

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

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Institute of Education
University of London

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

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Introduction and Background

There has been little research that analyses the work that Teaching Assistants (TAs) and other adults do in primary schools, and still less that examines in a systematic way associations between classroom support and teaching and curriculum coverage in the class, and effects on pupils' educational progress.

The Institute of Education Pupil Adult Ratios study was built on parallel research at the Institute of Education on class size differences. Overall, it was designed to help resolve a number of questions about the educational effects of class size differences and pupil adult ratios at Key Stage 1 (KS1).

The research was designed 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, the deployment of TAs, and class size differences; and third, to contribute to research on class size effects and pupil adult ratios, which would be of interest to researchers working in the UK and other countries.

This component of the research project addressed three aspects connected to TAs in KS1 classrooms: first, descriptive information on numbers and types of classroom support (e.g. paid staff, parents and volunteers) in classes and how these related to class sizes; second, whether there were measurable effects of the presence of classroom support on children's educational progress; and, third, whether the presence of classroom support affected a number of 'classroom processes' such as the amount of time spent on teaching, in different curriculum areas, and hearing children read, as well as teacher self perceptions such as stress and enthusiasm.

Research Approach

In previous work the research team have identified important problems with experimental research designs that make questionable the traditional reliance on experimental data as the main source of evidence on causal effects of class size and staffing differences. 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 several or more years. It made use of reliable measures of class size, extra staff and adults, and educational outcomes, and it made use of sophisticated statistical techniques, such as multilevel modeling (MLM), able to capture the complex structure of educational data, along with 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.

The DfES Pupil Adult Ratios study had three components. Study A: the quantitative study of connections between class size, adult child ratios and educational outcomes (using existing data on reception and year 1) and Study B: the quantitative longitudinal study of associations between class size and adult child ratios and educational progress over reception and KS1, are dealt with as one in this report because together they cover children's progress over the whole of reception and KS1. Study C: the case studies of classroom support in small, medium and large classes, was designed to provide complementary information to that in the main quantitative study.

Sample

The overall Class Size and 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. At the start of the project there were in Cohort 1, 7,142 pupils in 330 classes in 199 schools in 9 LEAs. The second cohort comprised 4,244 pupils in 212 classes, in 134 schools in 6 LEAs. The children were followed for the whole of reception and KS1, that is, through the three years: reception, Y1 and Y2. The research design involved random selection of schools within the participating LEAs. All children entering reception 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, For this report we have made use of selected types of data on the total sample; that is, information on class size and adult support in class, background details on the pupils, pupil assessments in maths and literacy, teacher estimates of time allocation, teacher end of year reports on the effectiveness of classroom support and scales measuring teacher perceptions of stress, enthusiasm and satisfaction. Information also comes from case studies on a sub sample of classes. 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.

Results

Results are organised into six sections:

1. A description of classroom support, pupil teacher, staff and adult ratios, and class sizes in the project schools;
2. Relationships between pupil:teacher, pupil:staff and pupil:adult ratios and classroom teaching (in terms of amount of teaching time overall, time teaching individuals, groups and the whole class); time in different curriculum areas; and the frequency and duration of hearing children read;
3. Teachers' reports on the contribution of TAs to the effectiveness of teaching and learning in the class;
4. Whether teacher professional self-perceptions of stress, enthusiasm and satisfaction were affected by extra support in class;
5. A complementary, more focused and individualised picture of the role and contribution of TAs, on the basis of case studies in classes varying in size;
6. Quantitative MLM analyses of relationships between teachers and classroom support staff and educational progress over KS1.

These results can be summarised as follows:

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. In some cases support staff and adults did not appear suited to an educational role with young children, and it is that unlikely training would be successful.

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 teacher's modelling of concepts, to be 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 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 therefore it is felt that 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. The DfEE and now DfES has presented some of the pedagogy of literacy and mathematics in their induction programme for teaching assistants at both primary and secondary school level. Overall, therefore, it is concluded that the views about the deployment of TAs and other adults cannot be separated 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.

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INTRODUCTION

Teaching Assistants in Primary Schools: A review of Issues and Previous Research

There is often a tacit assumption amongst primary teachers and parents that increasing the number of adults in a class will be beneficial to children in terms of their achievement, although the research evidence to support or refute this is relatively limited. It seems important, therefore, to examine this assumption, especially as the January 2000 figure for FTE education support staff in mainstream primary and secondary (i.e., excluding nursery, special and PRUs) in England only is 100,459. The 1998 Green Paper *Teachers: Meeting the Challenge of Change* (DfEE, 1998) explains that the Government aims to increase the numbers of Teaching Assistants (TAs) by 20,000 full-time (or equivalent) by March 2002. Additionally, local authorities are being mobilised to give standardised training to TAs from September 2000. These induction materials for new TAs are now available for delivery by local authorities and the Local Government National Training Organisation is developing National Occupational Standards for TAs. QCA will develop a qualifications framework for TAs. There is evidence that the deployment of classroom support has improved in recent years (Farrell, Balshaw & Polat, 1999), though systematic evidence on links with educational progress is lacking.

Several research studies have profiled the typical adult other than teachers working in primary classrooms as being female, white and in her mid-thirties (Lee & Mawson, 1998; Moyles & Suschitzky, 1997). Lee and Mawson (1998) had 767 questionnaires returned in their study and found that there were a variety of job titles assigned to classroom support staff in schools. Some were known as 'Learning Support Assistants', others were 'Non-Teaching Assistants', but the most common designation was 'Classroom Assistants'. The variety of job titles signals the wide diversity of training/education, working conditions, contracts and pay that has been experienced by this group. However, the Green Paper 'Teachers: Meeting the Challenge of Change', (DfEE, 1998) refers to support staff working in classrooms as 'Teaching Assistants.' The document 'Working with Teaching Assistants: A Good Practice Guide' claims that this term "*captures the essential 'active ingredient' of their work; in particular, it acknowledges the contribution which well-trained and well-managed assistants can make to the teaching and learning process and to pupil achievement*" (DfEE, 2000, p.4). This implies that these adults will be expected to aid the teacher in his or her task and will themselves engage in pedagogical activities with children. It could be argued that this is merely a recognition of the work that support staff in primary classrooms have already been doing. Farrell et al (1999) found during the course of their research in schools with TAs working with children with special educational needs, that there was a clearly understood distinction between the role of the TA and the teacher by all the stakeholders, including parents and children. The TA was perceived as being responsible for implementing programmes of work for the children, under the guidance of the teacher. However, other studies have not been able to draw such a conclusion. Mortimore et al (1992) raised questions about the 'boundaries' between the role of the professional teacher and the non-professional TA (p.44) and pointed to two roles available to the TA:

- Augmentation (when the TA is involved in activities that enable the teacher to provide an enhanced curriculum)
- Substitution (when the TA has routine tasks delegated to her/him)

What is significant in the more recent studies is the apparent blurring of these roles. Lee and Mawson (1998) found that 77% of their sample of TAs were involved in both augmentation and substitution at different times. The study by Moyles and Suschitzky (1997) had similar findings, but described a “dilemma” between providing support for the teacher and providing support for teaching. This seems to signal a shift towards TAs engaging in pedagogic activity and not merely implementing programmes of work, which raises issues of training and education as well as status and working conditions. On the issue of roles and responsibilities, the DfEE (2000) document states:

“By definition, support for the teacher is at the heart of the role of the teaching assistant...The teacher plans lessons and directs learning. The teaching assistant provides support to the teacher and through this to pupils and to the teaching of the curriculum. The teaching assistant works under the direction of the teacher...” (p.24)

Both the Green Paper (DfEE, 1998) and the latest DfES document (2000) raise the profile of TAs in schools, giving them coherence as a sub-professional (or para-professional) group with training and qualifications and the recognition that schools need to change to utilise their specific skills and competencies.

Review of research on ‘teaching assistants’

The recent Green Paper says: *“Teaching assistants are playing an increasingly important role in schools on tasks such as literacy support and helping pupils with special educational needs”* (DfEE, 1998, para 141). However, the research on the effectiveness of TAs in primary classrooms in terms of pupil outcome is relatively limited. Research conducted by Moyles and Suschitzky (1997) for the Trade Union and professional organisation ATL is one of the most extensive. Observations were conducted with teachers and TAs in classes in the same year in fifteen schools. The researchers concluded that, whilst TAs spent more concentrated time in supporting children’s learning than classroom teachers, the pedagogic practices of TAs were often uninformed. TAs, having not been involved in the lesson planning process, were often not aware of the learning aims of a particular task or activity and therefore did not provide appropriate teaching and/or support for the children. TAs were often focused on the product of a task rather than the learning process itself and were often reactive in learning situations. Moyles and Suschitzky (1997) also found that TAs were able to “perform” like a teacher, outwardly, but were unable to conceptualise the deeper pedagogical understandings that were required for the teaching tasks they were being asked to perform (p.3). Despite these shortcomings, TAs were often used in primary classrooms to work with children in lower ability groups in order to enhance their literacy and numeracy skills.

Moyles and Suschitzky's (1997) interview data are, perhaps, the most revealing of the differences between TAs' and teachers' understandings of pedagogy. These suggested that TAs have undeveloped understandings of pedagogy (seemingly confirming the observation data) compared to the teachers. This is in many ways unsurprising considering the training, education and continuing professional development required of teachers compared to that of the assistants. The researchers equate their research findings to models of teachers' career trajectories proposed by Berliner (1992) and Bennett and Carré (1993). Using this model, the researchers concluded that TAs behave as 'novice' teachers rather than 'experts'. Whilst this may be a valid theoretical position to take for teachers, it is questionable when applied to TAs who have not had similar training and education to teachers and who, unlike teachers, have not been socialised into the profession.

The most convincing research on the pedagogical effectiveness of para-professionals in primary schools is in the domain of literacy and most particularly in evaluations of literacy interventions for children who are deemed to be low achievers in literacy. Wasik and Slavin (1993), for example, compared five reading interventions for low achieving first grade children (six year olds) in the United States of America that used one-to-one teaching programmes for children. Three of these programmes required teachers to deliver the intervention, and two required para-professionals. The programmes delivered by teachers (which included Reading Recovery and the 'Success For All' programme) had consistently larger effects on pupil outcomes than those delivered by the para-professional groups. The interventions delivered by para-professionals tended to be more focused on the breaking down of skills and sub-skills of reading and applying these to print, with a systematic approach to phonics teaching, representing a skills-mastery approach of individual components. Conversely, the teacher-delivered interventions tended to require deeper understandings of literacy acquisition by the teachers and were less systematic in their approach to the acquisition of skills. However, none of the evaluations collected adequate process data to assess how the interventions were delivered or to analyse contextual elements that may have contributed to the successes and failures of the programmes. This is a serious evaluation weakness.

More recent research by Elliot, Arthurs and Williams (2000) evaluated a reading intervention for reception children in three primary schools in communities around Sunderland that were socially and economically disadvantaged. This intervention programme was delivered by volunteer tutors who were not trained teachers. These volunteers received six hours of training over three weeks and a manual to work from. Their key task was to enable children to develop a range of skills. The programme emphasised the teaching of phonological awareness, letter knowledge and allowing the children to experience a wide range of reading behaviours. The tutor was committed to working with the children for two half days per week, although this could be on an individual or group basis. The evaluation was based on an experimental model with 140 children forming the sample. Children were randomly allocated either to the control or the experimental group and were pre and post-intervention tested. Ninety-nine of these children were re-tested three years later on a battery of

standardised assessment tools. The overall results indicated that the intervention had failed, as the children in the experimental group had not achieved significantly better results than the control group. The researchers suggested reasons for this, although they did not mention the collection of any process data that contributed to their speculations.

It is difficult to draw specific conclusions from the Sunderland study, but it has been possible to make some general points across the range of evaluations of reading interventions. As outlined by Hurry (2000), in her review of reading interventions for primary aged children, the effect sizes for programmes taught by TAs or volunteers has been significantly smaller than those delivered by teachers. Hurry also notes that the programmes themselves differed depending on the person delivering them. Interventions delivered by TAs have been highly structured, using scripted instructional materials. They have also tended to focus on phonological skills and have only small amounts of text reading. The teacher delivered programmes have tended to be much more flexible and rely on teachers' understandings of the reading process and pedagogical knowledge. This is especially true of Reading Recovery, which requires intensive and ongoing training and education of people who are already teachers for its delivery. Hurry concludes that there is not enough research to ascertain whether TAs can be effective in raising achievement in literacy, but the existing research does suggest that to date the interventions administered by classroom support staff have not achieved their aims. The research concerning literacy interventions by TAs raises serious issues concerning the pedagogical competence of TAs and the kinds of training and education they require to be successful.

The Institute of Education Study

We have seen that there is little research that analyses the work that TAs do in primary schools. There is even less which examines in a systematic way associations between classroom support and teaching in the class and pupils' educational progress. The research that currently exists is inconsistent in its findings.

The Institute of Education Pupil Adult Ratios study was built on parallel research at the Institute of Education on class size differences. Overall, it was designed to help resolve a number of questions about the educational effects of class size differences and pupil adult ratios at Reception and Key Stage 1 (KS1). The project as funded by the DfES had three components: Study A - a quantitative study of connections between adult child ratios, class size and educational outcomes (using existing data on reception and year 1); Study B - a quantitative longitudinal study of associations between adult child ratios, class size and educational progress over the whole of Key Stage 1; and Study C - case studies of small, medium and large classes. One advantage of building on the existing class size longitudinal study was that setting up a study of this sort is very time consuming and depends on the creation of a large measure of goodwill from participating LEAs and schools. The existing research had been fortunate in this regard.

The three components were designed to mutually inform each other and to have several direct benefits. First, they would provide guidance to policy makers; second, they would provide guidance to practitioners and others directly involved in education on the classroom implications of pupil adult ratios, the deployment of TAs, and class size differences; and third, they would be a contribution to research on class size effects and pupil adult ratios, which would be of interest to researchers working in the UK and other countries.

Background to the Study

The overwhelming professional judgement is that, other things being equal, smaller classes will enable teachers to provide a better quality of educational experience for pupils, and hence better educational attainments, and, as we have said, it is probably also widely assumed that increasing the number of adults in the classroom will be beneficial to children and the classroom teacher. However, research on the effectiveness of TAs (as we saw above) has been limited.

On the basis of our research reviews and work in this area (e.g., Blatchford & Mortimore, 1994; Blatchford & Martin, 1998; Goldstein & Blatchford, 1998), it was felt that information was needed on three main areas: first, data on class size and adult child ratios, as experienced by teachers and pupils; second, evidence on the effects of class size and adult child ratios on educational progress; and, third, systematic results on the mediating role of classroom processes, that is, connections between staffing in class and class sizes on the one hand and classroom processes like time in teaching and curriculum areas on the other. Accordingly, the research addressed three main questions:

a. What are the characteristics of teachers and classroom support staff in the classes and how large are classes in schools?

There have been a number of limitations with some class size and pupil teacher ratio (PTR) measures, and it was felt important to obtain measures that described the situation as experienced by pupils. Defining and measuring class size and PTRs may appear straightforward but there are a number of difficulties. There is not space to discuss these in full, but see Blatchford, Goldstein and Mortimore (1998) and Goldstein and Blatchford (1998). There is a distinction between the class size as it appears on the school register and what might be called the 'experienced' class size, that is, the number of children in a classroom at any given moment during the school day. We also need to be clearer about different adult to child ratios. There is a need to differentiate between teachers, different forms of adult help, and parents (see below). Measures must be closely tied to a child's experience if they are to be precise enough to be examined in relation to educational progress.

b. Does the number of pupils and pupil adult ratios affect pupils' educational attainment and progress?

The clear answer to this question, likely to be given by teachers, is yes, but the early research evidence from the UK was not clear. The recent STAR research in Tennessee, in the US, has done much to renew interest in research evidence on class size effects. This is a large-scale experimental study that has provided evidence that small classes do have benefits for young children in schools (Word et al, 1990), and this has influenced policy in the US, and other countries, including the UK and The Netherlands (Bosker, forthcoming). Though there are important questions about the validity and generalisability of results from the STAR project (Goldstein & Blatchford, 1998; Mitchell et al, 1991; Prais, 1996), it suggests, along with reviews of the literature (e.g., Blatchford & Mortimore, 1994; Glass et al, 1982; Robinson & Wittebols, 1986; Slavin, 1989), the most solid conclusion that can be drawn: the largest effects have been found with children soon after, or at the point of entry into, the school system. There is also evidence that class size has most effect in the case of disadvantaged children (see Blatchford & Mortimore, 1994; Goldstein & Blatchford, 1998). Evidence on the educational effects of extra classroom support is not so extensive or clear.

c. Are processes within classrooms affected by class size differences and pupil teacher ratios?

Assuming class size and PTR differences have an impact on pupils' academic progress, this still leaves unanswered questions about what mediates the effect. In other words, the association between class size and PTRs and outcomes in terms of pupils' attainments presumably has to be explicable in terms of some other changes within classrooms. Unfortunately, we have little systematic information on what processes might be affected. Although the STAR project found differences in the attainments of children in small and regular classes, the researchers were not asked by the state of Tennessee to enquire about processes underlying the effect (Achilles, pers. comm.), and so we do not know WHY small classes were effective.

Institute of Education Class Size and Pupil Adult Ratio Project: Research Approach

It is our belief that correlational or observation designs, that is, research which seeks to model effects of naturally occurring differences in class sizes and pupil adult ratios, without intervention or control, can be more valid and more useful for policy recommendations than experimental research (see Goldstein & Blatchford, 1998). Such research, however, would need to overcome limitations of previous research. The study had the following features: it was longitudinal, with baseline measures, and follow-up of the same pupils, over several or more years. It also made use of reliable measures of class size and educational outcomes. And it made use of sophisticated statistical techniques, such as multilevel modelling, able to capture the complex structure of educational data, along with 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.

Results on the educational effects of class size differences are discussed in separate reports (see Blatchford, Goldstein, Martin & Browne, in press; Blatchford, Kutnick, Baines & Martin, 2001; Blatchford, Moriarty, Edmonds & Martin, 2001). A summary of results can be found in Appendix 1.

As described above, the DfES Pupil Adult Ratios Study had three components. Study A and Study B can be dealt with as one because together they cover children's progress over the whole of reception and Key Stage 1 (KS1). Study C (i.e., the case studies of classroom support) was designed to provide complementary information to that in the main quantitative study, and is dealt with in a separate section in this report. The methodology used in this and other components is described below.

The data from these components allow a more complete analysis of effects involving pupil adult ratios and class size differences than has been possible in previous research. It enabled us to compare the strength of the relationships between the different measures and educational outcomes. Interestingly, in the STAR project, no differences were found between the progress of children in regular classes (around 25 children) with and without a teacher aide, indicating that it is class size rather than the ratio of pupils to adults in a classroom that is crucial; however, it is necessary to be cautious about this finding - there may be differences between Tennessee and the UK, for example, in the training and experience of staff. It will also be important to assess the effectiveness of other voluntary help in the classroom. The data also allowed a multi-method analysis of relationships between pupil adult ratios and several aspects of classroom processes and teachers' professional self-perceptions.

METHODS

Sample

The overall Class Size and 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. Numbers of LEAs, schools, classes and pupils in each cohort are shown in the table below. The children were followed for the whole of reception and KS1, that is, through the three years: reception, Y1 and Y2. The research design involved a random selection of schools within the participating LEAs. All children entering reception in a selected school during the year were included in the study.

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

Data Collection

There were a number of forms of data collected in the study. For this report we have made use of selected types of data on the total sample; that is, information on class size and adult support in class, background details on the pupils, pupil assessments in maths and literacy, teacher estimates of time allocation, teacher end of year reports on the effectiveness of classroom support and scales measuring teacher perceptions of stress, enthusiasm and satisfaction. Information also comes from case studies on a sub sample of classes. As described above 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.

Basic information collected in the study is shown in Figure 1.

Each type of data collection is now briefly described, but is described in more detail when relevant results are discussed.

Main Sample

1. Information on class size and adult support in class.

Data were collected in two main ways:

a. School Entry Assessment Booklets: Teachers were asked to record information on class size (on register), age composition of class, number of teachers in class, TAs (details of personnel and hours), and other classroom support, for example, special educational needs (details of personnel and hours).

b. Termly Questionnaires: In the spring and summer terms, teachers were sent questionnaires asking for information relating to the situation at 10 a.m. on one of three specified days. They were asked to choose the most 'normal' of the days. So, for example, if they were going on a school outing they were asked to use the nearest appropriate date. If they were engaged in non-classroom activities at 10 a.m., for example, PE or assembly, they were asked to choose the nearest time when they were engaged in normal classroom activities. The questionnaire asked for information on: class size as register, experienced class size (i.e., present in classroom at given time), number of children absent, children present who were not on the class register (e.g., extra children from the class of an absent teacher, or peer tutoring), children on the register elsewhere in school at a given time (e.g., receiving language support, library work) and therefore not present at 10 a.m., adults present at the time in terms of the number of usual class teachers, nursery nurse or equivalent, TA, specialist teacher, specialist TA, parent, student teacher, and other adults.

So, taking a. and b. together it was possible to calculate measures for each year of:

- registered class size
- registered pupil teacher ratios
- registered pupil staff ratios
- registered pupil adult (including parents and helpers) ratios
- experienced class size
- experienced pupil teacher ratios
- experienced pupil staff ratios
- experienced pupil adult (including parents and helpers) ratios

2. Termly Questionnaires: A questionnaire on classroom activities during a half-day period completed twice during the year by the class teacher. This examined time devoted to management and other non-teaching activities and proportions of whole class/small group/individual teaching, as well as more detailed information on class size, classroom support, and grouping practices.

3. End of Year Questionnaires: Data on teacher and head teacher attitudes and experiences concerning a range of issues relating to class size, classroom support, biographical information about teacher qualifications and experience, and professional self perceptions, for example, concerning stress and satisfaction.

4. Start of Reception and End of Year Assessments of pupils in maths and reading: An adapted version of the Avon School Entry Assessment was used (beginning of reception year), followed by assessments of maths designed within the Institute of Education Class Size Study and the Hodder and Stoughton Literacy Baseline Test (end of reception), Young's Group Reading and Maths Tests (end of year 1), and an adapted version of KS1 English and Maths National Curriculum test results (end of year 2).

5. Pupil Behaviour Ratings: (completed by teachers on individual pupils), assessing adjustment to school, peer relations, relationships with adults, and behaviour problems.

6. Pupil Background Details: Including age, sex, free school meal entitlement, English language fluency, previous nursery education, attendance and special educational needs.

7. Case Studies of a sub-sample of classes of a different size (Study C): The aim of this part of the research was to provide complementary information to that in the main quantitative study. A very different form of methodology was used to provide a more detailed portrayal of individual classes, which provided the basis for a more interpretive and grounded analysis of factors related to size of class.

One overriding choice is between two main types of research approach: 1. collecting data in an objective way, using variables/headings drawn from the literature and results so far, and then drawing conclusions later (in the spirit of a quantitative paradigm), and 2. using a more dynamic, interpretative style of research in which headings might be used as the basis of interpreting what is observed and guiding discussions with teachers (in the spirit of qualitative/ethnographic paradigm). This component of the research might be considered a middle course between these two. The methodology was developed on the basis of field visits to schools. We defined selected aspects of classroom learning and experience in advance (based on the literature and data from the quantitative study so far), and collected data using a form of semi-structured observational event sampling, which used the aspects as categories structuring what to observe, and include ongoing notes and comments by observers. Semi-structured interviews were conducted with class teachers, again using the main headings. More informal discussions took place with head teachers and, where possible, other teachers in schools.

If components A and B were designed to provide systematic information on numbers of staff, the aim of Study C was to find out more about the use of staff on a day to day basis. From early observations it was apparent that classroom support allocated to teachers could vary in its effectiveness and reliability (e.g., in terms of when they are available to help). It may appear with a large class that all help can be welcome, but it was found that, on top of managing a large class, teachers may have to work doubly hard to organise children's work to accommodate classroom support available - time that could be spent on more direct teaching with children. However, it is also possible to miss opportunities arising from having a small class because

classroom support is not effectively used. It was our belief that the information collected in the case studies could inform that collected in the quantitative study.

RESULTS

This section reports on six sets of data that each had a connected but different purpose:

1. A description of classroom support, pupil teacher, staff and adult ratios, and class sizes in the project schools.
2. Relationships between pupil teacher, pupil staff and pupil adult ratios and classroom teaching in terms of amount of teaching time overall, time teaching individuals, groups and the whole class; time in different curriculum areas; and the frequency and duration of hearing children read.
3. Teachers' reports on the contribution of Teaching Assistants (TAs) to the effectiveness of teaching and learning in the class.
4. Whether teacher professional self-perceptions of stress, enthusiasm and satisfaction were affected by classroom support.
5. A complementary, more focused and individualised picture of the role and contribution of TAs, on the basis of case studies in classes varying in size.
6. Multi-level model analysis of adult ratios and class size in relation to progress in Maths and English for reception, Year 1 and Year 2.

1. Pupil to adults/staff and teacher ratios: descriptive information on sample schools

In Tables 1 to 3 we show basic descriptive information on the pupil to adult ratios, pupil to staff ratios and pupil to teacher ratios, for both 'present' and 'registered' information, for Cohort 1. As would be expected, for each type of ratio, numbers of children on a particular survey day are slightly less than those on the register. Average class sizes on register were 26 for reception, 27 for Y1 and 28 for Y2. Numbers of children to teachers were very similar to the numbers of children in the class, confirming that there were few cases when classes had more than one teacher. However, there were fewer children to staff (i.e., teachers and paid staff); for the registered information, numbers of children were now 17, 19, and 16 for reception, Y1 and Y2 respectively. Numbers of children to adults (staff plus volunteer helpers, mostly parents), were even lower still – now 14, 16, 17 respectively.

Tables 4 to 6 express data on ratios and class sizes in terms of a four-level categorisation of numbers of pupils – 20 or less, 21-25, 26-30 and 31 or more pupils. The category of 20 or less pupils can be described as 'small', while 31 or more pupils is 'large' (see Mortimore &

Blatchford, 1993). It can be seen that there are more small classes at reception level, though not fewer large class sizes. It needs to be borne in mind that the Government legislation on reducing class sizes at KS1 will have affected the current situation. When staff and adults are taken into account, the number of classes with 20 or less pupils to staff and adults goes up markedly; for example, 86% of classes at reception 84% of classes at Y1 and 76% of classes at Y2 have 20 pupils or less to adults (for registered information).

Tables 7 to 15 give information on the average numbers of additional staff and adults, and additional hours support, for each of the class size categories, for each year. These tables show that there tends to be more additional staff and more additional hours, as class size increases for reception and Y1, though the trend for Y2 is less clear.

Cohort Two – Year 2

Additional Adults in Class

When Cohort 2 were in Y2, it was decided in consultation with the DfES Steering Committee to collect extra information on adults working in the project classes. Information was returned on 95 year 2 classes on a sample day during the spring term (2000). Tables 16(i), 16(ii) and 16(iii) show a breakdown of the type of adults working in these classrooms, in terms of whether they were employed or were volunteers, and their hours of work per week.

Table 17 shows that the mean number of volunteer adults in class is greater than the mean number of employed adults in class. This contrasts with the hours worked, in the sense that employed adults work more hours per week than volunteer adults do.

In 36 classes there was only one employed adult (in addition to the teacher) who worked in the classroom. Very few classes reported having no adult help at all. The average class had 2.6 additional adults providing 4.52 hours of additional support within the classroom per week.

Relevant Work Experience

Information was collected on the work experience of the adults working in these classes. Table 18 shows the levels of experience for employed and volunteer adults. As would be expected, employed adults have more experience than volunteer adults, who perhaps, as parents (mostly), would be more short term in their commitment. Well over half of the employed adults surveyed had more than six years relevant experience.

Role within the Classroom

Further information was also required on the tasks and roles carried out in the classrooms (see Table 19). Given the uncertainty over how to classify these tasks it was decided to obtain information with an open-ended question and then categorise answers afterwards. The terminology used by individual teachers when completing the questionnaires varied. Wherever possible these have been grouped together to provide more consistent and usable categories. The categories used are based on the information supplied by class teachers taking part in the survey.

The majority of employed staff perform the role of learning support assistant, with others supporting pupils with statements of special educational need and children with special educational needs in general within the classroom (for example working with specific groups of children at stages 1 to 4). Most volunteer staff were used to perform general duties within the classroom, but most often focusing on hearing individual children read.

Qualifications

Finally, information was collected on the qualifications of adults working in the classrooms. A total of 51 (24% of employed adults and 22% of volunteer adults) adults working in these classrooms had no qualifications or training, either certificated or internal to the school or LEA (see Table 20). Fewer qualifications were recorded for volunteer adults, with most teachers simply describing them as 'parent', which has been included as a qualification category. The table shows the frequency of qualifications cited, which means that many of the adults have more than one qualification.

2. Associations between teaching time, curriculum coverage, hearing children read and pupil to teacher, staff and adult ratios and class size.

Summary

Results on teaching and curriculum time, and hearing children read, show most clearly that as class sizes increase there is less time for teaching overall and for hearing children read individually. The presence of classroom support 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.

On logical grounds it seems likely that the number of children in a class will increase the amount of time that teachers spend in procedural and domestic matters such as taking the register, collecting dinner money, liaising with adults, lining children up and putting on coats, dealing with domestic duties such as toileting, accidents etc (e.g., Bassey, 1996). It may also be that class size affects teaching, for example in terms of teachers in larger classes having less time for individual children, and spending more time with the whole class, and it may be that this is affected by classroom support. One question asked was whether teachers with larger classes spent more time on procedural/domestic activities and less on teaching/instructional activities, and a second question was whether classroom support affected teaching time; it might be expected that extra support would

allow teachers to spend more time teaching and relieve her of non-teaching activities.

Data were collected in the termly questionnaires. This paper makes use of Cohort 1 data only, and includes data on 279 reception classes, 207 Year 1 classes and 118 Year 2 classes. Teachers were asked to consider the period between the start of the day and the start of lunchtime on the day assigned to them. They were asked to estimate in minutes the length of the morning session, how much 'lesson time' there was in the session (i.e., excluding assembly, morning break, and PE). Teachers were then also asked to estimate how much time, in minutes, during the designated morning, THEY spent in various teaching and non-teaching activities. These were:

- Collecting dinner money
 - Liaising with other adults in the classroom
 - Dealing with domestic and personal problems e.g., toileting, accidents, etc.
 - Outside interruptions such as telephone calls, class receiving visitors, etc.
 - Lining the class up, putting on coats, etc.
 - Time out of class
 - Taking the register
 - Settling the class and allocating tasks and children to groups
 - Dealing with discipline and behaviour problems.
-
- Teaching/working with the whole class
 - Working with an individual child
 - Working with a group of children

The total time spent in the three most obviously teaching activities – that is to say, to the whole class, group or individual - was taken as a measure of 'teaching time'. There were therefore four measures used in the analyses reported here, that is to say, 1. teaching to individuals, 2. teaching to groups, 3. teaching to whole class and 4. total teaching time (i.e., 1+2+3). The other categories, including settling the class and allocating tasks and children to groups, and dealing with discipline and behaviour problems, were added to give a measure of 'non teaching' time, though these are not used in analysis (the way these were calculated means that they are inversely and exactly related to total teaching time). It is recognised that some 'non teaching' activities can be sometimes considered teaching activities, but it was felt that adding the three teaching modes - which asked the teacher specifically about teaching - would provide the most unambiguous estimate of time spent by the teacher in teaching.

Curriculum coverage

We then looked more specifically at how teachers allocated their time to different curriculum areas. We wished to find out to what extent basic curriculum coverage, in National Curriculum terms, was

related to size of class and extra adults in the class. Given recent guidance on time that should be spent in literacy and numeracy, it is clearly important to know whether situational factors like size of class and extra staff affected the amount of time that is spent in these areas.

On the same questionnaires as the termly class size data, teachers were asked to complete a checklist of curriculum areas they covered during the designated morning session. Teachers were asked to say how much time they spent in:

Maths (sets/number; shape, space, and measures);

English (reading - phonic and graphic knowledge; word recognition; grammar and contextual understanding, e.g., sentence structure, full stops, retelling story in own words; other reading activities; writing);

Science/technology;

Art/craft; history; geography; others;.

Teachers were told that groups of children might have been working on different areas at the same time, but that we were interested in curriculum areas THEY covered during the morning session. They were asked to refer only to their own time, not classroom support staff in the classroom. Results are presented here on percentage teaching time in maths and in English.

Hearing children read

We then looked more specifically at one main aspect of the teaching of reading. As part of a previous study of the teaching of reading in 3 LEAs it was found that the two most common reading activities were reading to the whole class and hearing children read individually (Ireson, Blatchford & Joscelyne, 1995). Early information from reception teachers in the current study with large classes showed they were concerned about not having enough time to listen to individuals read, monitor children's reading progress, and plan effective individual reading programmes. Teachers could feel obliged to give up lunchtimes in order to hear children read, and also rely on parental help. To what extent was the amount of time available for hearing children read affected by pupil to teacher, pupil to staff and pupil to adult ratios? Some teachers believed that even though they had help from parents and teaching assistants (with listening to individual children read), it was ultimately their responsibility to monitor each child's progress, and make sure they were being sufficiently catered for.

In order to examine whether class size and reading activities were connected, methods developed in previous research (Ireson & Blatchford, 1993) were adapted. Information was collected on hearing children read in terms of:

a. Frequency of reading activities, in terms of a grid listing types of reading activity:

- Reading aloud to adult in school
- Reading aloud to another child
- Reading alone
- Reading with whole class on, e.g., 'Big Books'
- Reading aloud in a group to adult

For each activity, the frequency was noted in terms of:

- Daily
- 3-4 times a week
- 1-2 times a week
- Less than weekly.

b. The duration of time each child was heard read by an adult per week this term (excluding parents/carers outside school time but including classroom support staff during school time) was estimated in terms of:

- Less than five minutes
- 5-10 minutes
- 10-20 minutes
- More than 20 minutes.

Only the frequency and time spent in hearing children read data are presented here.

Results

Correlation coefficients between pupil teacher, pupil staff, pupil adult ratios and class, for both experienced and present class sizes, for Cohort 1, are presented in Tables 21, 22 and 23.

Examining the total amount of teaching time and class size registered, there is consistent, though modest, evidence that as class size increases the percentage of the day spent in teaching decreases; children in small classes tend to experience more teaching time (see Blatchford, Moriarty, Edmonds & Martin (2001) for more details). Results are significant for reception and Y1 and in the same direction, though less marked, for Y2. The lack of association for teaching time and class size present may indicate that teachers tend to adjust their teaching in general strategic ways in relation to the children normally in class (i.e., on the register), rather than in relation to the number of children at a particular moment in time.

Associations between the pupil teacher ratio measure and percentage teaching time for class size registered is in a similar direction to that for class size, that is, as the number of children to teachers increases teaching time decreases. However, coefficients are lower in comparison to class size and only significant at Y1. With regard to pupil staff and pupil adult ratios and teaching time (for class size registered) the only significant result is for pupil adult ratio at Y2; as the number of children to adults (i.e., all adults including teachers, staff and parents) increases the time a teacher devotes to teaching decreases. This result is also found with class size present. These results indicate that it is class size that is most obviously related to overall teaching time, and this also largely explains the results concerning pupil adult ratio (pupil teacher ratio is very similar to class size, see above). The amount of classroom support overall does not affect overall amount of time spent teaching as much as class size.

Results concerning associations between the three constituent parts of teaching time, that is, percentage time teaching to the whole class, groups and individuals, and the class size and ratio measures, for both class size registered and present, are also shown in Tables 21 to 23. For the most part these do not show a clear pattern. At reception there are no significant results or consistent trends. At Y1 there is some evidence that as the number of children to staff increases so too does the amount of teaching to the whole class (for both class size registered and present; for class size present this trend is also found for pupil adult ratio) and individuals (registered only). At Y2, as the number of children to teachers, staff and adults increases the amount of time teaching to groups decreases. Overall, then, pupil to /teacher/staff/adult ratios are not clearly related to teaching time though there is some suggestion at least for some years that teaching to groups decreases, and teaching to the whole class and to individuals increases with more children to adults.

Results concerning associations between the two curriculum time measures and the class size and ratio measures for both class size registered and present are shown in Tables 21-23. For reception, for class size registered, there is a trend for the teaching to spend less time on English as the number of pupils to adults and pupils to teachers increases; for Y1 there is MORE time in maths as the number of pupils to adults and staff increases; and for Y2 there are no associations. There is therefore a hint of an effect on curriculum time for classroom support (not explainable in terms of class size), but the effect is different for maths and literacy. It seems that only the time the teacher spends on literacy is likely to suffer, in the sense of being reduced, with more children to staff and adults; indeed, possibly the strongest correlations suggest that the amount of time in maths increases with more children to staff and adults. This is difficult to explain but may reflect the fact that in maths, classroom support (more likely in larger classes) is used to boost overall teaching time, whilst this trend is less obvious for literacy.

Finally in this section we turn to associations between hearing children read and the ratio and class size measures. Results in full are shown again in Tables 21 to 23. Results concerning class size are very clear for reception and Y1 for both class size registered and present; as class size increases

teachers hear children read individually for less time and less frequently. This result is also found for the number of pupils and teachers. The association is NOT found for classroom support, however, indicating that their presence in the classroom is not being used to allow the teacher to hear children read more often (though they may be deployed to hear children read themselves).

3. Teachers' experiences of, and views about, the effectiveness of classroom support in terms of teaching and learning, within Reception and Key Stage 1 classrooms.

Summary.

From the class teachers' perspective, TAs and other adults were making a positive contribution, in terms of:

a. increased attention and support for learning

** more one to one attention*

** support for children with SEN and EBD*

** support for teaching of literacy*

b. Increased teaching effectiveness

** productive group work*

** productive creative and practical activities*

** lesson delivery and curriculum coverage*

c. effective classroom management

** day to day teaching related activities*

d. effects on children's learning outcomes.

End of year questionnaires by 151 reception teachers (cohort two) and 208 year one teachers (cohort one) during the summer term of 1998, and 130 year one teachers (cohort two) and 153 year two teachers (cohort one) during the following summer term of 1999 were used for analysis.

Teachers were asked about the contribution of classroom support staff to teaching and learning in the class. The question invited an open-ended response. A coding frame was developed on the basis of an initial analysis of a random sample of questionnaires within each teaching age group. Answers were read through, and categories were devised to capture recurrent themes. The remainder of the questionnaires were then read through, categorised and then tallied with this framework in mind (sample tallied; YR:C2 n=101, Y1:C1 n=158, Y1:C2 n=100, Y2:C1 n=103). Results are expressed in terms of the number and percentage of teachers who gave responses to these individual categories. It was possible for teachers to give more than one answer, and so results are also expressed in terms of the percentage of responses - this is informative about how many gave a particular answer as a

proportion of all responses and is also useful in calculating collective categories that ‘lump’ together individual response categories that reflect a common theme.

The analysis also allows an inspection of whether there were any perceived differences across the three teaching age groups (reception, year one and year two teachers). Selections of verbatim comments, expressed by teachers, are used in order to illustrate the main themes.

Almost all of the reception, year one and year two classes received some form of classroom support, and the availability of classroom support was therefore the norm within these reception and Key Stage 1 classes (though the number of hours a week and quality of this support varies, as we show elsewhere).

A main finding was that although not explicitly asked to indicate their degree of satisfaction with the contribution of TAs to teaching and learning, many teachers spontaneously indicated how valuable their classroom support had been (50% of reception teachers, 40% of year one teachers (cohort one and cohort two) and 32% of year two). Year two teachers tended to respond with rather briefer answers, and suggested fewer general comments regarding the perceived necessity of classroom support staff than teachers of lower age groups. This may suggest that teachers of the youngest children perceive their classroom support to be more essential, for example, to help them cope with the demands of younger children.

‘She is invaluable (NNEB support), an excellent communicator with young children, and gives 100% to her job. She makes an enormous impact on the teaching and learning in the class.’ (reception teacher)

‘My class would not run as effectively and smoothly without good G.A support.’ (reception teacher)

‘It makes a significant difference to have extra adult hands/ help in the classroom.’ (Year 1 teacher, C2)

‘Huge and valuable. 2 minds, 2 pair of hands, 2 places at one!’ (Year 2 teacher)

Only a very small percentage of teachers (1-4% across teaching age groups) said that classroom support had not been helpful, and occasionally a hindrance, to teaching and learning. The case studies, described below, suggest this may underestimate the true picture.

Teachers with larger or mixed aged classes seemed to find extra support helpful.

‘She was invaluable and of greatest help when I have had over 30 children in the class. Then it is vital to have another helper.’ (reception teacher)

'Helps with difficulty of teaching mixed age class - makes things more manageable.' (Year 1 teacher, C2)

'Effective. In a class of 34 it is impossible to give the children the support they need if not supported by NNEB for at least some of the time.' (Year 2 teacher)

On the whole, therefore, reception, year one and year two teachers saw TAs as beneficial, making a valuable contribution to the effectiveness of teaching and learning within their class. In general terms this appeared to be related to their personal qualities and experience of working with young children, as well as their training.

'The quality of the work is enhanced when my assistant is with a group of children. She is very experienced and contributes very much to the effectiveness of teaching and learning.' (reception teacher)

'A classroom assistant is even better (than adult help) because they receive training about expectations in behaviour and work and the level of independence each child can receive.' (Year 1 teacher, C2)

But, how more precisely do TAs influence teaching and learning in class? Tables 24 and 25 give a detailed breakdown of all the answers given by teachers at each age level, a summary of average responses across the year groups (Table 24), and the organisation of these individual categories grouped on conceptual grounds into four main types (Table 25).

1. Increased attention and support for children

The most frequent individual response, given by more than 20% of teachers at all three ages, was the view that TAs contributed through increased individual attention to pupils (33% reception teachers, 21% year 1 teachers cohort one, 31% year 1 teachers cohort two and 28% year 2 teachers). When classroom support is available, teachers felt that children received more individual help and attention, either from the assistant or themselves. This provides children with increased opportunities for individualised attention, learning support and feedback. Thus, individual learning needs are more likely to be met.

'The support has provided valuable one-to-one time for children who need to develop skills/concepts. Children who need to work on the basics and children who are most able and need extending.' (reception teacher)

'Young children need a great deal of 1 to 1 help in terms of explanation, reassurance, encouragement and simply keeping on task.' (Year 1 teacher, C1)

'It has provided extra support for children, to assist with their work and to give encouragement.'
(Year 2 teacher)

Furthermore, reception teachers reported that this benefits the children as they receive more interpersonal attention. Teachers of older children did not report this aspect.

'These young children need support with personal and social development often at an individual level when first adjusting to school routine.' (reception teacher)

This is one reason why classroom support, from a teacher's point of view, can be particularly valuable with the youngest children in school.

Support for children with SEN:

Another allied category of responses referred to support for teaching in a more specific way; for example, extra support for children with SEN. Where classroom support is used to provide extra 1:1 support to children with SEN, teachers feel that it enables these children to make better progress educationally, their needs are more likely to be met within the class when extra support is available, and it can increase their confidence.

'With having a classroom assistant I am able to support children with special needs, either myself leading the activity or direction from the C.A.' (reception teacher)

It has been tremendous help with giving the SEN children extra input in the skills they need developing.' (Year 1 teacher, C1)

'I have a very good classroom assistant who works with the SEN group in my class. The progress made by this group, due to her excellent support, has been tremendous.' (Year 2 teacher)

Support for teaching of Literacy:

Teachers also felt that classroom support can increase the time available to hear individual readers. 1 in 10 reception and year one teachers (in 1998) said that individual reading support had increased. Year one and year two teachers who completed the questionnaire a year later reported increased reading support to a lesser frequency (perhaps reflecting the decreasing role of hearing individual children read as a result of the literacy strategy?).

'It also enables the children to be heard to read more often which we are convinced has a direct relation to increased reading standards.' (Year 1 teacher, C1)

'The children have been heard to read more frequently, which in all cases has helped to raise standards.' (Year 1 teacher, C1)

Classroom support is considered important by teachers as a help in successfully implementing the National Literacy and National Numeracy strategy. This was expressed to a higher extent by year one and year two teachers (summer term, 1999), who commented principally on the National Literacy Strategy. Help is needed to support literacy groups, and to provide learning support to children with special educational needs.

'Children with lower literacy skills (particularly writing) have had extra support which has developed their understanding of structuring and punctuating sentences.' (Year 1 teacher, C2)

'My support assistant has been invaluable this year in helping me support my SEN children during the Literacy and Numeracy Hour strategies.' (Year 2 teacher)

To summarise: teachers felt that classroom support could contribute to support for learning, for example, in terms of increased individual attention for pupils, extra support for children with SEN, and increased support for the teaching of literacy through increased opportunities to hear children read and support for the National Literacy Strategy.

2. Increased teaching effectiveness

There were several individual responses that were more directly related to teaching, in the sense of describing instructional interactions between adults and children. The third most frequent category overall was more productive group work (30% reception, 26% year 1 cohort one, 20% year 1 cohort two and 18% year 2 teachers). Teachers felt that classroom support enables group sizes to be smaller, and that adults can therefore more easily monitor the groups, and activities can be more structured. This in turn permits more challenging and stimulating activities, enabling children to be more focused and actively involved, and yielding more productive work and discussions. This was expressed to a higher extent by reception teachers, and teachers who completed the questionnaire in the summer term of 1998. Having another adult within the class means that an additional group can have teaching input.

'A non-teaching assistant can take small groups of children and provide them with the input specific to their needs.' (reception teacher)

'The children have benefited from working in small groups with an adult to support them. This has meant more of the learning has been through discussion and interaction rather than self-maintaining tasks.' (Year 1 teacher, C1)

'The children can work in a small group with adult support and therefore can produce a higher

quality of work.' (Year 2 teacher)

One benefit of extra help, therefore, is the part it can play in increased teaching effectiveness, though here and with other responses to the questionnaires, it is not always possible to deduce whether TAs were seen as DIRECTLY providing more attention to children or whether their presence allowed teachers to give more attention to children.

There were other ways that classroom support could contribute to teaching effectiveness. One set of comments referred to practical and creative activities, particularly within reception classes. An extra pair of hands and eyes means that there is better supervision for such work, for example, in arts and crafts; design and technology; maths and language games.

'Enables all children at intervals to work on activities which need to be supervised by an adult e.g., art/ craft activities/ water capacity activities.' (Year 1 teacher, C1)

'I have a NNEB student one day a week. This is the day we do art and craft, otherwise we do very little.' (Year 1 teacher, C2)

Given increased demands on teachers' time, some teachers at least felt that creative and practical activities would be more challenging without support in the class.

In addition, teachers expressed the view that, as a consequence of having classroom support, they were able to be more effective in their lesson delivery and curriculum coverage. They were better able to focus upon class teaching and differentiation of work, allowing more heightened and in-depth coverage of the National Curriculum.

'A classroom assistant providing this support while the teacher continues the teaching routine enables the whole class to settle more quickly and learning to be tailored to the class needs.' (reception teacher)

'She leaves me free to extend literacy and numeracy skills of Y1 and Y2 children.' (Year 1 teacher, C1)

'Support enables objectives, differentiation targets to be met.' (Year 1 teacher, C2)

'Teacher able to be more focused.' (Year 2 teacher)

To summarise: from the teachers' perspective, support in class can enhance effective teaching through more productive group work, more creative and practical activities, more focused teaching and lesson delivery.

3. Effective classroom management

Another set of categories indicated that classroom support can make a teacher's workload easier, that is, it assists with classroom management. Main individual responses given by more than 10% of teachers at least one age level were: delegate day to day duties (6% reception teachers, 19% year 1 teachers cohort one, 3% year 1 cohort two and 11% of year 2 teachers); and reduces pressure on the teacher (10% reception, 6% year 1 cohort one, 1% year 1 cohort two and 3% of year 2 teachers).

Classroom support can, therefore, offer aid with day-to-day teaching related tasks, which can lighten the teacher's workload. They can help with displays, mounting work, photocopying, or involvement with lesson preparation. Teachers said that this relieved some of the heavy burdens they felt placed upon them, allowing them to focus upon their actual teaching.

'Their assistance in displays has helped to keep the classroom instructive, stimulating and attractive'. (Year 1 teacher, C1)

'Has helped assist teacher with paperwork, filing etc - cutting down workload'. (Year 2 teacher)

4. Effects on learning outcomes

The findings so far discussed show that teachers feel that the presence of classroom support can provide increased learning experiences for children, via the increased quantity and quality of adult help that children receive. Has this influenced children's learning? 1 in 5 of reception teachers and 19% of year one teachers (cohort one) said that as a result of effective classroom support the standards of learning and progress had been raised. They reported that children show greater achievements and complete work more quickly, demonstrating an enhanced quality and pace of learning. This was mentioned, to a lesser extent, by year one teachers (cohort two) and year two teachers (9% and 8% respectively).

'It would be difficult to achieve the high standards we currently have if extra supervision was unavailable'. (reception teacher)

'The support has helped to sustain the breadth of curriculum and contributed to the standard of learning the classroom'. (Year 1 teacher, C1)

'Children learn so much more with adult guidance'. (Year 1 teacher, C2)

Furthermore, a small percentage of teachers explicitly expressed that having classroom support created a more purposeful working atmosphere. The working pressure is reduced allowing the teacher to feel more relaxed and focused. As a result their day is more enjoyable and productive.

'I have more time for the children and everything is much more enjoyable, calm and productive'. (reception teacher)

'Reduces pressure on me'. (Year 2 teacher)

Differences according to age of child:

There were some indications that teachers' views on the role of classroom support varied according to the age of children and the year group taught. Year one and year two teachers more frequently (than reception teachers) said that TAs provided extra support for children with SEN. Reception teachers reported that children received increased attention. The presence of another adult allows more practical activities and lessons to take place, particularly within reception classes. With younger children there was an increase in the percentage of teachers mentioning more productive group work and reduced working pressure. Reception teachers reported that TAs helped deal with practical/ physical incidents; this was not mentioned by the older teaching age groups.

We looked to see if there were any obvious differences between answers of teachers who completed the questionnaire in 1998 and 1999, which might reflect general changes in education. Year 1 and year 2 teachers, who completed the questionnaire in the summer term of 1999, reported a higher incidence of TAs helping with the National Literacy/Numeracy Strategies, than teachers in the previous academic year. TAs are used to help manage these strategies and provide learning support to individuals, groups and children with special educational needs.

When classroom support is not helpful:

A few teachers, as we have seen, expressed the opinion that their classroom support did not contribute positively to classroom teaching and learning, perceiving them as ineffective (4% of reception teachers, 1% of year 1 cohort one teachers, 3% of year 1 teachers cohort two teachers, and 2% of year 2 teachers).

'She wouldn't communicate with the children and was more of a liability, than help'. (reception teacher)

'It's about time we had trained help in the classroom!' (reception teacher)

'So much time explaining how to go about the task'. (Year 1 teacher, C1)

'As little as only 1 hour a week'. (Year 1 teacher, C2)

'Non-qualified classroom assistant requires a lot of additional input - always fighting for time to give it'. (Year 2 teacher)

These comments indicate that the reasons for perceived ineffectiveness of TAs, and other classroom support, related to their direct communication with the children, as well as training and time needed to support them. We return to these areas in the section on case study results.

4. Teacher self-perceptions: enthusiasm, stress and satisfaction - affected by support in class?

Summary

Analysis of relationships between the three ratio measures (and class size) and three aspects of what we call teachers' professional self perceptions was not definitive, but 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.

It has been claimed by some that factors such as the number of children in a class are not important, and that the quality of teaching is the most significant factor (e.g., Burstall, 1979 & Ofsted, 1995). This view may be correct, but is likely to miss an important, if easily overlooked, effect of class size. It may be that teachers in large classes, perhaps without adequate classroom support, have had to *compensate* for the possibly negative effects on children, and this might be at a cost to the teacher. It might be that she spends lunch breaks hearing children read, assessing work at length during the evenings and weekends, meeting parents out of school hours, as well as experience the sheer exhaustion caused by these efforts. It may be in turn that all this effort adversely affects teachers' morale, enthusiasm, stress and well being.

This was suggested by teachers' comments at the end of the reception school year:

'I believe the children recognise the strain I am experiencing and this so often affects the enjoyment and laughter that usually typifies my classes'.

'I believe the small number of children in my class (22) has helped the quality of teaching and learning in my classroom this year. Obviously I am less tired, stressed and more enthusiastic in my work'.

'With a class of over 30 you really notice a difference - particularly with children of this age. It's a bit like a treadmill - working hard and getting nowhere fast!'

There is some, though not conclusive, support from research for a connection between size of class and teacher self-perceptions. Glass, Cahen, Smith and Filby (1982), in their meta analysis of 30 comparisons between smaller and larger classes, found that 25 favoured smaller classes, that is, teacher morale was higher, attitudes to students better, and satisfaction with performance greater (cf, Cooper, 1989). Clarke (1981) has argued that in smaller classes teachers are more caring toward pupils, and there is more opportunity for pupils to personally confide in teachers. A review by Day

and others describes a number of studies which indicate that large class sizes are associated with increased teacher stress (French, 1993; Kyriacou & Sutcliffe 1978; Lowenstein, 1991; Rivera-Batiz & Marti, 1995 - all cited in Day et al, 1996) and can lead to teacher burn-out (Rivera-Batiz & Marti, 1995, in Day et al, 1996). As Day et al conclude, stress is costly in human terms (ill-health), teaching quality terms, and also in economic terms (absenteeism and staff turnover). Any savings in staff costs stemming from larger classes need therefore to be set against increased costs in human, teaching and economic terms.

Research and teachers' comments are, therefore, suggestive of links between size of class and teacher enthusiasm, satisfaction and stress; however, the evidence is often indirect and better evidence is needed. In the allied class size study, we have examined relationships between three core professional self perceptions as they might be labelled - teacher stress, enthusiasm and satisfaction - and class size. In this section we are interested in the extent to which classroom support affected these three aspects.

To do this we required a method that would allow us to obtain reliable and valid information from all the teachers involved in the study. The method needed, therefore, to be technically sound but easy to complete. Previous research on teacher job satisfaction and stress was reviewed and examined critically. It was felt that many of the existing schedules were not appropriate, for example, because of their excessive length and uncertainties about reliability. With regard to teacher stress, we did not wish to replicate detailed survey work on main factors leading to stress.

We decided to measure teacher self-perceptions in three main areas.

1. Teacher energy/enthusiasm

In a longitudinal study of factors influencing children's reading progress, Rowe (1995), examined ways in which teacher's self perceptions were implicated in their competence and pupils' progress. Using Elsworth and Coulter's Professional Self Perception Questionnaire (1977), Rowe found that the first factor - 'energy/enthusiasm' - accounted for the largest proportion of variance (47.2%); the remaining 4 factors accounted for 20.8% of the variance between them. In multi-level modelling analyses, a large proportion of the variation in students' reading achievement was due to between class/teacher differences, and much of this variation was accounted for by differences in teachers' energy/enthusiasm.

We adapted Rowe's energy/enthusiasm scale (see 'The impact of Professional Development on Teachers' Self Perceptions', Rowe & Sykes, 1989). The 10 item Energy-Enthusiasm scale was reduced by Rowe to 4 items because he found all the items were highly correlated, and these 4 items had the strongest indices of linearity to be considered sufficient indicators for the scale. However, all the items had face validity and we wished to examine inter-relations between items ourselves, in order to make judgements about the best combination of items to use in analyses. We therefore retained the 10-item scale in our questionnaire.

Each item was rated by the teacher on a 7 point Likert scale:

fulfilled-unfulfilled (R)
relaxed-stressed
eager-indifferent (R)
enthusiastic-unenthusiastic (R)
confident-insecure
energetic-inert
satisfied-dissatisfied
fresh-stale
spirited-apatetic
energised-burnt out (R)

(R = Rowe as 1995, p 76)

2. Teacher stress in current post

There is a significant body of literature on the major sources of teacher stress, and the levels of stress in the teaching profession. Attention has been given to factors such as demands on teacher time, pupil behaviours, school ethos, role conflict, physical conditions, lack of rewards and professional recognition, and numerous other factors, including class size. See for examples Smith and Bourke (1992), Borg and Riding (1991), Kyriacou and Sutcliffe (1978).

Much of the research into teacher stress focuses on sources of stress, rather than an assessment of stress levels, whatever their source, and also the extent of teacher burnout. In looking at teacher stress within the context of class size (and classroom support), a choice was faced between asking questions about ways in which it affected teachers, that is to say, about class size as a source sources of stress, or asking about levels of self-reported stress and then relating this in separate analyses to class size differences (or to classroom support). It was felt that many of the available methods used to assess the sources of stress in teaching would be too detailed and burdensome for our purposes, and some (such as the Maslach method), concentrate on only one aspect of stress - for example, burnout is only one negative consequence of stress.

It was decided, therefore, to ask a single question about the level of stress experienced in their current teaching job, and then an additional open ended question about the main sources of their reported levels of stress. The 5 point scale used for the single item measure in our teacher questionnaire is common to many studies looking at teacher stress (e.g., Borg & Riding, 1991; Kyriacou & Sutcliffe, 1978).

Measures:

A measure of how stressful teachers found their current post and current circumstances (5 point scale), followed by an open-ended question: 'what do you find most stressful about your job?'

3. Teacher satisfaction in current post

The relationship between job satisfaction and teacher stress is not straightforward. Research has linked high levels of self-reported stress alongside high levels of satisfaction, as well as high levels of reported stress alongside low levels of satisfaction. However, job satisfaction in terms of teacher morale and motivation is important. For example, in the 'What makes teachers tick?' Survey (Varlaam, Nuttall & Walker, 1992), 87% of teachers replied that job satisfaction was very important in safeguarding and enhancing their own morale and motivation.

Research has frequently focused on the sources of job satisfaction/lack of job satisfaction. The use of a single item measure such as the Likert scales is common, and used, for example, to identify the extent to which particular factors affect an individual's level of job satisfaction. In 'What Makes Teachers Tick' (1992), a 4 point Likert scale is used to assess the level of teacher job satisfaction. Kyriacou and Sutcliffe cite the single item self reported measure of overall job satisfaction as having proved to be the most useful measure of overall job satisfaction and have used it in a number of studies.

Measures

A measure of how satisfied teachers were with their current post and current circumstances (5 point scale), followed by open-ended question: 'what are the main reasons for being satisfied/dissatisfied with you current job?'

Analysis

Relationships between the 12 items were examined using factor analysis. There was some suggestion that the Rowe items, along with the two extra stress and satisfaction measures, could be organised into three factors. In the future these may be used but initially, and for clarity, associations between the three ratio measures for both class size registered and present and the 12 individual self-perception items were calculated. Results are shown in Tables 26, 27 and 28.

Overall, few results were statistically significant. In the reception year, taking registered and present class size together, there was evidence (based on results that were statistically significant) that as the number of children to adults increased so did teachers' perception of insecurity and inertia; as the number of children to staff increased so to did stress; and as the number of children to teachers increased so too did dissatisfaction. Oddly, as the number of children to teachers increased perceived apathy increased – perhaps as numbers of children increase teachers have to become more 'spirited'

to cope! Only one result was significant for Y1 – as numbers of children to adults increased so too did teachers' perceived insecurity. In the case of Y2 teachers, as pupils to adults and pupils to teachers increased so too did stress. Perhaps the most consistent finding, therefore, is for more children to adults to be connected with more stress in teachers, but overall the connections between ratios and teacher professional self-perceptions were not strong.

Measuring stress and other reactions to one's profession in this objective way has a number of advantages, some of which have been discussed above. But one obvious possibility is that teachers' feelings about their work are not fully captured by these scales. This is suggested by the gap that sometimes existed between self reported levels of stress, as evidenced in the scales, and the open ended comments from teachers, on the same questionnaires, which could reveal a strongly expressed view about frustration and stress in their job! It is difficult to be precise about the degree of mismatch, but it is important to interpret the numerical results with care. (More information on our analysis of teachers' professional self-perceptions is reported in Moriarty, Edmonds, Blatchford & Martin, 2001).

5. Case studies of the role and contribution of classroom support staff in reception, Year 1 and Year 2 classes, varying in terms of number of children.

Summary

The most obvious point to arise out of the case studies was that classroom support varied in terms of its effectiveness. A theme to emerge from the case studies was the importance of reliability and consistency in classroom support. There were problems when support was not planned for and was fragmented. A second theme was 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. A third theme was the 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. But the main conclusion arising out of the case studies was that classroom support staff will inevitably be involved in direct teaching interactions and that it is therefore necessary to consider what kind of contribution is appropriate, not just in general terms relating to appropriate parts of the curriculum or general expectations about, for example, support with group work, but in terms of the moment by moment interactions with children, as well as the pedagogical knowledge that underpins such interactions.

As described in the Method section, the aim of this part of the research was to provide a more detailed portrayal of individual classes, which would provide the basis for a more interpretative and grounded analysis of factors related to size of class. Selected aspects of classroom learning and experience were defined, which we expected to be connected to class size differences and deployment of staff, and then on the basis of field visits these were refined into the following main

headings: 1. Physical space; 2. Grouping practices; 3. Establishment of routines; 4. Classroom discipline; 5. Tasks and curriculum; 6. Teacher pupil interactions and knowledge of children; 7. Teacher stress and enthusiasm; 8. Atmosphere/ethos; 9. Assessments and record keeping; 10. Pupil adjustment and peer relations; 11. Relationships with parents; 12. Special Educational Needs. In this paper we concentrate on teaching and learning factors connected to the deployment of classroom support. (This category includes the current preferred term 'teaching assistant', but we retain terms used in individual schools, e.g. 'Learning Support Assistant', 'Classroom Assistant', etc., as well as other adults, including parents.) Results relating to class size differences are reported in Blatchford, Moriarty, Edmonds and Martin (2001).

The method used in case studies comprised the following components:

1. Event sampling of significant events

a. Whole class observations: continuous notes were taken of the activities of the whole class, and groups working at the time. Observers' notes were made in terms of the main headings above. Observers noted on the sheets the time every five minutes but times of changes in activities were also noted, for example when a group of children moved to another task. Observation notes described the nature of the task and curriculum area, and the nature of the interactions between teachers, classroom support, and children.

b. Child focus observations: three children in each class were observed (one high, one medium and one low achiever - chosen from six children identified by the teacher, i.e. two high, two medium, and two low achievers). Again the main headings were used, as in the main observations above, to organise observation notes. As before, times were noted. The aim was to obtain more insight into children's adjustment to school, and connections with class size, pupil adult ratios, and groupings.

2. Semi-structured interviews with teachers, structured in terms of main headings above.

3. End of session/day comments and judgements by field workers in terms of main headings, related to the deployment of classroom support and class size differences

4. Summative judgements by field workers in terms of main headings, and end of year discussion between research team and field workers.

Documents concerning school policies were also collected to give background information on schools.

In this component of the study it was decided to use experienced teachers with experience in research as field workers. These included staff attached to the Primary Education Group in the

Institute of Education who all worked in teacher training and school inspection (and who therefore have routinely to make incisive judgements about classroom practice and experience), and current students on the MA/MSc Psychology in Education course, who have a background as teachers in primary schools. Quite deliberately, therefore, the aim in this component was to take advantage of the professional expertise of field workers, that is, to marry aspects of systematic observation and interviewing (with an emphasis on the objectivity of data), with professional and interpretative judgements by experienced teachers and teacher trainers, and a more enquiring/questioning role during field visits.

Sample and timetable

Schools could be selected according to a number of criteria. As well as size of class, factors that might be important could include quality of teaching, the progress made by pupils and their adjustment to school, size of classroom, catchment area. It would not be easy to control for all of these when selecting so few schools. The strategy adopted, therefore, was to select schools in differing class size categories and seek to take account of the factors listed above which might influence classroom activities, e.g., through interviews with teacher and head teachers. Results in pilot work and the quantitative results so far suggested that the following class size bands made sense educationally and in terms of actual distributions: large (31 and over), large medium (26-29), small medium (20-25), and small (under 20). The aim was to study two classes in each class size band in each year (reception, Yr1 and Yr2). This means $8 \times 3 = 24$ classes in all. Procedures differed for the reception year because classes are more likely to see changes over the year (e.g., because of termly entry). Class sizes at reception are also likely to be smaller, for at least part of the year. For years 1 and 2, number of visits was 3/term to take place in term 2 (i.e., spring term) of 1999 for year 2 (cohort 1) and year 1 (cohort 2). For reception classes, visits were to take place each term over the year.

Results

The picture revealed by the analysis of end of year questionnaires was largely positive about the role of classroom support. This picture is not entirely consistent with the quantitative analysis of effects on children's attainment and progress. One role of the case studies was to help address this difference. Perhaps the most obvious point to arise out of the case studies, which we state at the outset, is that the classroom support varied in terms of its effectiveness in the class, and that this is probably the main reason why the quantitative analysis has not shown strong evidence of the benefits of classroom support on children's educational progress. In other words, some classroom support staff were effective and were used effectively by teachers, but some were not. In this section we take a closer look at the reasons why classroom support was effective or not, and seek to draw conclusions about its deployment in classrooms.

It is not possible to do justice to the full set of reports provided by field workers, and in this section we provide a selective account, organised around several main themes.

1. Contribution of classroom support in terms of teaching interactions

We have seen from the questionnaire analysis that teachers could find TAs beneficial to classroom teaching, but in the case studies it was possible to explore this in more depth. There were many examples of classroom support staff working effectively, for example, with groups of children. The following extract from a field worker's report describes one such episode, involving a Learning Support Assistant (LSA).

'As register was taken the LSA checked the knees of a child who had fallen in the playground and then listened as the teacher explained which children were going to be the days 'helpers'. She assisted the teacher by finding the 'helpers' names to be displayed. For the next ten minutes she watched the whole class teaching session on mathematics, which she was to follow up with two groups afterwards. She then took four children who were of the same (lower) ability and of mixed gender. She first repeated the exercise of writing the numbers 1 to 5 on large 'post-its' and displayed them on a whiteboard in the wrong sequence. She was interrupted twice by children working on the computer who did not know how to operate the programme, but dealt with this very efficiently. When teaching the group she kept all individuals on task, drawing their attention to the order of the numbers that others were trying to correct and asking open-ended questions. One child slid down in his seat and stretched back, appearing to lose concentration, but she was quick to notice this and brought him back into the discussion. The LSA used the same strategies of reinforcing counting 1+1 as the teacher, and helped reinforce this concept. Children were then asked to write their own numbers on smaller post-its to place in sequence in their maths books. As each child worked she checked that their number formation was correct and asked children to tell her the number they were writing. She was very patient when children who had finished alerted her to this fact and asked them to wait a moment. The quality of interaction she engaged in with individual children was high, for example, asking children to point to numbers with 1:1 correspondence as they counted, and asking them which number came before, after or next. This 'reinforcement' group seemed to gain confidence by her use of praise and worked for a period of twenty minutes on the topic.'

This is a fairly typical exchange that will be found in many classrooms, but this should not blind us to the way in which the adult is effective in supporting learning. To itemise just the main features:

- * she deals smoothly with a potential disruption from one child while maintaining the flow of the topic
- * she keeps attention focused on the main mathematical concept that she wishes to consolidate

- * she uses practical activities and materials effectively to support learning
- * she offers immediate and relevant feedback on their work
- * she supports them with praise and encouragement.
- * additionally, she complements and supports the teacher's introduction and teaching aims (not least because she had watched the teacher closely and then deliberately modelled her actions).

We offer another example. The adult helpers in this class were used with groups of children, and this was laid out in the teacher's lesson plans. Their direct teaching qualities were valued by the teacher, but in this class, interestingly, it was parents who provided it, not the Classroom Assistant (CA). Parents helped with groups for IT, art/craft and topic activities. The teacher noted that they took initiative in preparing materials for use with groups, e.g., preparations for art activities and bringing materials into the school. She felt that they were effective in establishing good relations with the children, and observations of interactions with pupils suggested that they extended pupils' learning. The observer's report described the careful preparation by Parent 1 and Parent 2 for Christmas craft group activities and interactions with the children in which appropriate questioning and explanations facilitated learning. It was also observed that individuals were challenged with 'hands on' experiences; for example, one child initially used her rolling pin to push rather than roll out her icing and was encouraged to watch carefully as Parent 1 illustrated the action. The child then succeeded with this new skill. The expertise and enthusiasm of one parent for IT was especially noteworthy. This parent had set up facilities for E-mail for each child, shown them how to access the Internet, and spent 3 hours a week helping children in dyads. The teacher felt that she would not have been able to set this up without this parent's initiative and expertise. In addition to the direct contribution of these parents, the successful group work they engaged in enabled the teacher to concentrate on other groups and individuals.

To sum up the case reports so far, some of the direct interaction qualities that appeared to be effective, whether by TA or parent were: questioning and explanation strategies matched to children's abilities, initiative in preparation, teaching through demonstration, appropriateness of feedback, not allowing potentially disruptive behaviour to interrupt attention to a task, and expertise in particular areas.

What of those adults who were seen as not effective? There was an instructive contrast provided by the TA in the same class as that just quoted (with the effective parents). In contrast, the TA was described as 'inflexible' in her instructional interactions with children. She helped each morning for a total of 7 hours a week. The teacher felt she had a 'fixed pattern' of interactions with children which was somewhat didactic and lacking in warmth. It was felt the TA saw her role as a disciplinarian rather than one in which she 'worked with the children', and the teacher found it

difficult to encourage her to adopt a more personal and friendly style with children. As a consequence, while the TA assisted with individuals in groups, the teacher felt she could not let her work with a group as independently as some parents were naturally able to do. As well as using very limited praise or warmth with the children, she did not extend their thinking or their creativity. This was seen in the observer's report of the TA helping with a group working on worksheets involving the placing of positions as dots on a grid. The TA's comments focused on correctness, for example, *'What are these funny dots here? these should be on lines and not in gaps'*, followed by the TA rubbing out the child's dots. There were no probing or questioning techniques to enable the child to understand how far she had succeeded and why she had been mistaken.

Another case study showed limitations in direct teaching input by a classroom helper. The observer reported that the helper appeared to view her presence as a source of dissuasion. In one episode the helper was with a girl/boy pair working on the computer. The helper told the observer she did not know the programme they were using and would watch to see what the children had to do. When the observer returned five minutes later the same boy was in control of the mouse. Another girl asked if she could have a go but the boy did not allow her a turn. The helper did not intervene and said afterwards that this was not her job: *'with High-Scope it is up to the children to sort themselves out'*. The programme involved language and literacy work, a spelling game of CVC (consonant, vowel, consonant) words, finding words with the same initial letter or objects whose names rhymed, for example, find something that rhymes with 'ram' = 'ham'. The helper did not assist the boy in succeeding at this work, and he clicked at random on the screen. When asked afterwards about her role at the computer she was defensive about her non-intervention. It was the observer's view that she lacked confidence. The classroom teacher was not seen to supervise her.

As a way of summarising reports where helpers were not effective the following features seemed to apply:

- *inflexible and didactic
- *see role as dealing with the correctness of work and behaviour
- *limited warmth and praise
- *little probing or questioning or efforts to help children understand why they might be mistaken
- *little knowledge of the task undertaken by the children
- *little effort to ensure equal opportunities for all

Another case study report provided insights into ways of viewing the contribution of TAs to

teaching and learning. In this class there were two TAs, one of whom was considered to be excellent and one of whom needed more support. One TA was seen by the teacher as 'very capable'. She had worked with the teacher for many years and they got on well. She was able to work independently of the teacher and this was seen as a great asset. She was used largely to hear children read on a one to one basis, and to go over their weekly words. She also worked with small groups on literacy activities that had been planned and discussed with the teacher at the beginning of the lesson. The second TA was perceived by the teacher as quite capable but needed more support and this could sometimes prove difficult, for example, if she needed to discuss something with the teacher when the teacher was talking to the children. This was observed to take valuable teaching time away from the teacher.

In another case study of a reception class, the teacher articulated the difference between her role and that of two part time ancillary assistants (AA). She planned for the two AAs to focus on one group only, while she planned to use her time to focus on one group but also monitor the work in the other groups (usually three). Another case study of a class provided further information on ways in which the teacher's and two TA's interactions with children differed. The teacher concentrated her time with groups working on literacy tasks, and on hearing children read individually. In the afternoon she focused on helping the summer born children in their adjustment to school. The assistance provided by the TAs seemed valuable. They were observed preparing, distributing, and tidying resources, collecting and filing children's completed work, and helping children dress after PE. They also supported curriculum aims more directly. They gave the children a great deal of praise, enhancing their motivation. Comments included: *'He's got a lovely crown - that angel'*, of a child's picture, and *'That's really lovely, Joshua, be careful'*. The TAs provided feedback, which mostly took the form of error correction. Other comments included, *'I want you to stop now'* and *'That's a bit too much, Henry'* (during art activity). This kind of corrective feedback was also observed when the TAs heard individual children read. It was described by the observer as taking the form of 'guided practice' and it might be contrasted with the teacher's interactions with children in the same situation, which showed more evidence of further development of skills and meta-cognitive understanding. For example, TA1 encouraged the children in their decoding, drawing their attention to each word at a time, whereas the teacher left more space for the child to practice self-regulation, and questioning was used to encourage the child's inferences about the text. In contrast, the TAs were rarely seen questioning the children about their work.

Both TA1 and TA2 supported children's learning by modelling procedures for them, such as how to use a tube of 'glitter-glue'. Both also helped the children by, for example, warning them about taking home their Christmas cards too early. They were observed making direct suggestions to the children in both art and a literacy activity, although the latter was seen only when the teacher was interrupted by another adult, and unable to help herself.

In summary these case studies indicate that TAs had a valuable role in classroom learning, in terms of their educational interactions with children, but roles were different to those of the teacher.

In another case study of a reception class with 24 children the teacher had two full-time assistants (a Nursery Nurse (NN) and an LSA) shared between the two reception classes, taking it in turns to work both classes (so that there was the equivalent of one full-time assistant in each class). Both were experienced and worked well together and with the teacher, but the fieldworker's report identified a central uncertainty at the heart of their role. They were often deployed to work with groups of children but the researcher notes that they saw their role as primarily to prepare resources, to tidy areas of the classroom, to take and manage groups and individuals so that the class teacher could concentrate on teaching. Although the NN and LSA did encourage pupils' to think, more often they tended to give children answers or tell them what to do. They rarely showed that their interactions with children were informed by consideration of appropriate pedagogical practice. At no time during the visit were they seen to consult the class teacher's plans. In summary, the observer noted that the NN and LSA were both competent, but that there was an ambiguity and uncertainty about their role when it came to 'teaching' situations with children.

There is much more that could be offered by way of accounts from the fieldworkers' reports but perhaps enough has been offered to raise questions about the appropriate role of classroom assistants when it comes to direct interactions with children. We return to this theme at the end of this section.

2. Classroom support is affected by its reliability and consistency

The case studies made it clear that the expected benefits from classroom support could suffer if there were uncertainties about the regularity and predictability of their presence. In one case, voluntary help included two mothers who came for 40 minutes each week to read with groups of children. They were reliable and much appreciated by the teacher. In contrast a man from a local company also came to hear readers once a week, but the teacher found this less useful as there was no feedback and no time to discuss with him what he should be doing.

Some teachers felt that part-time support was not always helpful, because it made planning more difficult and children were less able to benefit from their presence. In one class a TA's time had been cut and another TA had been introduced for a few hours in the class and in the school office. The teacher felt that one full-time assistant would be more beneficial than splitting the hours between two people because the children could then build up a firmer relationship, and feel comfortable approaching them with questions. The teacher felt that uncertainties caused by the TAs' changing hours and days were not conducive to developing expectations about whom to approach when the teacher was busy with other children. It was observed that some of the younger children, who attended on a part-time basis, and who might be most likely to need help, were particularly unsure about the TAs' roles and did not feel confident in approaching them. The teacher felt that if the children had begun the school year with the teacher and TA working in conjunction throughout the week, this problem might have been more easily overcome.

One theme to emerge from the case studies was therefore the importance of reliability and consistency in classroom support, for example, with regard to hours worked. If support was unpredictable it could be disruptive and, from at least some teacher's point of view, better to have no help at all. Another main theme concerns the preference on balance for a given amount of time for support to be used to employ one person rather than spread it between more than one person.

3. Contribution of classroom support is affected by care in planning.

We have just seen that difficulties can arise as a result of the hours TAs are employed and spend in class. Teachers may have little control over this. But case studies also provided evidence of ways in which the time TAs were present was not always used effectively. One teacher explained that her class was small in comparison to previous years and therefore made teaching and monitoring easier. However, at this stage in the reception year class routines were still being established and the teacher found it difficult to teach a small group intensively without being interrupted. During the first morning observation there were two TAs and one parent helper present in the classroom. Despite the high ratio of adults to children, the teacher was still not free to work alone with a small group. At no time during the observation did the teacher instruct the children to approach the TAs if they had a problem with their individual work. The teacher was very conscious of one child identified as having behavioural problems who demanded a lot of her attention. It was observed many times during the day that the child would disrupt teaching. Although there was usually a TA present, the teacher always dealt with his problems herself. It was the observer's conclusion that encouraging the TA to spend more time with the child would have helped the teacher spend more time with the rest of the class.

This case study suggested that it was not only the class size, or the amount of classroom support, which affected the effectiveness of teaching in the class but the use of adult helpers' time. Making it clear to children and helpers that children should approach helpers rather than the teacher at certain times would have eased many problems.

In some classes the teacher had in place a written document that was used by the TA and other classroom support for guidance about what to do next. In one reception class, the teacher wrote the learning objectives of activities to be done with the children in a book, which the TAs could consult to clarify their role that day. The teacher said she did this because although one TA was effective and independent, the other TA and parent helpers needed a great deal of direction, which she could not give once the lesson had begun. In another class an Educational Care Officer (ECO) (who had no particular special needs qualifications) worked with individuals for 3 hours a week. She was well organised and was seen working with children with SEN, getting their folders and following the targets set down in the documents. Planning with the teacher was done through these records.

Planning in these cases is therefore done through a shared written version of the objectives of learning tasks, as well as suggested activities. This would seem helpful as a reminder in cases where

TAs are already competent and familiar with the class. In cases where TAs need more guidance and support, it is certainly better than them waiting for the teacher, for example, when she is too busy with children, but it would not seem a sufficient system on its own.

A case study of one reception class showed how the teacher planned the lesson and activities then shared her learning intentions with her two part-time and long-standing ancillary assistants (AAs). She characterised her relationships with the AAs as co-operative rather than 'hierarchical', and any imbalance in their roles was to do with responsibility rather than authority. She described the quality of relationship between her and the AAs as important and dependent on good communication and the AAs feeling valued. This teacher was wary of using parent helpers in the first term of the school year as she felt it could prevent the children from settling into school.

The amount of time that teachers could spend supporting TAs was a theme to emerge from the case studies. This was particularly evident when TAs attached to the same class differed in the support required. In one reception class the teacher reported having a good relationship with all her adult helpers. She felt she always gave them explicit instructions of what she wanted them to do, but one of the classroom assistants needed more guidance and direction than the other. She usually had to be shown, by example, exactly what she was required to do. The teacher found it frustrating when she had to spend so much time instructing the assistant because she could have completed the task in the same time herself. By contrast the other assistant was more self-motivated and confident. All of the paid classroom assistants in the school had a weekly meeting with teaching staff to discuss any issues or problems that had arisen, but this did not seem to deal with the teachers' frustration.

In another school there were two TAs, one in the morning and one in the afternoon. One therefore focused on literacy and numeracy, because these areas formed the mainstay of the morning's work, while one concentrated on the less formal activities that predominated in the afternoon. In this sense deployment of support was different in terms of curriculum, but this simply resulted from the time they were employed to work.

Case studies showed that more support does not necessarily mean more effective support, even when the staff involved are individually effective. In one case study of a large class there were different TAs each week. There was 15 hours support a week. During the observation week there were six different TAs used for 5 hours on literacy, 5 hours on maths, 2 hours every Wednesday for end-of-Key Stage test practice, 2 hours every Friday afternoon for listening to individual readers, 1 hour for a special needs TA, who usually took a group of Y2 children. In addition there was a parent used for 2 hours on Monday afternoons for science, and a student on PGCE final practice. The adults concerned were described as excellent; the observer actually made a wrong assumption that one was a teacher. They attended a lunchtime weekly KS1 planning session and were given the weekly written plan so they should know which group of children they are working with and a basic outline of the task, before arriving in the classroom. But the teacher felt that planning with so many different adults was difficult and she did not have enough time to talk through tasks in much detail.

Observations indicated that much planning took place in the classroom when the TA arrived. The teacher tried to arrange things so that a particular TA would continue a task with different groups of children, for example a grammar task from the literacy hour. But the lack of preparation could be a hindrance to effective teaching. On one occasion when a TA was working with a group in the annex room during the daily mathematics lesson, it was felt by the observer that opportunities to maximise child learning were missed, as the TA was not prepared for the session. Instead of setting up practical tasks or games, which would have been a logical next step, the children were just given worksheets and pages from books to complete. In a large class the teacher has to rely on the classroom support, and the quality of their input depends on the teacher's ability and time to plan appropriate activities that the classroom support can use. It did not appear that in this class the potential of classroom support was realised.

The complexity of arrangements involving classroom support in some classes was evident in another case study of a mixed aged class (15 reception and 15 Y1 children). During the visit there were a total of eight adults seen working with just the reception children in this class. Apart from the class teacher there was a primary helper with a Specialist Teacher Assistant (STAR) qualification, who has also attended SEN courses and who worked mainly with individual statemented children concentrating on language and literacy work, a classroom assistant who trained as an NNEB 29 years ago, another classroom assistant who had a history degree and a career in the civil service and who now had a job share with the NNEB, three volunteers (parents), and the head teacher who took all the children for one session. All had a good deal of experience and worked well together and with the children. The job share arrangement seemed to work particularly well, with the two women having an obvious respect for each other and their joint contribution to the children in the class. However, the observer concluded on the basis of her detailed observations that there was a large amount of 'dead' time, when voluntary helpers in particular were sitting and listening to other adults interacting with the children. It seemed that the management and the role of classroom support needed attention, particularly with regard to supporting children. It was also felt that that in this class, and given the numbers of adults, plans for the sessions could be shared in written form to avoid the need for verbal communication which could interrupt teaching time. There was also a case made for more opportunity for feedback and evaluation so that opinions could be shown to be valued and used in the context of professional development of knowledge and understanding.

4. The role of training

Whilst it may seem obvious that effective use of classroom support will depend on training there a number of difficult issues. In one case study of a reception class, the teacher said that the ancillary had probably received '*at most, 2 days training*', but she was not confident that further training would change her authoritarian style. She reported that she was not able to pre-plan lesson objectives with her. She commented that the ancillary doubled as a 'dinner lady' supervisor which she felt '*probably did not help her classroom role*' and emphasised her authoritarian/non social role. The observations in class confirmed the teacher's impression - the AA adopted an authoritarian and

detached approach referred to by the teacher.

In another case study of a reception class, the teacher had worked hard with her two ancillary assistants to translate in a coherent way lesson plans and learning aims. As we saw above she placed a lot of emphasis on the quality of her relationship and communication with the AAs. She considered that the ideal AA would have had a good deal of experience with young children, a desire for hard work and a genuine liking of children, and she saw this as more important than any specific training. She felt that since working with her one of her AAs had '*come on a lot*'. This AA had studied modules in Child Development at Diploma level but the teacher did not think this had shown itself in any overt way in her work.

In another case study the use of a LSA resulted in a better quality of work than if groups of children had been asked to work independently. Individuals achieved the learning objectives by working with a teacher substitute, even though she was untrained for this work. Her pedagogic practices may have been uninformed but as we saw above she modelled herself on the class teacher. By having copies of lesson plans beforehand she was aware of the learning aims. But she was conscious in a broad and informed sense of the process that she had to cover as well as the product. She also worked with both lower and upper ability children for mathematics tasks. This indicates that written guidelines supported by discussion with the teacher, modelling of teaching strategies and perhaps a natural ability to relate to children can contribute to effective support for learning. It also indicates that training may well be important, but it is the implementation of this training in specific classroom learning contexts that is crucial to children's learning and this will depend on the lead set by the teacher and efforts to ensure teaching and curricular aims are understood by classroom support staff.

Another indication of the importance of the personal qualities of classroom support, over and above any training they may have received, is provided in the contrast between the LSA just described and another LSA in a parallel class. This LSA worked on routine and cross-curricular tasks. Although in contrast well qualified, her impact on children's learning appeared not so great as the other LSA. It must be said that she did provide a valuable input: she eased the load of resource preparation and supervision of children. Her understanding of the reading scheme seemed adequate. She provided pastoral care when children needed it, and her presence reduced the day-to-day pressure on the teachers of dealing with 26 young children. But in terms of direct teaching input she was not as effective.

One head teacher explained that the TAs, as far as she knew, had no training. After arriving at the school she had changed the TA monitoring system and now held weekly meetings to discuss how the TAs time had been spent and encouraged evaluation of this time. She hoped that this would lead to maximising the benefit the teacher and children received from having extra help. She also reported that the TAs now went on various courses to train them to deal with specific needs, for example, autistic children, children with reading difficulties.

In one school, support was to varying degrees seen to be inactive during the time that they were observed. It was not the status of support that affected how well or the way they were used, but more their lack of comprehension of the role they could play. Though untrained, these adults were observed to work in ways such as watching children and intervening when it looked as if disagreements between children might disrupt the calm of the classroom. It was the observer's judgement that all three women in this class would benefit from training and briefing about their role in supporting both the class teacher and the children.

The case studies suggested aspects it would be useful to cover in training. One observer felt that this applied to the teaching of literacy in reception, particularly phonics. The support she provided children when hearing them read was not sufficient.

The composition of the class, for example, in terms of characteristics of the children, can affect the relevance of training of adult support. In one class there were many children considered to have special needs. The school funded classroom support for just four hours a week and this was the same for each class regardless of numbers of SEN children. The teacher found this inadequate, especially as last year she apparently had many more hours support for her class. It was felt that the less able children suffered, for example because adult help during group work was not available. The support included an Educational Care Officer (ECO), who had no particular special needs qualifications, and worked with individuals for 3 hours a week, and an NNEB qualified helper for 1 hour a week. One child observed had difficulties at home and at school. The teacher knew about this in detail and was able to respond sympathetically, but due to lack of support his educational needs were not being met. The child of average ability who was observed also had difficulties as he lacked confidence in his work and socially. He was having a particularly bad day when the observer was there and the teacher was able to sit next to him and talk to him quietly keeping him on task throughout the afternoon. This may not have been possible with more children in the class. It can be deduced that with effective help in the class the needs of the other children would also be met, and a TA could have sat with the child, thus freeing the teacher to interact with other children.

In a case study visit in July 2000 (reception class of 29 children) the issue of training for Learning Support Assistants in the school was high on the agenda. The LSA who worked with the reception class had been hired many years ago and saw her job as primarily one of carrying out 'maintenance' jobs around the classroom to help the teacher. She was happy with the job and was clear that she was not a trained teacher and had no desire to be one. However, given the staffing costs involved for the school, there was pressure from the head teacher for the LSAs to be doing more in the classrooms of an academic nature. The LSA was wary of the course she had been asked to go on. It was the teacher's judgement that the course had had little effect on the way that the LSAs in the school interacted with children. They were not perceived to ask children educationally appropriate questions and did not go into work in enough detail with children. The teacher felt the LSAs were still too 'cut and dried' with children. In this school at least the provision and success of training

would need to be seen in the context of deeply held attitudes about roles in the classroom, not necessarily shared among teaching staff or LSAs.

Conclusions from case studies

There are several themes, arising out of the case studies, which bear on effectiveness in the use of classroom support staff.

One theme to emerge from the case studies was the importance of reliability and consistency in classroom support. There were problems when support was not planned for and was fragmented; for example, when a teacher was not sure who would be with her class, or when she had several people for short lengths of time. Teachers could spend valuable time supporting staff, or opportunities were lost. There was preference on balance for a given amount of time for support to be used to employ one person rather than spread it between more than one person.

Another theme was the need for careful planning - how the teacher used the staff and helpers available to her. Case studies showed that it was not only the amount of classroom support which affected the effectiveness of teaching in the class but the USE to which it was put. There were enough examples given to show that more support does not necessarily mean more effective support, even when the staff involved are individually effective. The need for communication between the teacher and TAs, for example, about lesson plans, was discussed, as well as the use of written notes for quick reference by assistants.

There were implications for training. There was the salutary conclusion that the personal qualities of adults were a major factor in the effectiveness of their contribution and this was over and above training. There is also the general point that training, whatever the qualities and merits of individual courses, to be effective 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 teachers' modelling of concepts, to be followed up by TAs. Overall, training will need to attend to pedagogy and direct teaching.

So perhaps the overriding theme arising out of the case studies concerns the contribution of classroom support in terms of teaching interactions. The unavoidable conclusion from the case studies is that support staff WILL be involved in direct teaching interactions and that it is therefore necessary to consider how these can work well. In other words, we need to consider what kind of contribution is appropriate, not just in general terms relating to appropriate parts of the curriculum or general expectations about, for example, support with group work, but in terms of the moment by moment interactions with children, as well as the pedagogical knowledge that underpins such interactions. There is a need to articulate more deliberately what kinds of pedagogy are relevant, in the case of TAs and to use this to inform training.

The case studies suggested several key dichotomies by which to typify the contributions of classroom support staff to teaching:

- discipline / control versus facilitation of learning and inferences
- correctness versus probing for understanding/extending thinking
- guided practice versus skill development/ metacognitive understanding/self-regulation
- inflexible versus flexible
- product versus process

What is the appropriate role of TAs when it comes to direct teaching? Should they be expected to cover both polarities of these dichotomies? If teaching interactions are conceived in terms of a dichotomy such as discipline/control versus facilitative/learning, then this indicates one way in which uncertainty and lack of pedagogical objectives on the part of an adult can result (as we saw in the case studies) in interactions that are weighted toward control at the expense of teaching possibilities. There are also questions about the appropriate degree of subject knowledge. Sometimes the deployment of TAs was relatively ad hoc, depending on hours worked rather than expertise or training. In general there was no depth of understanding of concepts, especially mathematical. But it should also be born in mind that classroom support can contribute in many ways, not just in terms of direct teaching, and so this raises questions about the deployment of TAs and what SHOULD be expected from them.

There is not space here to develop this point fully. In general we argue that it would be helpful to consider what kinds of pedagogical models might be helpful as a way of positioning the pedagogical role of TAs and teachers. One model, constructed by Arends (1991), involves three teaching functions: executive, interactive, and organisational. It could be argued that, whilst teachers perform all three functions, TAs are engaged with the interactive function alone, and therefore need education and training in order to be able to carry out this role effectively. Another general model is Shulman's (1986) account of domains of knowledge (content knowledge, pedagogical knowledge, knowledge of learners, general pedagogical knowledge, knowledge of educational contexts, curriculum knowledge, knowledge of educational ends). Presumably teachers should be knowledgeable in all domains, but what are the appropriate domains of knowledge for TAs? And finally, Creemers' (1994) basic model of effective characteristics of teacher behaviour might be used. This is based on a thorough review of the literature on effective teaching, and covers areas such as structuring the content, clarity of presentation, questioning, immediate exercises, evaluation, feedback, corrective instruction.

These and other models could be used to consider what the appropriate role of TAs might be when it comes to direct teaching. This raises general but fundamental questions about effectiveness in teaching interactions and pedagogy and it seems likely that one cannot separate views about the deployment of classroom support staff from views about effective pedagogy. More specific

questions that arise out of this discussion include: Should they be expected to cover all aspects? What level of pedagogical knowledge should be expected, and how general or domain-specific should it be (e.g., connected to particular responsibilities in the classroom)?

It also raises questions about the contexts within which classroom support may be used most effectively; for example, small group work, where they can concentrate their contribution within a wider pedagogical and curriculum context set by the teacher. One worrying finding identified in recent research on within class groups in primary schools (Kutnick, Blatchford & Baines, in press) is for TAs to work with lower achievers - and sometimes this means small groups of boys or individual boys. Existing guidance on training for TAs is mostly concerned with subject knowledge in numeracy and literacy and management aspects of work. Pedagogical coverage is limited and implicit and left to the mentor at schools to model and discuss with the TAs. The effective TA should be able to extend thinking and develop skills, understanding and metacognitive processes in children. This will require even MORE complex skills if the children that TAs are working with are the lower achieving groups in primary classrooms. These aspects, then, need to be addressed in any training/professional development designed for TAs.

6. Quantitative analyses of relationships between staff and adult support and educational progress over KS1 (Multi-Level Modelling - results for reception, Yr1 and Yr2)

Summary

The statistical analysis of the data indicates that there is a significant effect of class size differences on children's progress in reception for both literacy and maths. There was no evidence of an effect of class size upon progress in either literacy or maths at either Year 1 or Year 2. In addition it was found that the benefits of smaller classes in the reception year were still evident in both literacy and maths at the end of Year 1, but were not longer present at Year 2. There is no evidence that numbers of adults in addition to the teacher have an influence on children's educational progress.

In this section we summarise a number of complex multi-level models, with the focus upon on the effect of differences in class size, additional staff and additional adults in the classroom on pupils' educational progress in maths and literacy. Data from the three years were analysed separately (reception, Y1 and Y2), and in addition the effects of previous class sizes upon attainment in future years was also examined. The full regression models are for the most part not presented, although examples are shown in Tables 29 and 30.

The basic method of analysis was the same for both literacy and maths across all three years. The data was analysed using multi-level regression models, with the basic model comprising class size, previous test data, ability group (sub-divided into three groups – low, average and high test scores), and pupil characteristics (gender, eligibility for free school meals, pupil age

and ethnic group) in relation to attainment at the end of the year. Additional terms relating to the number of extra adults providing classroom support in addition to the class teacher were then added to this basic model, as well as terms representing the interaction between the number of extra adults in class and class size, and the interaction between the number of extra adults in class and the ability group of the pupils (low, average, high).

Reception Literacy

There was found to be a significant negative relationship between class size and literacy attainment. This indicates quite conclusively, that increased class size has a negative effect on progress during the reception year. In other words, children in smaller classes tend to make more progress in literacy. There was no evidence that additional adults in the class had an effect on children's progress. In addition, there was little sign that the interactions between the number of adults and class size, and the number of adults and ability group were significant. This indicates that the effect of additional adults in the class was equivalent for classes of different sizes and also for differing ability pupils.

Further analysis of the effect of additional adults in terms of hours worked per week was also conducted, and presented last year (2000) at a seminar to the DfES. In a similar way to the number of additional adults, these analyses showed no effect for the amount of time, strengthening the conclusion that, overall, extra adults providing support in classes did not affect children's progress.

Year 1 Literacy

There was found to be no evidence of a class size effect upon literacy progress at year 1. There was no indication that the addition of adults had an effect on children's educational progress, nor any evidence that the effect of the number of extra adults was different for different class sizes or ability groups.

Year 2 Literacy

There was no evidence of a class size effect upon literacy progress at year 2. In addition, there was no evidence that additional adults in the classroom had any effect on literacy progress during the year, nor that the interactions with class size or pupils' ability group were significant.

Reception class on Year 1, Year 2 Literacy

Initial results indicate that the benefit gained by being in small classes in the reception year was still evident at the end of year 1, despite there being no additional benefit of small classes in year 1. The effect size of the reception year class size on year 1 literacy was less than half of that seen with the reception year literacy results. There was found to be no effect of class size in reception year, by the time pupils reach the end of year 2. These results are more difficult to interpret as children move between classes of differing sizes and also there is some dropout of pupils between years, both of which may not be happening at random. There is still more work to be done in this area.

Reception Maths

As with literacy, there was found to be a significant negative relationship between class size and maths attainment in the reception year. This indicates quite conclusively that class size has a negative effect on progress in maths during the reception year. Once again there is no indication that extra adults in the classroom have an effect on progress, or that the effects of extra adults differ between class sizes or ability groups.

Year 1 Maths

There was not found to be any evidence of an effect of class size on progress in maths during year 1. In addition, there is no evidence that additional adults have any effect on progress on maths attainment during year 1. Once again there is no evidence of an effect of adults on progress.

Year 2 Maths

As with the year 1 results, there was found to be no evidence of an effect of class size upon the progress in maths during year 2. Again, there is no evidence that the number adults in the classroom in addition to the class teacher has an effect on progress.

Reception class on Year 1, Year 2 Maths

As with the literacy results, initial results found evidence that the reception year class size had a significant effect upon maths attainment at year 1. In other words, the benefit gained by being in small classes in the reception year was still evident in the maths scores at the end of year 1, despite there being no additional benefit of year 1 class size on progress. The effect size of the reception class size on the year 1 maths results was less than half as large as that found for the reception year maths results. There was found to be no evidence of an effect of reception year

class size upon the year 2 maths results. Therefore the benefits of small class in reception year are no longer evident in year 2. Again work has yet to completed in this area.

CONCLUSIONS AND GENERAL DISCUSSION

This research project addressed three main aspects connected to TAs in KS1 classrooms: first, descriptive information on numbers and types of TAs and other adults working in classes and how this related to class sizes; second, whether there were measurable effects of the presence of TAs and other adults on children's educational progress; and, third, whether the presence of TAs and other adults affected a number of 'classroom processes' such as the amount of time spent on teaching, in different curriculum areas, and hearing children read, as well as teacher self perceptions such as stress and enthusiasm. In this final section we briefly review findings and implications for practice and training.

The numerical analysis of relationships between classroom support in addition to the class teacher, and class size, on the one hand, and pupils' educational progress in literacy and maths over reception, Y1 and Y2, on the other hand, showed that differences in class size had the most noticeable effects on children's educational progress, particularly in the reception year, and there was no obvious effect of extra staff or parents. Though there is more work still to be done with these analyses, the modelling presented in this report is probably the most reliable assessment of effects that we have to date in Britain. The analysis was sophisticated and precise, for example, by allowing for the multi-level structure of data (at separate levels of individual pupil, class, and school), and the possibly overlapping effects of allied variables.

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 provision of TAs and guidance on training, 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 MLM analysis is therefore sophisticated but relatively broad brush.

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 most clearly that as class sizes increased there was less time for teaching overall and for hearing children read individually. The presence of classroom support 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.

Some teachers felt that classroom support staff were helpful in hearing children read, though the

termly questionnaire data indicated that it had not helped teachers devote more time to hearing children read (though this could be consistent with classroom support staff spending more time). There is a wide spread expectation that parents will have a main role in hearing children read at home, though not that they will be able to substitute for teachers. Overall, we detect a good deal of uncertainty about the role of individual support for reading and a need to clarify more deliberately its contribution and the role of different adults - teachers, TAs, volunteer help, and parents at home – with regard to it.

The inconclusive results from the MLM analysis of relations with educational progress and analysis of associations with classroom processes, should be set alongside the results from the analysis of teachers' end of year comments. From the class teachers' perspective, TAs and other adults were making a positive contribution, in terms of:

- a. increased attention and support for learning
 - * more one to one attention
 - * support for children with SEN
 - * support for teaching of literacy
- b. increased teaching effectiveness
 - * productive group work
 - * productive creative and practical activities
 - * lesson delivery and curriculum coverage
- c. effective classroom management
 - * day to day teaching related activities
- d. effects on children's learning outcomes

Analysis of relationships between the three ratio measures (and class size) and three aspects of what we call teachers' professional self perceptions did not always show a consistent pattern, but there was 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 found large classes more difficult; moreover, they firmly believed that having extra support in class could help.

How do we reconcile the seemingly different picture about the contribution of TAs and other adults arising from the end of year questionnaires – which were broadly positive - and the numerical results from the MLM and correlational analyses – which were less clear? The case studies were helpful here. Perhaps the most obvious point to arise out of the case studies was that the support 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, some classroom support staff were effective and were used effectively by teachers, but some were not. In the section reporting on the case studies we took a closer look at the ways in which, and the reasons why, staff were effective or not, in terms of four main areas.

The first theme to emerge from the case studies was the importance of 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. The second theme was 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 are 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. And a third theme was the 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 teachers' modelling of concepts, to be followed up by TAs.

But the main conclusion, and fourth theme, arising out of the case studies was that classroom support staff will inevitably be involved in direct teaching interactions and that it is therefore necessary to consider what kind of contribution is appropriate. We need to consider the role of classroom support staff, not just in general terms relating to appropriate parts of the curriculum or general expectations about, for example, support with group work, but in terms of the moment by moment interactions with children, as well as the pedagogical knowledge that underpins such interactions. There is a need to articulate more deliberately what kinds of pedagogy are relevant, in the case of TAs, and to use this to inform training. Overall, we conclude that one cannot separate views about the deployment of TAs and other adults from views about effective pedagogy. It was 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. It may be that we need to consider TAs and teachers in much the same terms when it comes to teaching interactions but that, as we have seen in the case studies, teachers have responsibility for other dimensions, for example, the executive and organisational aspects, which sets them apart. Considering teachers and TAs together on one dimension does not therefore devalue in any way the teachers' contribution, but it might help to clarify the contribution of Teaching Assistants.

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APPENDIX 1

Table 1

Pupil-Adult Ratios – Cohort 1 Reception

	Mean	Minimum	Maximum	Std Deviation	Number of Classes
Pupil-Adult (Registered)	13.86	4.14	37.00	6.51	278
Pupil-Staff (Registered)	16.55	4.83	37.00	6.65	278
Pupil-Teacher (Registered)	25.53	6.75	52.00	5.69	272
Pupil-Adult (Present)	12.55	3.00	34.00	5.66	278
Pupil-Staff (Present)	15.02	4.00	34.00	5.87	278
Pupil-Teacher (Present)	23.32	6.00	43.00	5.42	272
Class Size (Registered)	25.90	10.00	48.66	5.06	329
Class Size (Present)	24.02	11.00	59.00	5.59	278

Table 2

Pupil-Adult Ratios – Cohort 1 Year 1

	Mean	Minimum	Maximum	Std Deviation	Number of Classes
Pupil-Adult (Registered)	15.61	6.64	32.00	5.44	254
Pupil-Staff (Registered)	19.10	6.64	34.33	6.04	254
Pupil-Teacher (Registered)	26.64	10.00	35.67	4.50	254
Pupil-Adult (Present)	14.22	3.00	29.00	5.00	254
Pupil-Staff (Present)	17.40	3.00	32.00	5.55	254
Pupil-Teacher (Present)	24.42	3.00	43.00	4.84	254
Class Size (Registered)	27.00	10.00	35.77	4.28	254
Class Size (Present)	24.85	3.00	52.65	5.48	254

Table 3

Pupil-Adult Ratios – Cohort 1 Year 2

	Mean	Minimum	Maximum	Std Deviation	Number of Classes
Pupil-Adult (Registered)	17.11	4.76	34.50	5.95	180
Pupil-Staff (Registered)	19.35	5.56	34.50	6.29	180
Pupil-Teacher (Registered)	27.29	6.67	35.00	4.29	180
Pupil-Adult (Present)	15.56	4.29	33.67	5.49	180
Pupil-Staff (Present)	17.55	5.00	33.67	5.77	180
Pupil-Teacher (Present)	24.85	6.00	33.67	4.44	180
Class Size (Registered)	27.81	6.67	36.00	3.96	180
Class Size (Present)	25.25	5.67	33.50	4.57	180

Table 4

Pupil-Adult Ratios- Cohort 1 Reception Categorical Information

	Number of Classes			
	20 or less pupils	21 to 25 pupils	26 to 30 pupils	31 or more pupils
Pupil-Adult (Registered)	238 (86%)	13 (5%)	21(8%)	6 (2%)
Pupil-Staff (Registered)	216 (78%)	20 (7%)	32 (12%)	10 (4%)
Pupil-Teacher (Registered)	48 (78%)	69 (25%)	118 (43%)	37 (14%)
Pupil-Adult (Present)	251 (90%)	13 (5%)	12 (4%)	2 (1%)
Pupil-Staff (Present)	231 (83%)	22 (8%)	23 (8%)	2 (1%)
Pupil-Teacher (Present)	78 (29%)	88 (32%)	90 (33%)	16 (6%)
Class Size (Registered)	47 (14%)	92 (28%)	145 (44%)	45 (14%)
Class Size (Present)	70 (25%)	89 (32%)	101 (36%)	18 (7%)

Table 5

Pupil-Adult Ratios- Cohort 1 Year 1 Categorical Information

	Number of Classes			
	20 or less pupils	21 to 25 pupils	26 to 30 pupils	31 or more pupils
Pupil-Adult (Registered)	213 (84%)	21 (8%)	19 (8%)	1 (*)
Pupil-Staff (Registered)	164 (65%)	41 (16%)	43 (17%)	6 (2%)
Pupil-Teacher (Registered)	30 (12%)	59 (23%)	127 (50%)	38 (15%)
Pupil-Adult (Present)	227 (89%)	17 (7%)	10 (4%)	0 (0%)
Pupil-Staff (Present)	186 (73%)	42 (17%)	25 (10%)	1 (*)
Pupil-Teacher (Present)	43 (17%)	106 (42%)	91 (36%)	14 (6%)
Class Size (Registered)	25 (10%)	57 (22%)	131 (52%)	41 (16%)
Class Size (Present)	39 (15%)	108 (43%)	90 (35%)	17 (7%)

Table 6

Pupil-Adult Ratios- Cohort 1 Year 2 Categorical Information

	Number of Classes			
	20 or less pupils	21 to 25 pupils	26 to 30 pupils	31 or more pupils
Pupil-Adult (Registered)	137 (76%)	27 (15%)	12 (7%)	4 (2%)
Pupil-Staff (Registered)	109 (61%)	41 (23%)	22 (12%)	8 (4%)
Pupil-Teacher (Registered)	10 (6%)	55 (31%)	75 (42%)	40 (22%)
Pupil-Adult (Present)	151 (84%)	19 (11%)	9 (5%)	1 (1%)
Pupil-Staff (Present)	130 (72%)	33 (18%)	16 (9%)	1 (1%)
Pupil-Teacher (Present)	31 (17%)	67 (37%)	75 (42%)	7 (4%)
Class Size (Registered)	7 (4%)	47 (26%)	83 (46%)	43 (24%)
Class Size (Present)	26 (14%)	59 (33%)	84 (47%)	11 (6%)

Table 7

Number of Additional Adults and Staff (Reception Classes) -
Number of Additional Staff (in addition to usual class teacher)

Class Size Category	Median	Min	Max	Inter-Quartile Range	Number of Classes
Registered					
20 or less pupils	0.5	0.0	3.0	(0.0-1.0)	36
21 to 25 pupils	1.0	0.0	2.0	(0.5-1.0)	78
26 to 30 pupils	1.0	0.0	2.0	(0.5-1.0)	124
31 or more pupils	1.0	0.0	2.0	(0.3-1.0)	36
Total	<i>1.0</i>	<i>0.0</i>	<i>3.0</i>	<i>(0.5-1.0)</i>	<i>272</i>
Present					
20 or less pupils	0.5	0.0	2.0	(0.0-1.0)	69
21 to 25 pupils	1.0	0.0	3.0	(0.5-1.0)	89
26 to 30 pupils	1.0	0.0	2.0	(0.5-1.0)	96
31 or more pupils	1.0	0.0	2.0	(0.7-1.0)	18
Total	<i>1.0</i>	<i>0.0</i>	<i>3.0</i>	<i>(0.5-1.0)</i>	<i>272</i>

Table 8

Number of Additional Adults and Staff (Reception Classes) -
Number of Additional Adults (in addition to usual class teacher)

Class Size Category	Median	Min	Max	Inter-Quartile Range	Number of Classes
Registered					
20 or less pupils	1.0	0.0	3.0	(0.0-1.5)	36
21 to 25 pupils	1.0	0.0	3.0	(0.0-1.5)	76
26 to 30 pupils	1.0	0.0	4.0	(1.0-2.0)	124
31 or more pupils	1.0	0.0	5.0	(0.5-2.0)	36
Total	<i>1.0</i>	<i>0.0</i>	<i>5.0</i>	<i>(0.5-2.0)</i>	<i>272</i>

Present					
20 or less pupils	1.0	0.0	3.0	(0.5-1.5)	69
21 to 25 pupils	1.0	0.0	3.0	(0.5-1.5)	89
26 to 30 pupils	1.0	0.0	5.0	(1.0-2.0)	96
31 or more pupils	1.5	0.0	2.5	(1.0-2.0)	18
Total	<i>1.0</i>	<i>0.0</i>	<i>5.0</i>	<i>(0.5-2.0)</i>	272

Table 9

Number of Additional Adults and Staff (Reception Classes)

Number of Additional Hours Support per Week

Class Size Category	Mean	Min	Max	Std Deviation	Number of Classes
Registered					
20 or less pupils	12.36	0	33.5	8.36	46
21 to 25 pupils	13.89	0	62.0	10.67	92
26 to 30 pupils	20.62	0	60.0	9.66	144
31 or more pupils	22.77	2.24	46.91	10.27	45
Mean Total	<i>17.86</i>	<i>0</i>	<i>62.0</i>	<i>10.58</i>	327
Present					
20 or less pupils	14.25	0	60.00	11.07	68
21 to 25 pupils	17.47	2.8	41.75	9.76	89
26 to 30 pupils	19.53	0	36.54	9.51	101
31 or more pupils	21.98	4.78	46.91	10.29	18
Mean Total	<i>17.72</i>	<i>0</i>	<i>60.00</i>	<i>10.25</i>	276

Table 10

**Number of Additional Adults and Staff (Year 1 Classes) -
Number of Additional Staff (in addition to usual class teacher)**

Class Size Category	Median	Min	Max	Inter-Quartile Range	Number of Classes
Registered					
20 or less pupils	0.0	0.0	1.0	(0.0-0.3)	25
21 to 25 pupils	0.3	0.0	2.7	(0.0-0.7)	57
26 to 30 pupils	0.3	0.0	2.0	(0.0-1.0)	131
31 or more pupils	0.7	0.0	2.0	(0.3-1.0)	41
Total	0.5	0.0	2.7	(0.5-1.0)	254
Present					
20 or less pupils	0.0	0.0	1.0	(0.0-0.5)	39
21 to 25 pupils	0.3	0.0	1.7	(0.0-1.0)	108
26 to 30 pupils	0.5	0.0	1.7	(0.0-1.0)	90
31 or more pupils	0.7	0.0	2.7	(0.7-1.2)	17
Total	0.5	0.0	2.7	(0.0-1.0)	254

Table 11

**Number of Additional Adults and Staff (Year 1 Classes) -
Number of Additional Adults (in addition to usual class teacher)**

Class Size Category	Median	Min	Max	Inter-Quartile Range	Number of Classes
Registered					
20 or less pupils	0.5	0.0	1.7	(0.0-1.0)	25
21 to 25 pupils	0.7	0.0	2.7	(0.3-1.0)	57
26 to 30 pupils	0.7	0.0	3.0	(0.3-1.3)	131
31 or more pupils	1.0	0.0	2.7	(0.7-1.3)	41
Total	1.0	0.0	3.0	(0.5-1.3)	254

Present					
20 or less pupils	0.5	0.0	2.0	(0.0-1.0)	39
21 to 25 pupils	0.7	0.0	2.7	(0.3-1.0)	108
26 to 30 pupils	1.0	0.0	2.7	(0.5-1.3)	90
31 or more pupils	1.3	0.3	3.0	(1.0-1.7)	17
Total	1.0	0	3.0	(0.5-1.3)	254

Table 12

**Number of Additional Adults and Staff (Year 1 Classes) -
Number of Additional Hours Support per Week**

Class Size Category	Mean	Minimum	Maximum	Std Deviation	Number of Classes
Registered					
20 or less pupils	5.98	0	13.00	3.99	18
21 to 25 pupils	9.74	0	25.00	6.71	44
26 to 30 pupils	8.89	0	26.50	6.33	110
31 or more pupils	11.96	0.5	22.00	5.89	36
Mean Total	9.35	0	26.50	6.32	208
Present					
20 or less pupils	8.01	0	20.00	5.19	27
21 to 25 pupils	9.27	0	25.00	6.61	90
26 to 30 pupils	9.49	0	26.50	6.51	75
31 or more pupils	11.35	3.16	20.00	5.38	16
Mean Total	9.35	0	26.50	6.32	208

Table 13

Number of Additional Adults and Staff (Year 2 Classes) -**Number of Additional Staff (in addition to usual class teacher)**

Class Size Category	Median	Min	Max	Inter-Quartile Range	Number of Classes
Registered					
20 or less pupils	0.2	0.0	1.3	(0.2-0.6)	7
21 to 25 pupils	0.3	0.0	2.0	(0.0-0.7)	47
26 to 30 pupils	0.4	0.0	2.2	(0.0-0.8)	83
31 or more pupils	0.7	0.0	2.0	(0.2-1.0)	43
Total	0.5	0.0	2.2	(0.0-0.8)	180
Present					
20 or less pupils	0.4	0.0	2.0	(0.0-0.7)	26
21 to 25 pupils	0.2	0.0	2.0	(0.0-0.8)	59
26 to 30 pupils	0.5	0.0	2.2	(0.2-0.9)	84
31 or more pupils	0.8	0.0	1.3	(0.2-0.8)	11
Total	0.5	0.0	2.2	(0.0-0.8)	180

Table 14

Number of Additional Adults and Staff (Year 2 Classes) -**Number of Additional Adults (in addition to usual class teacher)**

Class Size Category	Median	Min	Max	Inter-Quartile Range	Number of Classes
Registered					
20 or less pupils	0.6	0.0	1.4	(0.6-1.4)	7
21 to 25 pupils	0.5	0.0	3.0	(0.0-1.0)	47
26 to 30 pupils	0.7	0.0	4.1	(0.2-1.0)	83
31 or more pupils	0.8	0.0	2.3	(0.6-1.0)	43

Total	<i>0.7</i>	<i>0.0</i>	<i>4.1</i>	<i>(0.3-1.0)</i>	<i>180</i>
Present					
20 or less pupils	0.7	0.0	2.3	(0.3-1.2)	26
21 to 25 pupils	0.6	0.0	3.0	(0.0-1.0)	59
26 to 30 pupils	0.8	0.0	4.1	(0.3-1.0)	84
31 or more pupils	0.8	0.0	1.3	(0.5-1.0)	11
Total	<i>0.7</i>	<i>0.0</i>	<i>4.1</i>	<i>(0.3-1.0)</i>	<i>180</i>

Table 15

**Number of Additional Adults and Staff (Year 2 Classes) -
Additional Hours Support Per Week**

Class Size Category	Mean	Minimum	Maximum	Std Deviation	Number of Classes
Registered					
20 or less pupils	6.17	0	15.00	5.44	6
21 to 25 pupils	4.90	0	15.00	4.94	31
26 to 30 pupils	10.09	0	25.00	6.94	53
31 or more pupils	9.52	0	22.50	6.88	28
Mean Total	8.39	0	25.00	6.70	118
Present					
20 or less pupils	4.27	0	15.00	5.24	17
21 to 25 pupils	7.71	0	23.00	6.03	43
26 to 30 pupils	9.89	0	25.00	7.08	53
31 or more pupils	12.38	6.00	22.50	6.59	5
Mean Total	8.39	0	25.00	6.70	118

(Employed Staff only and excluding hours attached to Statements of Special Educational Need)

Types of Adult Working in Classrooms

Table 16 (i)

(employer/volunteer)

Type of Adult	Number	Percentage
Employed	125	56.6%
Volunteer	96	43.4%
Total	221	100%

Table 16 (ii)

Type of Adult	Number of Adults across all classes	Mean Number of hours per week per adult	Minimum	Maximum	Std Deviation
Employed	124	5.90	0.00	30.00	5.88
Volunteer	92	2.67	0.00	30.00	4.02
All Adults	216	4.52	0.00	30.00	5.40

Table 16 (iii)

Hours per week	Employed	Volunteer	Total
Less than 2 hours	21	38	59
Two to five hours	63	47	110

Six or more hours	38	7	45
Total	122	92	214

Table 17

Number of Adults in Class

Number of Adults	Number of Classes with this many employed adults	Number of Classes with this many volunteer adults	Number of Classes with this many adults in total
1 Adult	36	17	53
2 Adults	18	14	32
3 Adults	10	9	19
4 Adults	2	2	4
5 Adults	1	0	1
7 Adults	1	1	2
9 Adults	0	1	1
Total	68	44	112
Mean Number	1.79	2.18	2.60

Table 18

Relevant work experience of employed and volunteer adults

Level of Experience	Employed Adults	Volunteer Adults	All Adults
One year or less	14 (12.2%)	25 (35.2%)	39 (21.0%)
Two to five years	31 (27.0%)	36 (50.7%)	67 (36.0%)
Six to ten years	35 (30.4%)	8 (11.3%)	43 (23.1%)

Eleven or more years	35 (30.4%)	2 (2.8%)	37 (19.9%)
Total	115 (100%)	71 (100%)	186 (100%)

Table 19

Role within the classroom

Role	Employed		Volunteer		Total	
	No.	%	No.	%	No.	%
Learning Support Assistant/Classroom Assistant/General Assistant/Non-teaching Assistant	55	45.1%	1	1.1%	56	26.0%
Special Educational Needs (Statemented pupils)	16	13.1%	0	0	16	7.4%
Special Educational Needs (general support in class)	15	12.3%	1	1.1%	16	7.4%
Student teacher	0	0	1	1.1%	1	0.5%
Reading (hearing children read)	1	0.8%	20	21.5%	21	9.8%
General	1	0.8%	54	58.1%	55	25.6%
Curriculum specific (art, science, IT)	3	2.4%	6	6.4%	9	4.2%
Literacy and Numeracy (specifically for)	8	6.5%	4	4.3%	12	5.6%
Group work (not specified)	3	2.4%	5	5.4%	8	3.7%
Specialist Teaching Assistant (not specified)	2	1.6%	0	0	2	0.9%
English as an Additional Language	2	1.6%	0	0	2	0.9%
Ancillary/Auxiliary	9	7.4%	1	1.1%	10	4.6%
SSA	6	4.9%	0	0	6	2.8%
Teacher	1	0.8%	0	0	1	0.5%
TOTAL	122	100%	93	100%	215	100%

Table 20

Adults and Classrooms - Qualifications

Qualification Frequency	Employed		Volunteer		Total	
	No	%	No	%	No	%
No Qualifications	30	18%	21	21%	51	19%
NNEB	15	9%	4	4%	51	7%
Qualified Teacher	13	8%	9	9%	22	8%
RSA Certificate in Literacy and Numeracy for Support Assistants	4	2%	0	0%	4	1%
City and Guilds Certificate in Learning Support	12	7%	0	0%	12	5%
Open University Specialist Teaching Assistant Certificate	17	10%	0	0%	17	6%
NVQ Early Years, Childcare and Education	3	2%	0	0%	3	1%
Diploma in Childcare	2	1%	0	0%	2	1%
NVQ Pre-School Practice	1	1%	1	1%	2	1%
NVQ Level 3 Advanced Certificate in Learning Difficulties	1	1%	0	0%	1	0.4%
BTEC Arrow	1	1%	0	0%	1	0.4%
NVQ Classroom Assistants	2	1%	0	0%	2	1%
BTEC HNC Early Childhood Studies	1	1%	0	0%	1	0.4%
Open University Learning for All	2	1%	0	0%	2	1%
CACHE	0	0%	1	1%	1	0.4%
City and Guilds Teaching (Stage 1)	1	1%	0	0%	1	0.4%
Inset (General for LSAs)	5	3%	0	0%	5	2%
Inset (Literacy)	11	7%	1	1%	12	5%
Inset (Numeracy)	10	6%	0	0%	10	4%
Inset (EAL)	3	2%	0	0%	3	1%
Inset (Reading)	6	4%	1	1%	7	3%
Inset (SEN)	7	4%	0	0%	7	3%
Specialist SEN courses	9	5%	2	2%	11	4%
Awaiting Training	1	1%	0	0%	1	0.4%

Student Teacher	0	0%	1	1%	1	0.4%
Student NNEB or similar	0	0%	9	9%	9	3%
Governor	0	0%	3	3%	3	1%
Parent	0	0%	48	47%	48	18%
Various qualifications (not specified in detail)	1	1%	0	0%	1	0.4%
First Aid	3	2%	0	0%	3	1%
GCSEs	1	1%	0	0%	1	0.4%
Degree	1	1%	1	1%	2	1%
TOTAL QUALIFICATIONS	163	100%	102	100%	297	100.60%

Table 21

Pupil-Adult Ratios and Classroom Processes – Reception

		Registered Class Size				Present Class Size			
		Pupil-Adult Ratio	Pupil-Staff Ratio	Pupil-Teacher Ratio	Class Size Registered	Pupil-Adult Ratio	Pupil-Staff Ratio	Pupil-Teacher Ratio	Class Size Present
% of time spent teaching	Correlation	-.075	-.105	-.079	-.172**	-.030	-.056	-.012	.004
	Sig	.215	.080	.195	.004	.618	.356	.841	.948
	N	278	278	272	278	278	278	272	277
% of time spent teaching whole class	Correlation	-.046	.021	-.076	-.088	-.026	.046	-.035	-.016
	Sig	.460	.740	.230	.153	.673	.459	.583	.804
	N	260	260	254	267	260	260	254	258
% of time spent teaching individuals	Correlation	-.004	-.092	-.068	.005	-.012	-.106	.076	.035
	Sig	.946	.158	.300	???	.853	.116	.248	???
	N	236	236	231	242	236	236	231	235
% of time spent teaching groups	Correlation	-.036	-.034	.021	.040	-.031	-.027	.033	.045
	Sig	.563	.579	.738	.514	.622	.659	.601	.470
	N	262	262	257	269	262	262	257	260
% of teacher time spent on maths	Correlation	-.014	-.098	-.054	-.045	-.019	-.100	-.056	-.034
	Sig	.845	.179	.460	.536	.799	.174	.450	.647
	N	188	188	186	188	188	188	186	187
% of teacher time spent on English	Correlation	-.171*	-.117	-.146	-.086	-.129	-.065	-.095	.027
	Sig	.022	.118	.052	.253	.085	.385	.207	.718
	N	180	180	178	179	180	180	178	179
Frequency with	Correlation	-.044	-.022	-.160**	.262**	-.035	-.013	.150*	.203**

which child heard to read	Sig N	.461 279	.716 279	.008 273	.000 279	.566 279	.823 279	.013 273	.001 278
Time spent hearing child read	Correlation	.004 .946 279	.031 .607 279	.183** .002 273	-.202*** .001 277	.007 .904 279	.022 .179 279	.150* .013 273	-.194 .026 276
	Sig N								

Table 22
Pupil-Adult Ratios and Classroom Processes – Year 1

		Registered Class Size				Present Class Size			
		Pupil-Adult Ratio	Pupil-Staff Ratio	Pupil-Teacher Ratio	Class Size Registered	Pupil-Adult Ratio	Pupil-Staff Ratio	Pupil-Teacher Ratio	Class Size Present
% of time spent teaching	Correlation	-.004	-.043	-.193	-.204*	.005	-.040	-.146	-.083
	Sig	.964	.642	.033*	.025*	.959	.661	.109	.364
	N	122	122	122	122	122	122	122	122
% of time spent teaching whole class	Correlation	.160	.163	-.067	-.100	.218	.233	.028	-.010
	Sig	.022*	.020*	.344	.154	.002**	.001***	.690	.890
	N	204	204	204	204	204	204	204	204
% of time spent teaching individuals	Correlation	.140	.159	.049	.079	.124	.134	-.025	-.061
	Sig	.081	.048*	.546	.538	.124	.097	.754	.451
	N	155	155	155	63	155	155	155	155
% of time spent teaching groups	Correlation	-.123	-.099	-.064	-.054	-.126	-.107	-.037	.002
	Sig	.092	.178	.386	.463	.085	.145	.611	.983
	N	188	188	188	188	188	188	188	188
% of teacher time spent on maths	Correlation	.244	.240	.018	-.076	.315	.322	.132	.024
	Sig	.022*	.024*	.871	.481	.003**	.002**	.220	.827
	N	88	88	88	88	88	88	88	88
% of teacher time spent on English	Correlation	-.142	-.117	-.136	-.075	-.126	-.099	-.050	.019
	Sig	.146	.234	.165	.447	.198	.311	.612	.846
	N	106	106	106	106	106	106	106	106
Frequency with which child	Correlation	-.065	-.061	.132	.154	-.015	-.010	.221	.213
	Sig	.354	.389	.061	.028*	.831	.886		.002**

heard to read	N	203	203	203	203	203	203	.001*** 203	203
Time spent hearing child read	Correlation	.009	-.019	-.293	-.362	-.043	-.079	-.382	-.379
		.897	.785			.534	.259		.000***
	Sig N	207	207	.000*** 207	.000*** 207	207	207	.000*** 207	207

Table 23

Pupil-Adult Ratios and Classroom Processes – Year 2

		Registered Class Size				Present Class Size			
		Pupil-Adult Ratio	Pupil-Staff Ratio	Pupil-Teacher Ratio	Class Size Registered	Pupil-Adult Ratio	Pupil-Staff Ratio	Pupil-Teacher Ratio	Class Size Present
% of time spent teaching	Correlation	-.212	-.122	-.158	-.162	-.176	-.084	-.068	-.013
	Sig	.021*	.187	.088	.130	.057	.366	.465	.902
	N	118	118	118	88	118	118	118	88
% of time spent teaching whole class	Correlation	.028	.066	.127	.117	.012	.046	.093	.062
	Sig	.761	.477	.172	.209	.901	.623	.314	.504
	N	118	118	118	118	118	118	118	118
% of time spent teaching individuals	Correlation	.085	.064	-.059	-.030	.076	.041	-.085	.012
	Sig	.360	.493	.528	.749	.414	.658	.361	.897
	N	118	118	118	118	118	118	118	118
% of time spent teaching groups	Correlation	-.250	-.203	-.201	-.185*	-.200	-.138	-.082	-.060
	Sig	.006**	.027*	.029*	.045*	.030*	.136	.379	.517
	N	118	118	118	118	118	118	118	118
% of teacher time spent on maths	Correlation	.012	.044	-.134	-.134	.037	.069	-.084	-.052
	Sig	.901	.636	.151	.151	.694	.459	.365	.575
	N	117	117	117	117	117	117	117	117
% of teacher time spent on English	Correlation	.074	.117	-.029	-.036	.087	.133	-.005	.018
	Sig	.431	.210	.754	.701	.352	.154	.953	.847
	N	117	117	117	117	117	117	117	117
Frequency with which child	Correlation	-.035	.001	-.083	-.059	.009	.064	.023	-.004
	Sig	.708	.988	.374	.530	.927	.492	.804	.969

heard to read	N	117	117	117	117	117	117	117	117
Time spent hearing child read	Correlation	-.004	.001	-.071	-.082	.035	.092	.012	.036
		.968	.988	.444	.375	.710	.323	.901	.699
	Sig N	118	117	118	118	118	118	118	118

Table 24: the frequency (Freq.), percentage of teachers (%T) and percentage of overall responses (%R) by reception, year one and year two teachers indicating the ways in which non-teaching staff have contributed to effective teaching and learning

Individual Response Categories	1997/ 1998 Reception Teachers C2			1997/ 1998 Year One Teachers C1			1998/ 1999 Year One Teachers C2			1998/ 1999 Year Two Teachers C1			Key Stage 1 Teachers Average Responses	
	Freq.	% T	%R	Freq.	%T	%R	Freq.	%T	%R	Freq.	%T	%R	Freq.	% T
Increased individual attention	33	33	18	33	21	12	31	31	23	28	27	22	31	27
Extra support for children with SEN + EBD	14	14	8	48	30	18	23	23	17	28	27	22	28	24
More productive group work	30	30	16	40	25	15	20	20	15	18	17	14	27	23
Raises standards/ better progress	20	20	11	30	19	11	9	9	7	8	8	6	17	15
Delegate day to day duties	6	6	3	31	20	12	3	3	2	11	11	9	13	11
Vital with Literacy Hour support	2	2	1	11	7	4	15	15	11	14	14	11	11	9

More Practical lessons/ activities	16	16	9	11	7	4	6	6	4	6	6	5	10	8
More Focused Teaching/ Lesson Delivery	11	11	6	16	10	6	8	8	6	3	3	2	10	8
Increased reading opportunities	10	10	5	15	9	6	4	4	3	2	2	2	8	7
Reduces Pressures	10	10	5	9	6	3	1	1	.7	3	3	2	6	5
Children more focused on tasks	9	9	5	5	3	2	4	4	3	1	1	.8	5	4
Morale Boosting	-	-	-	5	3	2	4	4	3	5	5	4	4	3
Deal with Practical/ Physical incidents	9	9	5	-	-	-	-	-	-	-	-	-	2	2
Planning; more time/ effective	3	3	2	4	3	2	-	-	-	-	-	-	2	2
Aid with Assessments	-	-	-	2	1	.8	4	4	3	1	1	.8	2	2
Assist with Baseline Assessments	3	3	2	-	-	-	-	-	-	-	-	-	1	1
Help with Setting up activities	5	5	3	-	-	-	-	-	-	-	-	-	1	1
Aid with Discipline	-	-	-	3	2	1	2	2	1	-	-	-	1	1
Relieve Playground duty	-	-	-	3	2	1	-	-	-	-	-	-	1	1
Children less frustrated	1	1	.5	-	-	-	-	-	-	-	-	-	.3	.2

Table 25: the frequency (Freq.), percentage of teachers (%T) and percentage of overall responses (%R) by reception, year one and year two teachers indicating the ways in which non-teaching staff have contributed to effective teaching and learning

Collective Categories	Individual Response Categories	1997/ 1998 Reception Teachers C2			1997/ 1998 Year One Teachers C1			1998/ 1999 Year One Teachers C2			1998/ 1999 Year Two Teachers C1		
		Freq.	% T	%R	Freq.	%T	%R	Freq.	%T	%R	Freq.	%T	%R
Attention and Support	Increased individual attention	33	33	18	33	21	12	31	31	23	28	27	22
	Extra support for children with SEN +EBD	14	14	8	48	30	18	23	23	17	28	27	22
	Increased reading opportunities	10	10	5	15	9	6	4	4	3	2	2	2
	Vital with Literacy Hour support	2	2	1	11	7	4	15	15	11	14	14	11
	Reduces Pressures	10	10	5	9	6	3	1	1	.7	3	3	2
	Morale Boosting	-	-	-	5	3	2	4	4	3	5	5	4
	Aid with Assessments	-	-	-	2	1	.8	4	4	3	1	1	.8
	Assist with Baseline Assessments	3	3	2	-	-	-	-	-	-	-	-	-
Teacher Effectiveness	More productive group work	30	30	16	40	25	15	20	20	15	18	17	14
	More Practical lessons/ activities	16	16	9	11	7	4	6	6	4	6	6	5
	More Focused Teaching/ Lesson Delivery	11	11	6	16	10	6	8	8	6	3	3	2
	Planning; more time/ effective	3	3	2	4	3	2	-	-	-	-	-	-

Classroom Management	Delegate day to day duties	6	6	3	31	20	12	3	3	2	11	11	9
	Deal with Practical/ Physical incidents	9	9	5	-	-	-	-	-	-	-	-	-
	Help with Setting up activities	5	5	3	-	-	-	-	-	-	-	-	-
	Aid with Discipline	-	-	-	3	2	1	2	2	1	-	-	-
	Relieve Playground duty	-	-	-	3	2	1	-	-	-	-	-	-
Benefits to Children	Raises standards/ better progress	20	20	11	30	19	11	9	9	7	8	8	6
	Children more focused on tasks	9	9	5	5	3	2	4	4	3	1	1	.8
	Children less frustrated	1	1	.5	-	-	-	-	-	-	-	-	-

Table 26 Pupil Adult Ratios and Teacher Professional Self--Perceptions – Reception

		Registered Class Size			Present Class Size		
		Pupil-Adult	Pupil-Staff	Pupil-Teacher	Pupil-Adult	Pupil-Staff	Pupil-Teacher
Fulfilled/Unfulfilled	Correlation	.066	.119	-.024	.047	.093	-.059
	Sig	.378	.112	.755	.535	.219	.437
	N	178	178	175	178	178	175
Relaxed/Stressed	Correlation	.122	.168	.088	.114	.154	.093
	Sig	.106	.025	.245	.128	.040*	.219
	N	178	178	175	178	178	175
Eager/Indifferent	Correlation	.088	.075	.007	.071	.057	-.023
	Sig	.241	.318	.924	.345	.447	.765
	N	178	178	175	178	178	175
Enthusiastic/Unenthusiastic	Correlation	.016	.060	-.029	.025	.060	-.014
	Sig	.812	.370	.663	.713	.371	.842
	N	225	225	.221	225	225	221
Confident/Insecure	Correlation	.160	.143	.114	.145	.125	.083
	Sig	.032*	.057	.130	.054	.096	.274
	N	179	179	176	179	179	176
Energetic/Inert	Correlation	.154	.104	-.017	.168	.117	.023
	Sig	.039*	.164	.819	.025*	.120	.760
	N	179	179	176	179	179	176
Satisfied/Dissatisfied	Correlation	.003	.102	.150	.012	.109	-.121
	Sig	.970	.175	.048*	.869	.150	.112
	N	177	177	174	177	177	174
Fresh/Stale	Correlation	-.042	-.145	-.089	-.033	-.132	-.056
	Sig	.578	.054	.243	.660	.079	.460

	N	178	178	175	178	178	175
Spirited/Apathetic	Correlation	-.042	-.106	-.141	-.070	-.137	-.199
	Sig	.575	.160	.063	.356	.068	.008**
	N	178	178	175	178	178	175
Energised/Burnt Out	Correlation	.052	-.022	-.032	.062	-.011	-.011
	Sig	.488	.767	.672	.409	.883	.885
	N	177	177	174	177	177	174
How Stressed?	Correlation	.122	.189	.109	.108	.175	.074
	Sig	.105	.012*	.152	.152	.020*	.332
	N	178	178	175	178	178	175
How Satisfied?	Correlation	-.129	-.107	-.003	-.119	-.094	.021
	Sig	.085	.155	.973	.112	.211	.777
	N	179	179	176	179	179	176

Table 27

Pupil Adult Ratios and Teacher Professional Self-**Perceptions – Year 1**

		Registered Class Size			Present Class Size		
		Pupil-Adult	Pupil-Staff	Pupil-Teacher	Pupil-Adult	Pupil-Staff	Pupil-Teacher
Fulfilled/Unfulfilled	Correlation	.060	-.021	-.117	.062	-.026	-.127
	Sig	.412	.770	.111	.396	.726	.083
	N	187	187	187	187	187	187
Relaxed/Stressed	Correlation	.043	-.065	-.020	.042	-.070	-.035
	Sig	.555	.377	.790	.568	.338	.636
	N	188	188	188	188	188	188
Eager/Indifferent	Correlation	.075	.047	-.051	.049	.021	-.098
	Sig	.309	.522	.484	.505	.776	.182
	N	188	188	188	188	188	188

Enthusiastic/Unenthusiastic	Correlation	.070	.022	-.002	.059	.008	-.024
	Sig	.341	.767	.981	.423	.910	.748
	N	188	188	188	188	188	188
Confident/Insecure	Correlation	.166	.041	.036	.159	.034	.005
	Sig	.023*	.575	.626	.028*	.642	.942
	N	189	189	189	189	189	189
Energetic/Inert	Correlation	.037	-.039	.014	.048	-.029	.044
	Sig	.613	.593	.848	.516	.687	.551
	N	189	189	189	189	189	189
Satisfied/Dissatisfied	Correlation	.049	-.057	-.064	.060	-.047	-.055
	Sig	.501	.433	.379	.414	.522	.454
	N	188	188	188	188	188	188
Fresh/Stale	Correlation	.074	-.034	-.015	.094	-.018	.031
	Sig	.310	.645	.842	.199	.805	.675
	N	189	189	189	189	189	189
Spirited/Apathetic	Correlation	.048	.012	-.060	.053	.011	-.046
	Sig	.511	.874	.410	.473	.878	.526
	N	189	189	189	189	189	189
Energised/Burnt Out	Correlation	.065	-.050	-.010	.075	-.041	.001
	Sig	.376	.496	.894	.307	.573	.994
	N	189	189	189	189	189	189
How Stressed?	Correlation	-.010	-.083	.093	.003	-.066	.110
	Sig	.892	.257	.204	.963	.365	.130
	N	189	189	189	189	189	189
How Satisfied?	Correlation	-.048	.046	.067	-.063	.032	.054
	Sig	.516	.531	.361	.388	.659	.462
	N	188	188	188	188	188	188

Table 28
2

Pupil Adult Ratios and Teacher Characteristics – Year

		Registered Class Size			Present Class Size		
		Pupil-Adult	Pupil-Staff	Pupil-Teacher	Pupil-Adult	Pupil-Staff	Pupil-Teacher
Fulfilled/Unfulfilled	Correlation	-.087	-.108	.049	-.093	-.123	.046
	Sig	.327	.220	.577	.293	.164	.604
	N	130	130	130	130	130	130
Relaxed/Stressed	Correlation	.217	.108	.150	.237	.127	.173
	Sig	.012*	.216	.086	.006**	.147	.047*
	N	132	132	132	132	132	132
Eager/Indifferent	Correlation	-.041	-.081	.021	-.011	-.054	.065
	Sig	.643	.355	.814	.904	.543	.459
	N	131	131	131	131	131	131
Enthusiastic/Unenthusiastic	Correlation	-.025	-.049	.024	.008	-.007	.087
	Sig	.773	.580	.788	.930	.933	.320
	N	132	132	132	132	132	132
Confident/Insecure	Correlation	-.045	-.071	-.044	-.061	-.088	-.072
	Sig	.606	.418	.614	.485	.318	.414
	N	132	132	132	132	132	132
Energetic/Inert	Correlation	-.014	-.021	.053	.001	-.005	.070
	Sig	.878	.813	.548	.987	.951	.426
	N	131	131	131	131	131	131
Satisfied/Dissatisfied	Correlation	.078	.033	.109	.072	.026	.091
	Sig	.378	.711	.214	.412	.772	.303
	N	131	131	131	131	131	131
Fresh/Stale	Correlation	-.007	-.005	.030	.020	.019	.062
	Sig	.940	.953	.731	.820	.833	.482

	N	132	132	132	132	132	132
Spirited/Apathetic	Correlation	.007	.008	.049	.027	.033	.081
	Sig	.933	.924	.577	.757	.708	.359
	N	132	132	132	132	132	132
Energised/Burnt Out	Correlation	-.020	-.057	-.020	.009	-.029	.029
	Sig	.819	.518	.817	.919	.742	.742
	N	132	132	132	132	132	132
How Stressed?	Correlation	.222	.130	.066	.205	.116	.030
	Sig	.010*	.139	.449	.018*	.187	.733
	N	132	132	132	132	132	132
How Satisfied?	Correlation	-.008	.001	-.012	-.011	-.002	-.022
	Sig	.928	.991	.894	.899	.984	.802
	N	131	131	131	131	131	131

Table 29 Coefficients from a basic reception year literacy model, containing previous test scores, class size and additional staff.

The literacy score was normalised for the analysis, so that one unit of the outcome represents one standard deviation of the literacy score.

Parameter	Coefficient	Standard Error
Constant	-0.382	0.186
Class Size	-0.134	0.095
Class Size ^2	-0.007	0.016
Class Size ^3	0.000	0.001
Lower class size cubic spline	0.000	0.002
Upper class size cubic spline	0.001	0.001
Pre-reception score	0.794	0.014
Pre-reception score^2	0.019	0.007
Pre-reception score^3	-0.023	0.004
(less than one – none) extra adults	0.008	0.092
(one or more – none) extra adults	0.041	0.081
School level variance	0.176	0.033
Class level variance	0.107	0.019
Pupil level variance	0.316	0.007
Significance of extra staff: χ^2 (2) p-value	0.32 <0.85	
Significance of class size: χ^2 (5) p-value	123.6 <0.001	
Number of pupils used in analysis	4685	

Extra staff in the classroom were divided into three groups: none, average of less than one, average of one or more.

Table 30 Coefficients from a basic reception year mathematics model, containing previous test scores, class size and additional staff.

The mathematics score was normalised for the analysis, so that one unit of the outcome represents one standard deviation of the mathematics score.

Parameter	Coefficient	Standard Error
Constant	-0.315	0.209
Class Size	-0.135	0.109
Class Size ^2	-0.010	0.018
Class Size ^3	-0.001	0.001
Lower class size cubic spline	0.005	0.003
Upper class size cubic spline	0.001	0.001
Pre-reception score	0.720	0.018
Pre-reception score^2	-0.035	0.009
Pre-reception score^3	-0.035	0.006
(less than one – none) extra adults	0.036	0.107
(one or more – none) extra adults	0.061	0.095
School level variance	0.110	0.034
Class level variance	0.169	0.027
Pupil level variance	0.400	0.008
Significance of extra staff: χ^2 (2) p-value	0.42 0.81	
Significance of class size: χ^2 (5) p-value	114.0 <0.001	
Number of subjects used in analysis	4893	

Extra staff in the classroom were divided into three groups: none, average of less than one, average of one or more.

APPENDIX 2

The educational effects of class size differences over KS1: Summary of Results from the Class Size Study

One of the most important debates in education in recent years has been about the effects of class size differences in schools. In a number of countries there have been policies to reduce class sizes for young children. This is consistent with the view of teachers and parents that smaller classes can allow more effective teaching and learning to occur. However, there are still considerable gaps in our understanding of the effects of class size differences. Though there is evidence from the USA that children in small classes of less than 20 do better academically, there are still questions about the effects of class size outside this range and about classroom processes that might mediate and hence explain class size effects.

The London Class Size Research Project provides the most complete analysis to date of the educational consequences of class size differences. It had two aims:

- to establish whether class size differences affect pupils' academic achievement
- to study connections between class size and classroom processes, which might explain any differences found. Processes studied included within class groupings, teaching, adults' individual support for reading, pupil attentiveness, and peer relations

The study had a number of features that were designed to be an improvement on previous research. It used an 'observational' approach, rather than an interventionist one involving random assignment, in order to capture the nature of the relationship between class size and achievement across the full range of observed classes, and it employed a longitudinal design with baseline assessment to adjust for possible non-random selection of children into classes. The study followed a large sample of over 10,000 children from school entry through the infant stage, i.e., children aged 4 –7 years. It used multi-level statistical procedures to model effects of class size differences while controlling for sources of variation that might affect the relationship with academic achievement, and a multi-method research approach, integrating teachers' judgements and experiences with case studies, and also carefully designed time allocation estimates as well as systematic observation data.

Results showed that there was a clear effect of class size difference on children's academic attainment over the (first) reception year, both before and after adjusting for possible confounding factors. The effect appears stronger than that reported by the experimental STAR project, though class sizes in the UK are larger and results are not directly comparable. The results also showed differential effects for the initial low achievers in the case of literacy, in that the lowest attainers on entry to school benefited most from small classes, particularly below 25. For mathematics the pattern is somewhat different, with all three initial attaining groups

benefitting from small classes. Results showed no discernible effect of extra non-teaching staff on children's attainments.

Connections between class size and classroom processes were examined and showed effects on teaching. It was found, on the basis of quantitative analyses of time allocation estimates and systematic observation, along with qualitative analyses of teachers' end-of-year accounts and case studies, that in smaller classes there was more individual teacher support for learning.

There were also effects on children. Results from the systematic observation study showed that children in large classes were more likely to be off-task and distracted from work. They were less likely to attend to the teacher and to be off-task in contacts with her, more likely to be actively off task with other children, and more likely to be off-task when on their own, especially in the passive form of being disengaged from allocated work.

There was a slight though consistent tendency for worse peer relations, in terms of aggression and rejection of peers, in the smallest classes. Intriguingly, then, there were signs that relationships between children are WORSE in small classes with fewer than 20 children. Smaller classes may be better academically but not necessarily socially.

There were also effects on within class learning contexts. Results showed that class size affects the size and number of groups, which in turn affect children's educational experiences. In large classes there are more large groups and this presents teachers with more difficulties and children with less individual attention.

It is concluded that class size effects are not singular but multiple, and that we need multiple theoretical or conceptual frameworks to account for these effects and to judge their implications, for example, connected to within class groupings, teaching, and pupil attentiveness and social relations. Further, the different effects may have conflicting outcomes, for example, in the sense that smaller classes can lead to positive academic outcomes but problematic social effects.

These results raise questions about traditional ways of viewing teaching effects. Classroom processes have tended to be viewed in terms of a direct model, where teachers' actions toward pupils are seen as having effects on pupils' learning or attainments. The present study, however, supports a contextual approach, within which class size differences have effects on both teachers and pupils. Small classes will not necessarily make a bad teacher better, but small classes seem likely to make it easier for teachers to be effective. It is concluded that much will depend on how teachers adapt their teaching to different class sizes and that more could be done in teacher training and professional development to address contextual features like size of class.