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RESEARCH

Pupil Adult Ratio Differences and Educational Progress over Reception and Key Stage 1

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Background

This study looks at the educational effects of and pupil adult ratio and class size differences at Reception and Key Stage 1 (KS1). The research gathered information on the numbers and types of Teaching Assistants (TAs) and other adults working in classrooms, and examined the effects on children's educational progress and the impact on classroom processes.

Key Findings

- ✦ The statistical analysis of the data indicated that there is a significant effect of class size differences on children's educational progress in Reception for both literacy and maths. However, there was no clear statistical evidence of an effect of class size upon progress in literacy or maths at Year 1 or Year 2. There was no statistical evidence that the number of TAs or other adults in addition to teachers in the classroom have an influence on children's educational progress.
- ✦ The case studies showed the importance of the reliability and consistency of classroom support. There were problems when support was not planned for and was fragmented. The importance of training was also clear, to ensure it is clearly linked to teachers' aims and lesson plans. Perhaps most importantly, it was found that the use and effectiveness of adult help in classes *varied between classes*, and that this is probably the main reason why the quantitative analyses did not show clear evidence of the benefits of classroom support on children's educational progress. The results show that TAs are inevitably involved in direct face-to-face interactions with pupils and there is a need to articulate what kinds of pedagogy - in particular regarding direct teaching interactions - are relevant, and to use this to inform training.
- ✦ Results show that as class sizes increase there is less time for teaching overall and, in particular, for hearing children read individually. The presence of extra staff and adults does not have a consistent or clear effect on teaching and curriculum time and no effect on the time a teacher has to hear children read individually.
- ✦ When considering teachers' experiences of and views about the effectiveness of TAs, they were seen to be making a valuable contribution in a number of ways. For example, they provide increased individual attention, increased support for children with Special Educational Needs and Emotional and Behavioural Difficulties, support for teaching literacy, they facilitate more productive group work, enabling more practical and creative activities, and they help with classroom management.
- ✦ There is some evidence that as the numbers of children increase so too does the teachers' sense of stress.

Introduction

There is often a tacit assumption that increasing the number of adults in a class will be beneficial to children in terms of their learning and achievement, although the research evidence to support or refute this is relatively limited. Several previous research studies have described the typical adult other than teachers working in primary classrooms as having poor working conditions, contracts and pay, and training. They have also found considerable uncertainty about their role and deployment in classrooms, including whether the assistant's role is to augment or substitute for the teacher. Lee and Mawson (1998) and Moyles and Suschitzky (1997) identify a "dilemma" between providing support for the teacher and providing support for teaching.

However, there has been little research that analyses the work that TAs and other adults do in primary schools, and still less that examines in a systematic way associations between classroom support and processes and teaching in the classroom, and effects on pupils' educational progress. (Note: in line with recent usage, the generic term 'Teaching Assistant' is used to describe all support staff in classes.)

The Institute of Education Pupil Adult Ratios study was designed to extend previous research by examining in a systematic way the effects of support staff in classes over Key Stage 1 (KS1) on children's educational progress and classroom processes, on the basis of a large scale, longitudinal and multi-method study.

The research project had three main aims:

1. provide descriptive information on numbers and types of TAs and other adults working in classes;
2. examine whether there were measurable effects of the presence of TAs and other adults on children's educational progress;
3. explore whether the presence of TAs and other adults affected a number of 'classroom processes' such as the amount of time spent on teaching, different curriculum areas, and hearing children read, as well as teacher self perceptions such as stress and enthusiasm.

The research had three general purposes: first, to provide guidance to policy makers; second, to provide guidance to practitioners and others directly involved in education on the classroom implications of pupil adult ratios and deployment of TAs; and third, to contribute to research on the effects of pupil adult ratios (and class size differences), which would be of interest to researchers working in the UK and other countries.

Currently the Government is seeking to increase numbers of TAs in schools and to improve their training and qualifications. The fieldwork reported in this Research Brief took place before the current initiative and is not therefore an evaluation of it. However, as is argued below, any shift towards TAs being engaged in pedagogic activity, implied in

recent initiatives, raises questions about how in practice these activities are carried out, as well as their effect on children's achievements, and this is the focus of the research.

Research Approach

There has been a lot of controversy in recent years concerning the educational effects of class size differences. In the USA the often-cited Tennessee STAR Research Project used an experimental research design within which children in schools were randomly assigned to three different classes: small, regular and regular with teacher-aide. The study provided evidence that children in small classes did better academically than those in regular classes, and also those in regular classes but with a teacher-aide. This implies that it is class size rather than the presence of extra support staff that is important. However, in previous work we have identified important problems with experimental research designs that call into question the STAR results, at least in their generalisability to the UK. It is our conclusion that correlational or observation designs, that is, research which seeks to model effects of naturally occurring differences in class sizes and pupil teacher ratios, without intervention or control, can be more valid and more useful for policy recommendations (see Goldstein & Blatchford, 1998). Such research, however, will need to overcome limitations of previous research.

The study therefore had the following features:

- It was longitudinal, with baseline measures, and follow-up of the same pupils, over the three years of KS1.
- It made use of reliable measures of class size, extra staff and adults, and educational outcomes.
- It made use of sophisticated statistical techniques, including multilevel modelling, able to capture the complex structure of educational data.
- It employed a multi-method approach to data on classroom processes such as teaching interactions and children's behaviour in class, and complementary case studies of individual classes.
- It built on measures and theory developed in previous research.

Sample

The overall Pupil Adult Ratio Projects followed for three years a large cohort of pupils who entered Reception classes during 1996/7, and a second separate cohort of pupils who entered Reception classes one year later during 1997/8. Full details of the numbers of LEAs, schools, classes and pupils at the beginning of the study are shown in the following table.

	Cohort 1	Cohort 2
Number of LEAs	9	6
Number of Schools	199	134
Number of Classes	330	212
Number of Pupils	7142	4244

The children were followed for the first three years of school, that is, through Reception, Year 1 and Year 2. The research design involved random selection of schools within the participating LEAs. All children entering Reception class in a selected school during the year were included in the study.

Data Collection

There were a number of forms of data collected in the study:

- information on types of adult support (summarised in terms of three ratios - pupil:teacher, pupil:staff including teacher, pupil:all adults, including parents in class)
- background details on the pupils,
- pupil assessments in maths and literacy,
- teacher estimates of time allocation in teaching activities, different curriculum areas and hearing children read,
- teacher end of year reports on the deployment and effectiveness of classroom support,
- scales measuring teacher perceptions of stress, enthusiasm and satisfaction,
- information from case studies of classroom support in small, medium and large classes, designed to provide complementary information to that in the main quantitative study.

The aim was to use the strengths of different approaches in a complementary way and to check for consistencies across different forms of data, thereby strengthening the validity of conclusions.

Key Results

1. Analysis of relationships between numbers of staff and adults in addition to the class teacher, and class size, on the one hand, and pupils' educational progress over Reception, Y1 and Y2, on the other hand, showed the most significant effects for class size were in the Reception year. Results showed no clear effects of additional staff and adults on children's educational progress in any of the three years of KS1. The most noticeable effects on children's educational progress, particularly in the Reception year, were therefore as a result of class size, and there was no obvious effect of extra staff or parents.

2. Analysis of connections between the three ratio measures (and class size) and three sets of classroom processes: teaching time, curriculum time, and hearing children read, showed that the presence of extra staff and adults did not have a consistent or clear effect on teaching and curriculum

time and none on the time a teacher had to hear children read individually. The clearest result was that as class sizes increased there was less time for teaching overall and for hearing children read individually.

3. Analysis of the class teachers' end of year questionnaires showed that they felt TAs and other adults were making a positive contribution, in terms of :

i. increased attention and support for learning

- * more one to one attention
- * support for children with SEN and EBD
- * support for teaching of literacy

ii. Increased teaching effectiveness

- * productive group work
- * productive creative and practical activities
- * lesson delivery and curriculum coverage

iii. effective classroom management

- * day to day teaching related activities

iv. effects on children's learning outcomes.

4. Analysis of relationships between the three ratio measures (and class size) and three aspects of what we call teachers' professional self perceptions did not show a clear or strong pattern overall, though there was some evidence that as the numbers of children increased so too did teachers' sense of stress. This tendency is consistent with open-ended comments from teachers in the same end of year questionnaire. These comments indicated that teachers could suffer with large classes; moreover, they believed that having extra support in class could help.

5. The case study results were helpful in reconciling the seemingly different picture about the contribution of TAs and adults arising from the end of year questionnaires - which were broadly positive - and results from the statistical analyses of relationships with educational progress - which were less clear. The most obvious point to arise out of the case studies was that the adult help in classes *varied in terms of its effectiveness*, and that this is probably the main reason why the quantitative analyses did not show clear evidence of the benefits of classroom support on children's educational progress. In other words, in some classes staff and adults were effective and were used effectively by teachers, but in others they were not.

6. In the case studies we analysed ways in which, and the reasons why, support staff were effective or not, in terms of four main themes.

i. Reliability and consistency in classroom support. There were problems when support was not planned for and was fragmented. Teachers could spend valuable time supporting staff, or opportunities were lost.

- ii. The need for careful planning. There were examples given which showed that more support does not necessarily mean more effective support, even when the staff involved were individually effective. There is a need for communication between the teacher and TAs, for example, about lesson plans and learning objectives, and a relationship within which TAs feel valued.
- iii. Implications for training. It was concluded that to be effective this would need to be integrated into classroom practice and connect with a teacher's aims and lesson plans, and take account of the often deeply held views of TAs about their role and contribution. One feature of case studies was the potentially important role of a teacher's modelling of concepts to children, to be then followed up by TAs.
- iv. Support staff will inevitably be involved in direct teaching interactions and it is therefore necessary to consider what kind of contribution is appropriate. This will need to include consideration of deployment in relation to curriculum areas and general expectations about, for example, support with group work, but importantly it will need to consider actual interactions with children, as well as the pedagogical knowledge that underpins such interactions.

It is important to interpret these results carefully. As with all educational research the results are historically located. For the most part results relate to a period before the current Government drive to improve recruitment of TAs and provide training for them, and there were some suggestions from the end of year comments and from the case studies that initiatives such as the National Literacy and Numeracy Strategies were having an impact on the way that staff were being used in classrooms. Another limitation is that the categories used for classroom support were broad. Although we distinguished between class size, numbers of additional staff (the closest to the current preferred term of 'teaching assistants') and other adults (usually volunteers and usually parents), it was not possible in the models with educational progress as an outcome to take account of the type and length of training these people received or the length of their classroom experience. The statistical analysis is therefore sophisticated but based on relatively broad measures.

Conclusion

It was found in this study that the use and effectiveness of adult help in classes varied between classes, and that this is probably the main reason why the quantitative analyses did not show clear evidence of the benefits of classroom support on children's educational progress. Some staff and adults were effective and were used effectively by teachers, but some were not.

The results show that support staff are involved in direct face-to-face interactions with pupils and we feel there is a need to articulate more deliberately what kinds of pedagogy - in particular regarding direct teaching interactions - are

relevant, and to use this to inform training. Overall, therefore, we conclude that one cannot separate views about the deployment of TAs and other adults from views about effective pedagogy. It is suggested that models of pedagogical knowledge and classroom teaching be examined and developed to help position the contributions of teachers and TAs, and help inform support and training for TAs.

Copies of the full report (RR335) - priced £4.95 - are available by writing to DfES Publications, PO Box 5050, Sherwood Park, Annesley, Nottingham NG15 0DJ.

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Copies of this Research Brief (RB335) are available free of charge from the above address (tel: 0845 60 222 60). Research Briefs and Research Reports can also be accessed at <http://www.dfes.gov.uk/research/>

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