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The effects of class size on English learning at a Thai university

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Abstract

Large classes are the norm and a cause for concern for many language teachers. Most previous research into large classes has surveyed teachers' beliefs about the size and problems of large classes. Surprisingly, there has been no previous research in English language teaching into the effects of class size on learning. This study examines the relationship between class size and learning for 984 classes of students ranging in size from 10 to 103 students for four fundamental English courses at a Thai university. The findings show significant negative correlations between class sizes and grades, both for all students on all courses and for those students who studied in very differently sized classes on different courses. Furthermore, comparing the grades of students in different classes suggests two threshold levels of 25 and 45 students per class beyond which learning drops off noticeably.

Keywords: large classes, class size, language learning, grades, threshold levels

Large classes are the norm and a cause for concern for many language teachers. In many, if not most, educational contexts around the world, classes of 40, 50 or even more students are common. Teachers appear to believe that such class sizes are the cause of many of the problems they face. Yet, while large classes may add substantially to teacher workload, there is almost no evidence from English language teaching contexts that large class sizes adversely affect learning. This paper investigates the impact of class size on student learning in the context of a Thai university.

Previous research into large classes

The vast majority of the existing literature on large classes in English language teaching falls into two categories: surveys of teachers' beliefs about large classes, and teaching tips for how to deal with the problems associated with large classes (Watson Todd, 2006c, forthcoming).

Surveys of teachers' beliefs about large classes tend to focus on two main issues: the minimum number of students in a class for it to be considered a large class, and the problems which arise. Minimum numbers of students needed for an English language class to be viewed as large mostly fall within the range of 40 to 60 students (e.g. Chimbombo, 1986; George, 1991; Hayes, 1997; Holliday, 1996; Li, 1998; Nolasco & Arthur, 1990; Safnil, 1991; Touba, 1999). Such judgments of whether a certain class size is large, however, depend on a

range of variables including the teacher's experience, the objectives being taught (minimum sizes of a large class for speaking are generally lower than for reading), the size of the room, and the students' age (Dudley-Evans & St. John, 1998, ch. 10; LoCastro, 1989), and teachers generally set a lower threshold for large classes than students and administrators (Office of Instructional Consultation USCB, 2008).

Whatever the threshold number for a class to be considered large, teachers perceive large classes as a source of numerous problems. Frequently cited problems include management issues such as discipline (e.g. Hayes, 1997; Li, 1998; LoCastro, 1989), practical concerns such as space and noise (e.g. Coleman, 1989; LoCastro, 1989; Peachey, 1989), affective factors such as difficulties in achieving rapport with students (e.g. Holliday, 1996; LoCastro, 1989; McLeod, 1989); interaction issues including fewer opportunities for students to speak and less individual attention (e.g. Coleman, 1989; Hayes, 1997; Watson Todd, 1999), and feedback problems such as monitoring individual students and the teacher's marking load (e.g. McLeod, 1989; Peachey, 1989; Watson Todd, 1999). Only two sources explicitly state that teachers believe that learning is less effective in large classes (Coleman, 1989; Ur, 1996).

Given that many of the problems identified by teachers have the potential to adversely affect student learning (for instance, both Long's Interaction Hypothesis and Swain's Output Hypothesis would suggest that the interaction issues in large classes would lead to less effective learning; see LoCastro, 2001), the paucity of explicitly stated links between class size and effectiveness of learning is surprising. This dearth of explicit connections between class size and learning could be due to three issues.

First, although large classes can lead to numerous problems, these problems may be solvable as the literature on teaching tips for large classes suggests. These teaching tips range from very specific solutions such as ways of remembering large numbers of students' names (e.g. Duppenthaler, 1991; Nunan & Lamb, 1996; Sarwar, 1991) to global solutions such as using project-based or cooperative learning (e.g. McDonald et al., 2002; Sarwar, 2001). However, while such tips provide useful suggestions for teachers, there is no research evidence that they promote student learning.

A second reason for the lack of links between class size and learning is that the problems reported by teachers in surveys may reflect teachers' perceptions more than reality. Although there are comparatively few studies that investigate what actually happens in large language classes, those that do exist show that the problems associated with large classes may be fewer and less serious than the surveys of teachers' beliefs suggest. For instance, Boonmoh (2005) kept a diary while teaching a class of 84 students and found that his initial very negative expectations of the situation did not actually manifest themselves; and Watson Todd (2006b), comparing two different-sized classes of similar students following the same course and taught by the same teacher, found few differences in classroom language or teacher behaviour.

The third reason is that, despite the beliefs of teachers that large classes cause problems, there is very little actual evidence showing any relationship between class size and learning. Over twenty years ago, Allwright (1989) cited a lack of research evidence showing that large class sizes are prejudicial to learning, and almost nothing has changed since then. In contrast to mainstream education where large-scale research projects have been conducted to investigate the effects of class size on learning (e.g. Finn & Achilles, 1999), in English language teaching there is almost nothing, and the little research that has been conducted has shown that the effects on learning of other factors such as teacher quality or classroom activities greatly outweigh the effects of class size (Kumar, 1992). Nevertheless, even if other factors have a greater impact on learning than class size, class size may still influence

learning, and since class size is a factor that is easier to control than, say, teacher quality, it seems essential to know whether and to what extent class size does influence learning.

Purposes of the study

This study therefore aims firstly to investigate the relationship between class size and learning in the context of foundation English language courses at a Thai university. Given that other factors may have a greater impact on learning than class size, it is necessary to isolate class size as a variable. There are two main ways in which this can be done. First, we could take an experimental approach and attempt to control all variables except class size. The number of variables that could potentially affect learning and thus that would need to be controlled, however, is so large that an experimental approach to investigating the effects of class size is unlikely to be valid. The second approach is to examine the effects of class size across a very large number of classes with the assumption that, if the number of classes investigated is high enough, the impact of other variables which might affect learning is evened out across different classes. This second approach is the one used in this study.

If the investigation shows that there is a relationship between class size and learning whereby students in larger classes show less effective learning, we are then faced with a second issue which this study could investigate. Are there threshold levels of class size at which learning is more effective below this level and less effective above it? Although there is a vast amount of research into teachers' beliefs about how many students make a large class, there is no previous research into threshold levels of numbers of students for English language learning to be affected. While some teachers' organisations have issued policy statements about threshold levels for classes (for instance, the Conference on College Composition and Communication in its 2009 statement on second language writers states, 'in classes made up exclusively of second language writers, enrollments should be limited to a maximum of 15 students per class'), it is unclear what evidence is used for setting these thresholds.

This study therefore aims to answer two questions:

1. Is there a relationship between class size and learning?
2. Are there threshold levels of class size for effective learning, and, if so, what are these threshold levels?

Methodology

In this study, there are two main variables: class size and learning. While the first is relatively easy to operationalise as the number of students enrolled in a class, the second is more problematic. In formal learning contexts, grades are taken as evidence of learning, so in this study, the students' grades on a course are taken as a measure of learning, even though such grades only measure learning of the course objectives and ignore other things that students might have learnt. This study then investigates the relationship between individual students' grades on formal courses and the size of the class for the courses.

The context

The data for this study is taken from all foundation English courses at a respected Thai university between 2006 and 2009. As a technological university, the students are mostly studying science or engineering majors and are required to take three foundation English courses within their first two years. On entry to the university, students are placed into two levels based on their university entrance exam scores for English. The lower-scoring students are required to take the three lower-level courses called LNG101, LNG102 and LNG103,

while the higher-scoring students take LNG102, LNG103 and LNG104. The objectives of these courses form a mix of general English and English for academic purposes (see Pichaipattanasophon, 2001 and Watson Todd, 2006a for details). The nature and main objectives of the four foundation English courses are summarised in Table 1. The courses are largely based around tasks and projects, although the first two courses also include explicit teaching of basic language skills and language knowledge. Generally, students present their task and project work in both spoken (e.g. presentations) and written formats, but there is a heavier focus on productive skills in LNG103 and LNG104 than in the first two courses.

Table 1
The Four Foundation English Courses

LNG101	Basic reading and listening skills, revision of grammar knowledge, large-scale task to write a news article
LNG102	Revision of grammar knowledge including student presentations of a grammar point, large-scale resourcing task involving finding resources and writing a summary, use of concordances and dictionaries, portfolio of e-learning tasks
LNG103	Large-scale survey task involving collecting, analysing and reporting survey data, large-scale task to write a report on a creative technological design, use of e-discussion forums and e-mail lists
LNG104	Term-length project to create an e-zine on a social issue

Class sizes

Enrollments in a class are taken as a measure of class size, even though the number of students in a given lesson may be less than this through absences. Since students are required to attend at least 80% of a course, absences are generally low, and there is no reason to think that the level of absences is related to class size.

Although the university aims for classes of 30 to 40 students per foundation English class, several factors mean that this is not always possible so there is substantial variation in class size at the university. For timetabling reasons, students are usually grouped according to the major they are studying. For majors with a large number of students, this means that classes can be set at around 30 to 40, but for majors with a small intake, placement of the students into two levels can lead to small class sizes. On the other hand, with a fixed teaching staff and a two-semester year and with twice as many foundation courses being run in the first semester as in the second semester, there can be pressure in the first semester to set classes of far more than 40 students. These conflicting factors mean that the class sizes for the courses under consideration vary between 10 students and 103 students with a mean of 35.8 students. There is no evidence that certain teachers are more likely to teach larger or smaller classes than other teachers or that different activities are used in different-sized classes since the course materials include suggested activities. Thus, any differences in learning are likely to be due to class size rather than the other factors identified in previous studies. In total, there were 984 classes of students taking the four foundation courses between 2006 and 2009, and the basic figures about class size for these courses are given in Table 2. The distributions are all fairly normal.

Table 2
Class Size Data for the Four Foundation Courses from 2006 to 2009

<i>Course</i>	<i>No. of classes</i>	<i>No. of students</i>	<i>Minimum class size</i>	<i>Maximum class size</i>	<i>Mean class size</i>	<i>SD for class size</i>
All courses	984	32,967	10	103	35.8	10.0
LNG101	239	8262	19	49	35.4	5.3
LNG102	325	11,268	12	103	36.3	8.6
LNG103	302	10,001	10	94	36.6	13.3
LNG104	118	3436	12	75	32.5	11.0

Student grades

Evaluation of students on the courses is largely based on their productive work on the large-scale tasks or projects in the courses, with 30-40% coming from summative exams. The percentage scores from a course are converted into a grade through norm-referencing against all students who took that course in that semester meaning that grades from different courses and different semesters are comparable. Since nearly all students in a cohort move on to the next course in the next semester and since the dropout rate is very low, a student who places at the same norm ranking in two semesters should obtain the same grade. The grades that can be obtained are A, B+, B, C+, C, D+, D and F, and these are converted into numbers to create grade point averages with A being 4, B+ being 3.5 down to D being 2, with F being 0. These grade-equivalent numbers are used as the learning data for comparison with class size in this study.

Data analysis

To see whether there is a relationship between class size and learning, Pearson product-moment correlation coefficients were calculated between the grade-equivalent number each student obtained and the number of students in the class that the student attended. Correlations were calculated for all students together, for each course separately to see if the different natures of the courses influenced the relationship, and for those students who studied different courses in very differently-sized classes. If class size affects learning, we should expect negative correlation coefficients since larger class sizes should lead to lower grades (although correlation statistics should not normally be interpreted as showing a direction of cause to effect, in the case of class size and learning it seems reasonable to assume such a direction).

To see if there are certain threshold levels of class size for effective learning, the average grades achieved by students at different class sizes were calculated. Threshold levels can be identified at points where grade levels drop off as class size increases.

Findings

The relationship between class size and learning

The correlations between class size and grade-equivalent numbers are presented in Table 3. The findings show that there is a relationship between class size and grade, most notably in LNG103, with students studying in larger classes having a tendency to receive a lower grade. While the coefficient values are not particularly high (perhaps because many students study all three courses in classes of similar sizes), all of the correlations are significant. These findings therefore suggest that larger class sizes do adversely affect learning.

Table 3
Correlations of Class Size and Grades

<i>Course</i>	<i>No. of students</i>	<i>Correlation of class size and grade</i>
All courses	32,967	$r = -0.126; p < 0.001$
LNG101	8262	$r = -0.087; p < 0.01$
LNG102	11,268	$r = -0.108; p < 0.001$
LNG103	10,001	$r = -0.157; p < 0.001$
LNG104	3436	$r = -0.099; p < 0.01$

Given that students tend to be grouped into classes by major and that average English language proficiency levels may vary between majors, there is a small chance that the results may be due to students from those majors with higher general proficiency levels being grouped into smaller classes. To check this, we can examine more closely the learning of those students who studied different courses in classes of very different sizes. For example, one student studied LNG102 in a class of 31 students getting a B+; he then learnt LNG103 in a class of 83 students obtaining a C grade; and finally he studied LNG104 with 74 other students getting a C+. A sub-group of 289 students whose class sizes over the two or three courses they studied within the timeframe of this research varied by at least a standard deviation of 12 was selected. For these students, the correlation between class size and grade-equivalent numbers is $-.222$ ($N = 780; p < .001$), confirming that the negative correlations between class sizes and grades is due to the effects of class size rather than other variables.

Threshold levels of class size for learning

To see whether there are any class sizes beyond which learning becomes less effective as manifested in drop-offs in grades, the average grades for different class sizes were calculated. The average grades for all courses are shown in Table 4 with class sizes grouped into increments of five students.

Table 4
Average Grades at Different Class Sizes for All Courses

<i>Class size</i>	<i>No. of classes</i>	<i>No. of students</i>	<i>Average grade</i>	<i>Difference from previous class size</i>
15 or less	16	212	2.85	
16 - 20	51	932	2.89	0.04
21 - 25	86	1974	2.88	-0.01
26 - 30	149	4232	2.73	-0.15
31 - 35	247	8190	2.77	0.04
36 - 40	334	12,681	2.71	-0.06
41 - 45	77	3293	2.60	-0.11
46 or more	24	1453	2.13	-0.47

From Table 4, we can see that there are two class size thresholds. There is clearly a very large drop in grades when class sizes exceed 45, and there is also a noticeable drop in grades when class sizes exceed 25.

The figures in Table 4 are for all courses, but teachers believe that courses with productive skills objectives should have fewer students than other courses. Similarly, the threshold of 15 students per class mentioned in the policy statement quoted above concerns writing courses. Since LNG103 and LNG104 place a heavier emphasis on the productive skills than the other two courses, we should also check whether the class size thresholds are different for these two courses, and the grade averages at different class sizes for these two courses are shown in Table 5. As with Table 4, Table 5 suggests thresholds at 25 and 45,

implying that in this context these are the key class size thresholds irrespective of the focus of the course.

Table 5

Average Grades at Different Class Sizes for LNG103 and LNG104

<i>Class size</i>	<i>No. of classes</i>	<i>No. of students</i>	<i>Average grade</i>	<i>Difference from previous class size</i>
15 or less	12	158	3.00	
16 - 20	39	715	2.96	-0.04
21 - 25	62	1421	2.97	0.01
26 - 30	61	1715	2.81	-0.18
31 - 35	92	3036	2.76	-0.05
36 - 40	114	4330	2.75	-0.01
41 - 45	24	1011	2.79	0.04
46 or more	16	1051	2.50	-0.29

Discussion

The findings show a clear relationship between class size and grades with students studying in large classes generally receiving lower grades. This pattern holds across all courses but is most noticeable for LNG103, the course with the greatest variation in class size and with objectives focusing on productive skills, and least noticeable for LNG101, the course with the greatest homogeneity in class size and with objectives most suited for transmission learning. Nevertheless, the differences between courses with a greater or lesser emphasis on productive skills are minimal, suggesting that in this context the impact of class size on grades does not vary for different objectives.

The significant correlations between class size and grades (and with no obvious relationships between class size and other factors such as teacher quality) suggest that class size does affect learning. However, the assumption that grades equate with learning is open to question. It could be reasonably argued, for instance, that grades reflect performance more than learning and that teachers may unconsciously give higher marks to those students they know well resulting in students performing at the same level being likely to receive higher marks from teachers in smaller classes. However, in the curriculum investigated in this study, several attempts have been made to increase the objectivity of marking, for example by making marking criteria more specific and detailed, (see Watson Todd, 2006a) suggesting that the impact on grades of teachers' unconscious biases should be minimal. Furthermore, with the possible exception of LNG101, the courses cover objectives which are expected to be new to students, and thus performance on these objectives should equate with learning.

It therefore seems reasonable to argue that the findings show that students in larger classes learn less effectively than students in smaller classes. These findings are consistent with the research into teachers' beliefs about large classes. Although most studies did not show an explicitly stated belief that large classes adversely affect learning, the problems identified by teachers as associated with large classes, especially the problems concerning interaction and feedback, could lead to less effective learning. For example, LoCastro's (2001) arguments that, based on theories of second language acquisition, learning opportunities would be fewer in larger classes mainly concern the effects of poorer quality interaction and feedback in larger classes. The findings, however, stand in contrast to the studies investigating what actually happens in large classes which showed few real differences between larger and smaller classes. This may be because the studies of classroom

discourse investigated features that were easy to identify rather than features that may have the most effect on learning.

The most immediately applicable findings from the current study are the threshold levels beyond which learning drops off noticeably. For the context under study, the threshold of 25 students per class may not be achievable given the pressures of student numbers, but the second threshold of 45 students per class could be usefully set as an administrative regulation with potential benefits for those students who would otherwise be placed in larger classes. These two thresholds are notably higher than the threshold of 15 students per class set by the Conference on College Composition and Communication (CCCC). The applicability of the findings from the current study which took place in an EFL context to ESL contexts which are the concern of the CCCC is unclear. Indeed, the applicability of the two threshold levels to any other contexts is unclear. However, until other institutes conduct research to identify threshold levels in their own contexts, the threshold levels of 25 and 45 students per class could be usefully applied as rules of thumb by administrators in setting up language classes to minimise the adverse effects of large classes on learning.

Biographical information

Dr. Richard Watson Todd is Associate Professor at King Mongkut's University of Technology Thonburi and Head of the Centre for Research and Services in the School of Liberal Arts. He is the author of 'Much Ado about English' and 'Classroom Teaching Strategies', and has published numerous articles in the areas of text linguistics, computer-based analyses of language, and curriculum innovation. He can be contacted at irictodd@kmutt.ac.th.

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