes have fewer academic interactions with professors and peers, and that these negative effects can be more pronounced among Black, Latino and first-generation students. Our research supports the notion that after decades of attention to student affairs and nonacademic aspects of college student experiences, campuses could improve student learning and engagement by investing in the academic aspects of student experiences (Arum & Roksa, 2011). Unlike specialized programs or particular campus organizations which may reach only a handful of students, classes are a ubiquitous institutional feature. Importantly, class size and the organization of instruction are malleable, relatively inexpensive to change, and under control of faculty and administrators. Creating smaller college classes could enhance academic social capital for all students, but especially among Black, Latino, and first-generation students. Increasing class size may save campuses some money, but such savings are likely undermined by real costs to students in the form of lost opportunities for academic connections with their professors and peers.


Abstract

This investigation uses student course evaluations to examine the relationship between class size and perceived student learning, after student effort and instructor quality have been taken into account. This study found that despite the efforts by students and instructors, class size had a significant negative relationship with perceived student learning.

Conclusions

With the ever-increasing interest in student learning and the corresponding debate over accountability in higher education today, it is important for colleges and universities to understand how different factors influence this somewhat elusive outcome. Large college classes are a prevalent part of the current higher education landscape, and with increasing pressure on schools to continue to increase their classes, they will likely persist (Cooper & Robinson, 2000). This is unfortunate because learning is built upon throughout students’ time at their higher education institution. As previous research has found, students who took large introductory classes had lower grades in their subsequent classes than did students who did not take large introductory classes (Raimondo, Esposito, & Gershenberg, 1990). This suggests that even maintaining large class sizes at the introductory course level while cutting down classes at the upperclassman level could have a long-term negative impact on student learning. While students and teachers themselves clearly play a role in maximizing student learning, it is important to understand that the underlying factor of class size may still negatively affect classroom learning, and yet students and instructors have little to no direct control over it.

In addition to general concerns around the relationship between class size and student achievement, there is a specific fear of neglecting the undergraduate teaching mission among research universities (Orillion, 2009). This fear is centered on concerns that faculty research demands will have negative
impacts on general education programs. These concerns are particularly relevant for general education courses because they are considered by many to be the “building blocks” of liberal learning (Nelson Laird et al., 2009, p. 66). In addition to this role, there is a shift in liberal education toward expanding students’ liberal arts experience to include “action and practice” (Freeland, 2009, p. 8). One suggested vehicle through which to do this is via undergraduate students working with faculty on research projects (Freeland, 2009). The success of such an approach may be influenced by findings from the current study. That is, this study found a significant positive relationship between professor availability and perceived student learning and a significant negative relationship between class size and perceived student learning. Taken together, these suggest that smaller class sizes in general education courses may facilitate “personalized educational” opportunities for students that, in turn, lead to further “action and practice” such as becoming involved in faculty research outside of class.

From an institutional perspective it would be prudent to examine class size options and weigh whether the cost-cutting solutions that larger classes provide are worth the trade-off of potentially decreasing student learning. If student learning is indeed one of the most pressing issues facing higher education institutions today (U.S. Department of Education, 2006), it is vital that we conduct studies that lead to a better understanding of student learning, what we can do to improve it, and how we may unwittingly undo much hard work through mandating large college class sizes. The elementary and secondary literature, in particular, contains many promising ideas on combating the negative effects of large class sizes (Borland, Howsen, & Trawick, 2005; Englehart, 2007; Januzaj & Dixon-Krauss, 2008).


Abstract

This is the first study to use self-reported ratings of student learning, instructor recommendations, and course recommendations as the outcome measure to estimate class size effects, doing so across 24 disciplines. Fixed-effects models controlling for heterogeneous courses and instructors reveal that increasing enrollment has negative and significant effects on student satisfaction in Sociology, Political Science, Computer Science and Engineering, and Mechanical and Aerospace Engineering. Educational outcomes in Linguistics, Psychology, Biological Sciences, Chemistry, Math, Physics, Cognitive Sciences, Visual Arts, History, and Philosophy are unaffected by class size. Other disciplines, including Economics, have inconclusive findings. No discipline benefits from increasing enrollment.

Conclusions

Student ratings of learning, instructor recommendations, and course recommendations serve as alternative measures of educational success. While these measures are more subjective than test scores and grades, they reveal overall student contentment, which is another valid outcome of education. The main results and robustness checks show that on average, larger class sizes do hinder educational outcomes. However, when departments are analyzed individually, many seem to be unaffected by class size. Since this study puts equal weight on the three ratings, it makes definite statements about 14 of the 24 disciplines analyzed.

While educational success changes with class size for some disciplines, success in other disciplines seem to be dependent on other factors. For the ten disciplines that are unaffected by increasing enrollment, class size is not a primary determinant of educational outcomes. There are many implications of these results. Administrators concerned with budget cuts and educational outcomes may find that some subjects can “afford” to increase class sizes more than other subjects. Why this is the case is up to future research to determine. Perhaps there is no universal impact of larger enrollment. While some students, instructors, and courses are adversely affected, others appear to be unaffected by larger class sizes.
Abstract

We model how class size affects the grade higher education students earn and we test the model using an ordinal logit with and without fixed effects on over 760,000 undergraduate observations from a northeastern public university. We find that class size negatively affects grades for a variety of specifications and subsets of the data, as well as for the whole data set from this school. The specifications tested hold constant for academic department, peer effects (relative ability in class), student ability, level of student, level of course, gender, minority status, and other factors. Average grade point declines as class size increases, precipitously up to class sizes of twenty, and more gradually but monotonically through larger class sizes. The evidence is that this is not exclusively a small class effect. We conclude that there are diseconomies of scale associated with a deterioration of student outcomes as class sizes grow larger. The cost of this deterioration is not quantifiable with our data, as much of the costs are non-market costs and unobservable. Future studies of economies of scale in higher education need to address the traditional assumption of constant product quality.

Discussion

This study of grades in higher education, using various models relating environment, ability, and experience to undergraduate course grades, shows that class size has a negative relationship to grades and that while the value of the class size coefficient differs across different departments and subsets of data, it is negative in all cases.

Though we have found a negative relationship between grades and class size, we cannot conclude, to the extent that grades are but a proxy for knowledge, that students learn more in smaller classes, nor do we offer a reason for our result. As Glass et al. (1982) argued attitudinal changes among faculty and students might account for the observed results. Recall that McKeachie (1999) suggests that optimal teaching methods and class sizes vary by subject matter and level. He also reminds us that students may self select class sizes whenever possible. Alternatively, as the K-12 literature suggests, the attention faculty can give to individual students and the intensity of engagement in learning that occurs in small classes could account for the results. We do observe however, that the negative relationship persists even when we account for variations in data subsets, models, included variables, and statistical methodology, a robust result.

We conclude that there are diseconomies of scale associated with a deterioration of student outcomes as class sizes grow larger. The cost of this deterioration is not quantifiable with our data, as much of the costs are non-market costs and unobservable. For example these costs may include lost revenue due to a decrease in student persistence and a resulting lower student retention rate as well as the loss of reputation caused by lower graduation rates. Nor have we quantified the added cost of training and properly staffing large classes to negate adverse grade effects. We do conclude that any institutional benefits from larger classes must be set against the short and long-term costs associated with the resulting poorer student performance. The evidence presented in this paper suggests class size influences the likelihood of getting good grades and that future studies of economies of scale in higher education need to consider the effect class size has on student outcomes.

NOTE: Student-staff ratios (SSRs) refers to student-faculty ratios.

Student–staff ratios (SSRs) in higher education have a significant impact on teaching and learning and critical financial implications for organisations. While SSRs are often used as a currency for quality both externally for political reasons and internally within universities for resource allocations, there is a considerable amount of ambiguity over the actual impact of SSRs and whether a low SSR is reflective of better education outcomes. To provide insight into the importance of SSRs, this
The article reviews the existing literature looking at both an Australian and international context. It explores the impact of SSRs from three perspectives: (1) learning outcomes; (2) staff workloads and well-being; and (3) organisation reputation and funding. This article concludes by proposing a range of recommendations to improve SSRs in the tertiary education sector.

Conclusion

Increasing class sizes is an issue affecting many higher education institutions in the world, and the spectrum of views surrounding the issue demonstrates its overall significance to the sector. Based on the findings, it appears that more important than the issue of SSRs and large classes is the quality of teaching. Research testifies to the fact that student satisfaction is not entirely dependent on small class sizes, a view particularly popular in the 1970s and late twentieth century (Kokkelenberg et al., 2008). Having said that, recent literature (post-2000) on the issue is focused heavily on the detrimental impact raised SSRs has on students, teachers and teaching and learning in general. The Bradley Review of higher education in Australia was just one ‘voice’ amongst many in the international arena, arguing that raised SSRs are seriously damaging to students and teachers alike.

There is inevitable tension in educational institutions to seek better use of their resources and financial improvements through raising SSRs. All the while, however, there is a perception that SSRs impact negatively on quality. This tension is ever present and would undoubtedly benefit from further investigation, particularly in regard to the perceptions of the impacts of increased SSRs. The question that arises, of course, is: should the discussion be about student-to-staff ratios or appropriate staffing levels? The former may give an illusion of a measurable, solid target that can be used to benchmark/compare the investment in human resources between faculties or between institutions; however, in reality, the statistical approach often falls short of this expectation.

This article has canvassed the extant literature to ascertain the broad range of views relating to the overall impact of SSRs and whether class size really does matter. From the research surrounding the impact of SSRs on student learning outcomes, staff workloads and organisations’ reputations and funding, recommendations have been developed for higher education institutions to consider in their efforts to improve SSRs in the tertiary sector. These recommendations are timely given the international productivity pressures to increase SSRs around the world and the fact that they look as if they are ‘here to stay’.


Abstract

Increasingly, student success in college is gauged by retention and graduation rates. Understanding the factors that influence student success can assist practitioners in terms of programming and institutional investments. This study evaluated factors such as residential living, attendance programs, demographic attributes, average class size, and student academic preparation by employing longitudinal, student-level data at one midsized university in the southeastern United States from 1998 to 2004. Individual student information was analyzed, including average class size and student performance in general education courses. Probit regression models indicated that retention and graduation rates were higher for students who were academically prepared, received grants or scholarships, and were in smaller classes. These rates were not influenced by sex, race, absenteeism, or living in residence halls. This work suggests that universities could improve graduation and retention rates by investing in scholarships, smaller class sizes, and financial aid infrastructure.

Conclusion

This study contributes to the literature on college retention and graduation by demonstrating an application of institutional analysis that combines data from several different sources across a single university. This study systematically tracked individual student transcripts to capture the marginal impacts of freshman general education academic experiences on retention and graduation rates.

The practical implications of this work suggest that universities should invest in smaller class sizes and focus on students’ financial constraints to improve student success. Surprisingly, two factors typically
considered important for freshmen retention and eventual graduation, absenteeism and on-campus residence, were not found to be significant in our models.

Although the nature of the individual-level analysis justifies use of a single institution, the tradeoff is that the results may not be sufficiently generalizable. This study provides an example of combining information across institutional datasets to inform strategic decision making. Future work could apply a similar methodology to other universities’ student populations using more current data and additional factors, such as access to online education. Researchers can also modify the metrics of student success to align with specific institutional goals, funding models, or administrators’ focus areas.


Abstract

Numerous studies have investigated the impact of class size on student outcomes. This analysis contributes to this discussion by examining the impact of class size on student outcomes in higher education. Additionally, this paper investigates the importance of student load (total number of students taught across all courses) in educational outcomes. We find that both class size and student load negatively impact student assessments of courses and instructors. Large classes and heavy student loads appear to prompt faculty to alter their courses in ways deleterious to students.

Conclusions

The evidence found in this analysis unequivocally leads to the conclusion that both class size and the total number of students that a faculty member is responsible for teaching have a negative impact on the self-reported outcomes of amount learned, instructor rating, course rating, and expected course grade. These negative relationships between class size and student load with student outcomes are found conditional on faculty and course fixed effects, and thus represent changes in student outcomes within instructors and courses, and are not attributable to endogenous variation in class size across instructors. Additionally, the analysis above reveals that class size and student load primarily influence student outcomes by altering certain aspects of courses that students find beneficial and helpful in learning. For example, large class sizes and higher student loads are correlated with less critical and analytical thinking, less clarity in the course presentations, and lower ratings on the instructor’s ability to stimulate student interest. In turn, these course and instructor attributes are positively related to students’ course assessments.

Reducing class sizes will help to improve student outcomes but ignores the impact that student load plays in how faculty structure their courses. Reducing class sizes and the total number of students that a faculty member is responsible for teaching in a semester will lead to significant improvements in student outcomes. Administrative policies of hiring adjunct faculty to teach numerous sections of a course in order to minimize class sizes ignores the important role that total student responsibility plays in how faculty actually teach those courses. Course attributes important to student learning and how much students get out of a course suffer when class size and student loads increase. Policies designed to reduce class sizes in order to fare better in institutional rankings should be weighed against the impact these policies may have on student load and the equally important impact it plays in student outcomes.


Abstract

This article presents findings of a study conducted to determine instructors’ perceptions of optimal class sizes for online courses with different levels of interaction. Implications for research and practice are also presented. A Web-based survey method was employed. Online courses studied were those taught sometime in the last 5 years by a single instructor in undergraduate or graduate programs from U.S. higher education institutions. Instructors described the level of interactive qualities in their most recently taught online course using a Web version of Roblyer and Wiencke’s (2004) Rubric for Assessing Interactive
Qualities in Distance Courses, and they indicated optimal class sizes according to such qualities. Responses from 131 instructors were analyzed. On average (a) instructors described their online courses as highly interactive, (b) the actual class size of the online courses was 22.8, (c) a class size of 18.9 was perceived as optimal to better achieve the course’s actual level of interaction, and (d) a class size of 15.9 was perceived as optimal to achieve the highest level of interaction. No relationship was found between online courses’ actual class sizes and their actual level of interaction.

Conclusions

Results of this study were intended to be practical. Optimal class sizes from the perspective of the instructor were thought to be helpful to policymakers who are trying to establish class-size limits for online courses. Limitations of the study were inherent to the research method employed (i.e., recruitment of participants, availability and credibility of respondents, and limitations of the instruments), and results are likely to be applicable to online courses as defined in the study. Future research is recommended to examine class size and interaction from the perspectives of administrators and of students.

Findings indicate that, even though the actual class sizes of the studied online courses were not related to their actual interactive qualities and that most respondents perceived their online courses as moderately and highly interactive, respondents still believed that they needed smaller classes to achieve higher interactive levels (i.e., an average class size of 22.8 versus a perceived average optimal class size of 18.9). Furthermore, the data indicate that every respondent believed that even smaller class sizes were needed to achieve the highest interactive level possible in the RAIQ (i.e., an average of 15.6).

Because interaction is a concept that has been measured in different ways in research and practice, accrediting organizations might need to clearly indicate how an institution is to measure for appropriate interaction reflected in the design of the online course in order to meet quality standards. Also, institutions should take recommendations from consortia cautiously. Specifically, recommendations of having smaller classes to allow for high interactivity because it has not been supported by research and it has not been agreed upon what actually constitutes a large or a small online class. However, respondents perceived that smaller classes were needed to achieve the actual interactive level in their online courses. This might be because of a perceived increased effort if they had more students. Hence, for future research, it is highly recommended to examine the relationship between class size and instructors’ workload and between class size and online teaching time commitment.


Abstract

Student participation in online discussion forums is associated with positive outcomes for student achievement and satisfaction, but research findings on the impact of class size and instructors’ participation on student participation have been mixed. The present study analyzed the frequency of instructor and student posts in asynchronous discussion forums in 500 online courses to examine factors contributing to student participation. Results showed significant effects of both class size and amount of instructor participation, with a significant interaction between the two. In medium class sizes (with 15–30 students), amount of instructor participation did not predict the number of posts per student, but in smaller classes, significant differences in student participation were found depending on amount of instructor participation. Implications for fostering student participation in online discussion forums and interpreting research in this area are discussed.

Class size

Another factor that may contribute to student participation in online discussions is class size. “Large” classes (greater than 34 students according to established categories that define “small” as less than 15 and medium as 15–34; Benton, Li, Brown, Guo, & Sullivan, 2015; Hoyt & Lee, 2002) lead to less participation than medium (Kim, 2013) or small-sized groups (Shaw, 2013), but the ideal class size within the small-to-medium range has been debated. On the one hand, larger groups allow for more interactions between students and more potential points to discuss (Caspi, Gorsky, & Chajut, 2003). Class size was positively associated with the number of posts playing higher-level knowledge in small groups ranging from 2 to
10 (Hew & Cheung, 2011). Orellana (2006) reported that faculty members with less than 15 students in an online class believed more students were needed to achieve the optimal level of interaction, and students in Vrasidas and McIsaac’s (1999) case study felt four participants were insufficient for an asynchronous discussion. On the other hand, larger online discussions may lead to “information overload” (Jones, Ravid, & Rafaeli, 2004), a reduction in instructor-student interaction (Caspi et al., 2003), or a mirroring of psychological barriers to participation in traditional classes (e.g., shyness; Hyde & Ruth, 2002). Some argue that larger classes decrease the quality of instructor feedback resulting in an overall decrease in course quality (Sorensen, 2015). Conflicting with the above recommendations for larger groups, classes of 8–10 students have been recommended to maximize group interaction (Schellens, Van Keer, Valcke, & De Wever, 2007).

Conclusion
The present study examined participation data from the discussion forums of 500 online courses. Instructor participation and class size both significantly predicted weekly per student participation. Most critically, the present study introduced class size as an important moderator of the relationship between instructor and student participation in asynchronous online discussion forums. Considering class size can help reconcile conflicting findings in the literature about the impact of teacher participation on student participation, inform institutions’ and accrediting agencies’ decision-making about optimal class size, and provide instructors with guidance about when their participation is most necessary to encourage active learning in online discussions.


Abstract:
This essay describes the process and findings of a class size research project at an access institution. With increasing pressure from state legislatures and campus or system governing bodies to maximize “efficiency” through such measures as increasing class sizes and demanding higher teaching loads, such situations are becoming more common and the need for specific disciplinary recommendations more urgent.

—“Statement on Working Conditions for Non-Tenure-Track Writing Faculty”

Conclusions and Implications for Future Research
As stated at the beginning of this article, we hope our story encourages conversation about connections between student learning and class size, especially for students at institutions of access who have the most to lose. Ultimately, we learned what many other class size researchers have—it is difficult to connect specific learning outcomes to changes in class size because of the myriad variables that can influence results. Likewise, we want to reiterate that the challenges of doing research at a multicampus, open-access, two-year college limited what we were able to do with our project. For example, given more time and resources we could have included additional ways to triangulate our data. Instructional quality could also influence student learning in class sizes large or small (see Sapelli and Ianess; Strauss), and this variable could have affected our results as we have over one hundred instructors (with regular turnover) spread out across thirteen campuses and an online program. Instructors who do not take advantage of smaller class sizes through more complex writing process activities and extensive feedback might not provide their students with as effective of a first-year writing course as instructors with slightly larger class sizes who do provide these opportunities. Likewise, it might be equally important to look at the total number of composition students an individual instructor has in addition to the number of students in each section, given the labor practices of composition that result in instructors teaching more than five sections across multiple campuses.
Further, it is difficult to account for the impact of students’ prior knowledge—as an open-access institution our students range from very well prepared to needing significant academic support—or the differences in their writing classroom experiences. As we analyzed student writing, it was clear that some students were simply more informed about the complexities of writing process, and some students had more opportunities to write than others (see Yancey et al. 5–6). Finally, we acknowledge that in an institution like ours, noncognitive issues including academic self-confidence, social support, and socioeconomic status play a significant role in the academic success and retention of our students (see Beattie and Thiele; Lotkowski et al.). These factors impact student success, and our high number of first-generation, low-income students from the lowest quartile of their high school classes means that our students are at risk in many ways. It would be an over-simplification to suggest class size was the only or largest factor in play here, and our research could not directly account for these noncognitive factors when comparing students. However, it is not unreasonable to suggest that smaller class sizes might allow for more social support from both the instructor and classmates especially if the instructor takes advantage of small class sizes by including more conferencing and guided peer review.

All of these variables aside, and while many questions about the effects of class size on student perception of writing process remain, we believe the following observations from our project could guide important conversations and research about class size:

1. Many college writing instructors make pedagogical changes in the face of increasing class sizes, including reducing the amount of writing they respond to and reducing the number of conferences or other one-on-one time they share with students, as our instructor surveys indicate.

2. Class size seems to affect the way students perceive writing process, possibly because of the pedagogical changes instructors make when class size increases. Students reported in their reflective essays that they value collaborating with both their instructor and their peers when writing, but the student surveys suggest they were less likely to do these things in larger classes, perhaps resulting in the fact that students in larger classes have less confidence in their writing process than students in smaller classes. The surveys also indicate that students in smaller classes were more likely to adopt a writing process that involves multiple drafts with changes based on feedback and evolving ideas.

3. When students effectively identify effective writing process awareness, it is almost always in the context of smaller class size characteristics, and almost always in relation to classroom practices that instructors identify as vulnerable when class size increases. In the reflective essays, we saw that it was difficult for students to identify the importance of multiple drafts and recursive revision—practices that help students see writing as a process and see revision as a sustained academic writing strategy, even beyond first-year writing. The activities and practices that contribute to an understanding of a recursive writing process (conferences, sustained feedback, and guided peer review) are the most vulnerable when class sizes are increased.

Perhaps the most important contribution this project makes to the conversation about class size is that it includes an educational environment that is historically underresearched and, as we show in this essay, has the most at stake when it comes to student success and retention. Class size research is particularly important at two-year and open-access institutions, many of which have increased class sizes as an austerity measure made necessary by decreased state funding without addressing strategies for dealing with the significant negative repercussions of this decision. Failure to do so is both unwise and unethical: it is unwise to threaten the long-term economic health of institutions for a short-term budget fix and unethical to enforce changes in the classroom that have proven to water down curriculum, decrease instructor-student interactions, and impede learning for our most vulnerable students.


Abstract

Researchers have long recognized class size as affecting students’ performance in face-to-face contexts. However, few studies have examined the effects of class size on exact reading and writing loads in online
graduate-level courses. This mixed-methods study examined relationships among class size, note reading, note writing, and collaborative discourse by analyzing tracking logs from 25 graduate-level online courses (25 instructors and 341 students) and interviews with 10 instructors and 12 graduate students. The quantitative and qualitative data analyses were designed to complement each other. The findings from this study point to class size as a major factor affecting note reading and writing loads in online graduate-level courses. Class size was found positively correlated with total number of notes students and instructors read and wrote, but negatively correlated with the percentage of notes students read, their note size and note grade level score. In larger classes, participants were more likely to experience information overload and students were more selective in reading notes. The data also suggest that the overload effects of large classes can be minimized by dividing students into small groups for discussion purposes. Interviewees felt that the use of small groups in large classes benefited their collaborative discussions. Findings suggested 13 to 15 as an optimal class size. The paper concludes with a list of pedagogical recommendations and suggestions for new multimedia software features to enhance collaborative learning in online classes.

Conclusions

The findings from this study points to class size as a major factor affecting note reading and writing loads in online classes. However, it appears not necessarily true that smaller classes have better class discussions and larger classes have worse ones. Both optimal class size and effective organizational strategies, such as appropriate group configuration, contribute to more interactive and productive online conferencing.

When the class size is too small, students may not have access to sufficient information; the instructor’s participation usually determines whether a small-class discussion will be successful or not. As class size increases, note reading load for both students and instructors increases greatly. When class size increases beyond an optimal size, information overload may “kick in” and students’ complaints arise. Instructors’ note-reading activities in larger classes are not obviously seen; therefore, some students think that their instructors often are not participating in discussions, especially in subgroup discussions. Instructors’ responding to notes appropriately often seems to encourage students’ note writing.

As class size increases, note-writing load increases accordingly. Both students and instructors tend to write more notes of shorter length and with fewer academic words. Discussions become more like dialogues. However, assessment of note writing has an impact on quantity and quality of student note-writing behaviors.

Different class sizes played an important role in students’ learning experiences and the amount of information the students learn. Instructors’ teaching experiences in different sizes of classes lead to their developing different strategies to cope with different class situations, which then may affect students’ learning experiences. This study found that splitting larger classes into subgroups serves as a strategy to reduce information overload and to encourage focused, in-depth small group discussions. Finally, the study found that class size and group configuration affect how collaborative the online discourse becomes: Larger classes tend to be more cooperative and less collaborative.

Many online courses intended as collaborative learning environments are not effective due to the failure to consider class size and note reading and writing loads. Some experienced online instructors do utilize effective strategies but keep these stored in their own mental “attics” rather than broadcasting them to benefit other online instructors and students. As a result, some online students and instructors, especially new ones, tend to participate in discussions mechanically without noticing that some of the problems they encounter may be caused by class size and note reading and writing due to pure online text-based communication. We need to take class size into consideration rationally and place more emphasis on effective student learning with appropriate strategies. Any instructor who is blind to this point may pay a heavy price: their students’ unsatisfied or even failures in online learning.


NOTE: This article seems to focus on first-time teachers

Abstract

Using student evaluations of their instructor as an outcome measure, we estimate and compare class size and teacher effects for higher education, with an emphasis on determining whether a comprehensive class
size reduction policy that draws on the hiring of new teachers is likely to improve educational outcomes. We find that first time teachers perform significantly worse than their peers, and we find substantial class size effects. Hence higher education institutions face a tradeoff if they wish to increase admission. This tradeoff implies that as class size increases, at first the negative class size effect is smaller than that of introducing a first time teacher. However, beyond a certain level, the class size effect dominates and it is better to create a new class with a first time teacher.

Conclusions

We study the tradeoff between smaller class sizes and teacher effects in the production function for higher education. While reducing class size has a positive effect, we argue that a comprehensive class size reduction policy has to be coupled with an expansion in the number of teachers. If this is the case, then the relative quality of marginal teachers is critical for the success of such a policy. In order to explore whether the quality gap between infra-marginal and marginal teachers dominates the class size effect, we estimate class size and first time teacher effects. Our findings show that a negative class effect does exist, and its impact when class size is reduced can be offset by the negative impact of a first time teacher. Hanushek and Rivkin (2010) survey various studies and argue that the effect of a ten student reduction in class size is between 0.10 and 0.30 standard deviations of the dependent variable. In comparison, we predict that said impact is roughly 0.10 standard deviations, a relatively small class effect. At the same time, Rockoff (2004) finds that a one standard deviation increase in teacher quality raises learning outcomes in 0.24 standard deviations. We find that a first time teacher lowers outcomes in roughly 0.41 standard deviations, and that first time teachers that are not invited to teach again lower them in 0.7 standard deviations.

These results imply that it is Pareto optimal to break up a class, giving half the students to a first time teacher, for class sizes above 85 students. This is the case because the students who keep the same teacher gain a 0.425 standard deviation increase in satisfaction on average due to lower class size, while the students who are assigned to the new teacher have a 0.01 standard deviation increase in satisfaction. Since this is precisely the rule in place at FACEAPUC, one could judge this institution’s hiring policies to be on average getting this decision right. However, the effect of low quality first time teacher, defined as individuals who are not invited to teach again, is so large (−0.71 SDs) that it is Pareto optimal to break up a class only when class size is greater than 140 students. This suggests that the ability to detect low quality first time teachers is important, and while on average FACEAPUC seems to be doing this correctly, we are unable to determine whether the marginal hire is of high or low quality. These results highlight that finding methodologies to identify poor quality first time teachers seems like a relevant area of future research.

Regarding the external validity of our results, to begin we find results that relate well to those in the literature. But many results are dependent on criteria used by administrators, characteristics of the student pool, of the teacher pool one has available, and on the characteristics of full time (or experienced) professors. The stopping rule we described is key in determining the margin at which we are measuring results. However, much of the discussion is relevant to any education institution and in particular to any higher education institution.