

Class size

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Introduction

There has been a vigorous debate about the educational effects of class size differences in primary schools. There is consensus among many in education that smaller classes allow a better quality of teaching and learning, and this has led to policy in favour of small classes. Class size reductions (CSR) have been implemented by a number of US States, the UK, Netherlands, and Asia Pacific countries as diverse as New Zealand and China. This policy is contentious, however, and some argue that the effects of CSR are modest and that there are other more cost effective strategies for improving educational standards (Slavin, 1987; Rivkin, Hanushek and Kain, 2000).

Despite the important policy and practice implications of the topic, the research literature on the educational effects of class size differences has not been clear (Blatchford and Mortimore, 1993). However, recent research and reviews provide some answers, and in this paper we address whether class size differences affect children's educational attainment and learning, and classroom processes like teaching and pupil behaviour. It draws on main reviews of research: Anderson (2000); Biddle and Berliner (no date); Blatchford and Mortimore (1993); Blatchford, Goldstein & Mortimore (1998); Cooper (1989); Ehrenberg, Brewer, Gamoran and Willms (2001); Finn, Pannozzo and Achilles (2003); Galton (1998); Grissmer (1999) and Hattie (2005), and also the CSPAR study (see below).

Do class size differences affect children's educational attainment and learning?

Overall, much previous research has not had designs strong enough to draw reliable conclusions (Blatchford, Goldstein and Mortimore, 1998). It has long been recognised, for example, that simple correlational designs, which examine associations between a measure of class size or pupil teacher ratios on the one hand and measures of pupil attainment on the other, are misleading, because we often do not know whether the results can be explained by another factor, e.g., that poorer performing pupils are placed in smaller classes. To arrive at sounder evidence two kinds of research design have been used.

1. Experimental studies.

It is often assumed that the problems of correlational research are best overcome by the use of experimental research or randomised controlled trials. This is one reason for the great attention paid to the Tennessee STAR project. A cohort of pupils and teachers at kindergarten through to Grade 3 were assigned at random to three types of class within the

same school: a small class (around 17 pupils), a 'regular' class (around 23 students) and a regular class with a teacher-aide. In brief, the researchers found that in both reading and maths pupils in small classes performed significantly better than pupils in regular classes, and children from minority ethnic group backgrounds benefited most from small classes (Finn and Achilles, 1999, Nye et al, 2000). In fourth grade the pupils returned to regular classes and the experiment ended, but gains were still evident after a further three years, that is, grades 4 - 6 (Word et al, 1990).

2. Longitudinal studies

There are some difficulties with experimental studies (see Goldstein and Blatchford, 1998) and an alternative approach is to set up longitudinal studies, which measure the full range of class sizes and which account statistically for other possibly confounding factors, including pupil differences at an earlier point. This was the approach adopted in a large scale UK study (the Class Size and Pupil Adult Ratio - CSPAR) project, see e.g., Blatchford (2003), Blatchford, Bassett and Brown (2005); Blatchford, Bassett, Goldstein and Martin (2003). This project tracked over 10,000 pupils in over 300 schools from school entry (at 4/5 years) to the end of the primary school stage (11 years). It used a multi-method approach and sophisticated multi-level regression statistical analyses.

In brief it found that there was a clear effect of class size differences on children's academic attainment over the first year (4/5 years), in both literacy and mathematics. The effect size was comparable to that reported by the STAR project, and this trend is therefore supported by both experimental and non-experimental research designs. Small classes (below 25) worked best in literacy for children with the lowest school entry scores who had most ground to make up. The effects of class size in the first year were still evident on literacy progress at the end of the second year of school, though by the end of the third year the effects were not clear. There were no clear longer-term effects of class size differences on mathematics achievement. Though this indicates that the early benefits 'wash out' after two years in school, there were no restrictions in terms of which size of class they moved to from year to year (in contrast with the STAR project).

The CSPAR's naturalistic design captured changes in class sizes from year to year. An important 'disruption' effect on children's educational progress was found, i.e., the effect of first year small classes carried over into the second year only when children moved into a similar or smaller class. Moving to a class of a different size, especially a larger class, had a negative effect on progress.

Do class size differences affect classroom processes like teaching and pupil behaviour?

Despite the widely held view that small classes will lead to a better quality of teaching and learning, the research evidence is not clear. One reason for this is the often anecdotal nature of the evidence collected. Overall, research suggests that class size effects are likely to be not singular but multiple, and that it is difficult to capture all the possible complexities involved.

1. Within class groups

The CSPAR results showed that larger classes led to more and bigger groups within the class, and this had an adverse effect on the amount and quality of teaching and the quality

of pupils' work and concentration in these groups. It is therefore important educationally to consider the mediating role of within class groupings.

2. Effects on teachers

Perhaps the most consistent finding is that class size affects individualisation of teaching. The smaller the class the more likelihood there is that a teacher will spend more time with individual pupils. In smaller classes there also tends to be more teaching overall and large classes present more challenges for classroom management, pupil control and marking, planning and assessment. Teachers are put under more strain when faced with large classes. Qualitative studies suggest that in smaller classes it can be easier for teachers to spot problems and give feedback, identify specific needs and gear teaching to meet them, and set individual targets for pupils. Teachers also experience better relationships with, and have more knowledge of, individual pupils.

3. Effects on pupils

Finn et al. (2003) conclude that students in small classes in the elementary grades are more engaged in learning behaviors, and they display less disruptive behavior than do students in larger classes. The CSPAR study found in the case of 4/5 year old pupils more disengagement when working on their own but no effects on pupil attentiveness in 10/11 year old pupils, possibly because of assessment and curriculum pressures at that age. The CSPAR study showed that in large classes pupils were more likely to simply listen to the teacher while in smaller classes pupils were more likely to interact in an active way with teachers, through initiating, responding and sustaining contact.

4. Curriculum effects

Research shows a moderating role of school subject on relationships between class size and classroom processes. Rice (1999) found that in mathematics, but not science, as class size increased, less time was spent on small groups and individuals, innovative instructional practices, and whole group discussions. In the CSPAR study, the overall effects of class size on individualized attention were found in all subjects but English. One direction for future research is to identify more precisely ways in which class size effects vary in relation to particular school subjects and student age.

Overall, results suggest that while small classes will not make a bad teacher better, they can allow teachers to be more effective; conversely large classes inevitably present teachers with difficulties and the need for compromises. Small classes can offer *opportunities* for teachers to teach better (Anderson, 2000) or, to use a different term, they can create *facilitating conditions* for teachers to teach and students to learn (Wang and Finn, 2000).

Implications for policy and practice

Age of pupil

Research shows we need to take account of the age of the child when considering class size effects. There is a clear case for small class sizes in the first years of school, but results show where resources could be further targeted, that is, classes smaller than about 20 - 25 for those with most ground to make up in literacy skills. Another policy implication is to maintain smaller classes across years where possible.

Age vs start up effect?

Results also suggest that class size reduction initiatives are best seen as a policy of prevention but not remediation, in the sense that the evidence supports the use of small classes immediately after entry to school, but there is little evidence that small classes introduced later in children's school lives are as effective. However, there is still the possibility that smaller classes may be advantageous at later strategic points of transition in student's school lives, e.g., in the first year of secondary education. Research evidence on this possibility is needed.

Implications for Practice

It has often been pointed out that teachers do not necessarily change the way they teach when faced with smaller classes and this might well account for the relatively modest effects of class size on achievement. Blatchford, Russell, Bassett, Brown and Martin (2007) have suggested several ways in which CSR can be accompanied by pedagogical changes to enhance beneficial effects for students, e.g., taking advantage of the possibilities of increased individualization; adopting more adventurous and flexible teaching; and implementing more effective collaborative learning between pupils. Some have argued that teacher professional development is a better investment than CSR, but it is preferable not to see them in opposition. Rather, professional development should be used to help teachers harness the opportunities of small classes, and help teachers develop strategies for realizing educational objectives in large classes.

(1689 words)

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