Introduction

The key aim of this chapter is to draw on complementary sources of data in order to provide a detailed, comprehensive and informative analysis of ways in which teaching is affected by class size. In particular, we draw out insights from three different detailed accounts: first, from teachers about how class size has affected their teaching; second, from moment by moment systematic observations of teacher–pupil interactions (with additional results from the DISS study – see Chapter 2); and third, from detailed case studies, involving interviews with teachers, headteachers and pupils and semi-structured classroom observations, in classes of different sizes.

In many ways this is the main chapter in this book. In the previous chapter we looked at the evidence for connections between class size and pupil ‘outcomes’. We believe this went some way to solving our first ‘class size conundrum’ (CSC1), that is, the gap between research findings on the modest connection between class size and pupil attainment and the strong and persistent view of many practitioners that class size matters.

To make further progress in our examination of class size effects we now need to turn our attention to how class size affects what happens in the classroom. This will, we hope, also address our second class size conundrum (CSC2), that is, asking why the effects of class size on pupil outcomes are not more marked – remembering that the effects in the CSPAR study were significant, but modest.
The effect of class size, if there is one, must be expressed somehow in processes within the classroom itself. Given the central role of the teacher in classroom life, the main classroom process is likely to be the teaching that takes place, as seen in the interactions and relationships between teachers and pupils, classroom management, and so on. In relation to CSC2, it is also important to examine teaching in order to explain why there may be no or limited impact of class size. Perhaps teachers in small classes don’t take advantage of any opportunities afforded them? Or perhaps teachers in large classes compensate in certain ways?

We first of all make what we think is an important but basic point: teaching is not just about delivering or presenting a lecture or lesson to the class. This might seem obvious to many, but it seems, unfortunately, to be the implicit assumption critics have in mind when saying class size is not important. Delivering material is a main facet of teaching, of course. It does not matter so much how many students there are if all that is required is to listen to a lecture about, for example, what happened to British troops at Dunkirk in the Second World War or some aspect of algebra. This is not to devalue the purpose of an engaging presentation, and all school teachers will of course use whole class delivery at times. But teaching involves, or should involve, so much more than that. For example, it will also involve working with groups, supporting collaborative group work and supporting individual pupils who need help. Teachers will also need to monitor, give feedback on and assess work, both written and ongoing. Teaching will in addition involve efforts to stretch and challenge pupils, drawing on their contributions, and probing and extending their understanding. As part of teaching, teachers will also need to set up equipment and resources, as well as a range of activities, to meet curriculum objectives and support the learning of pupils.

It is a central conclusion of this chapter, and of this book, that these everyday facets of teaching are not often recognised in comments about the unimportance of class size – yet they are both vital and influenced by the size of the class. A main aim of this chapter and this book is to show just how.

A teacher’s view of class size

We start this chapter with an account of an informal conversation between PB and a history teacher in a South London secondary school. The teacher is known to PB. He is committed and conscientious and, though aware of the value of well-grounded research evidence, has a
healthy scepticism of strong opinions based on research, especially when they don’t accord with his own experience. PB asked the teacher about his own classroom experience as a practising teacher.

He took a few moments to think about the question before saying that he thought that the ideal class size for one of the current Year 11 (15–16 years) classes he was teaching, and whose books he was just marking, would be 16–20 pupils. He thought a smaller class size like this allowed better teaching because there was more individual attention and management and control were easier. In a larger class it is easier for students to lose attention, while in a smaller class there is less off-task behaviour. He made the interesting point that when the number of naughty and disruptive pupils in the class reach a critical mass, it is much harder to maintain control, so two disruptive pupils in a class of 16 might be manageable, but four in a class of 32 can be far more challenging.

Reflecting further on the benefits of smaller classes for teaching, the teacher said that it is possible to give more detailed individual feedback, both written and also live feedback on ongoing work. One can ‘home in’ on certain things in order to test and develop a concept or point. Thinking about a topic he was teaching at the moment, he identified what we might think of as another kind of critical mass process connected to class size. He pointed out that with 16 in the class he could give them a task to do in silence, which is more likely to be maintained than in a larger class. In addition, he can then go round and monitor the work of individual pupils and give suggestions. With, say, 30 in the class the potential for disruption is more obvious, and so he would be more likely to direct the class from the front and scan everyone from there. It would then be accordingly less easy to give live feedback to individuals. He said that just as noise is infectious, so is silence; silence in a smaller class becomes self-sustaining.

The teacher also thought that class size can affect the quality of teaching. In a small class he was more likely to be open to trying out new things, more open to challenging the students, and exploring issues around the topic. He made two further points on teaching and class size: he felt that ‘The energy flow is more malleable in a smaller class’, meaning that the teacher can be more flexible in how they make use of student contributions and work, and that ‘the risk/reward ratio is higher in a larger class’, with the result that a larger class leads to safer styles of teaching, more centred on control and less cognitively challenging.

The last point he made was that class size effects will be affected by the types of pupils in the class. Class size matters more in the low-attaining secondary school sets he teaches.
He was careful to point out that the key factor is the effectiveness and quality of the teacher. A small class in the hands of a poor teacher is still likely to be badly taught and their progress limited. He gave the example of a trainee teacher in his school who felt awkward when the children in a small class were engaged in individual work, and consequently spoke too much – an interesting example of how not to make the most of a small class, a theme we return to in this book.

It sounds like this was a long interview, but in truth it did not take long for a number of key, lived connections between class size and teaching to emerge. We need to say of course, that though grounded in everyday teaching experiences, the comments just reported are anecdotal, and are the experience of one person, who is mostly referring to children in their last years at secondary school. Nevertheless, it indicates that, other things being equal, from the teacher’s perspective there are some important ways in which a small class can facilitate higher quality teaching and more effective classroom management. As we shall see, many of the points that emerged in this conversation are mirrored in the thorough analysis of interconnections between class size and teaching, to which we soon turn.

The study of teaching

It has been argued by an influential educationalist that the most important driver of an effective education system is the quality of teaching (Wiliam 2013). It is hard to disagree with this, and it is therefore vital that we seek to better understand what constitutes high-quality teaching and effective modes of classroom interaction. This is not straightforward, however. When thought about generally, the terms ‘teaching’ and ‘pedagogy’ cover a number of features: tasks and activities, interactions and judgements framed and supported by classroom organisation, pupil organisation, time and the curriculum, and by classroom routines, rules and rituals. An influential educational researcher, Nate Gage, argued that ‘Teaching is the central process of education’ (Gage 1985). He considered classroom teaching in terms of such things as: ‘lecturing and tutoring but all other types of interactions such as teacher–pupil questioning, pupil responding and initiations, as well as pupil work at tables and desks, and the managerial activities that maintain the whole process.’ Arends (1994) argued that teachers, regardless of the age of their pupils, their subject areas, or the types of schools in which they teach, are asked to perform three important functions: first, executive (providing leadership to students); second,
interactive (face to face instructions with students); and third, organisational (working with colleagues, parents and others).

There has been an extensive but very diverse research literature on teaching and teaching methods, which is too vast to be reviewed here. In the book *The Child at School* (Blatchford et al. 2016a), two main strands of research on teaching are reviewed. First, we have quantitative approaches, as seen in the work of Flanders (1970), ‘process-product’ research (Brophy and Good 1986), the descriptive observation studies of Galton et al. (1980; 1999), which identified teaching styles and their effects on pupils' progress, and more recent quantitative research on school and teacher effectiveness which tends to stress the importance of direct instruction, in which the teacher actively engages pupils by bringing the content to the whole class (see Ko et al. 2013; Kyriacou 2009; Muijs and Reynolds 2011). A more recent tradition of quantitative research is seen in work by Pianta and colleagues in the United States on teacher–pupil relationships (Hamre and Pianta 2010).

A second approach to teaching is to take sociocultural approaches that build on interpretations of Vygotskian theory, in which the use of language is seen to have a privileged role in transforming children's thinking. There has been much concern from this perspective with what are seen as the limitations of a lot of teacher to pupil dialogue, and in particular the ubiquity of closed questioning and the three-part teacher sequence: initiation, pupil response, teacher feedback – the ‘IRF’ pattern (Howe and Abedin 2013). Many in this tradition have argued that this reliance on eliciting simple factual right or wrong answers is unlikely to develop pupils' knowledge or understanding (Alexander 2001). Far more likely to be cognitively challenging is ‘dialogic thinking’ (Alexander 2004) or ‘exploratory talk’ (Mercer and Howe 2012), which encourages co-reasoning, sharing knowledge and evaluating evidence. Myhill, Jones and Hopper (2006) make the important point that one reason for the ubiquity of conventional limited teacher questioning styles is the close connection with teacher control, especially important given the size of many classes and the curriculum and assessment imperatives within which teachers have to operate.

Two other psychological approaches to teaching have been influential. Resnick (2000), drawing on well-established approaches in psychology, identified two core features of effective pedagogy. The first she called ‘knowledge-based constructivism’ – a deliberate oxymoron that was meant to capture the now well understood interpretive, inferential basis of learning, as well as the responsibility of an educational system
to provide learners with high-quality material from which they can construct. The second core component drew on social developmental and motivational theory and was called by Resnick ‘effort-based learning’. She argues that it is important not to socialise learners into inhibiting views of their own learning and intelligence, and to ensure learners realise effort and application are important in learning.

The influential American psychologist Linda Darling-Hammond has in a number of publications provided a powerful vision of what we can all learn from the science of learning and development to guide effective pedagogies (Darling-Hammond et al. 2020). This is a wide-ranging vision, not one confined to teacher delivery in core subjects areas. Learning is seen as essentially social in nature and relationships, emotion and learning are inextricably linked. Learning is facilitated by teacher feedback and cognitive flexibility and is enhanced by a wide range of curriculum experiences, not a narrow curriculum diet. Darling-Hammond stresses that effective teaching should have at its heart scaffolded instruction, ongoing formative assessment and relevant, engaging tasks.

We are very much in agreement with the views of Resnick and Darling-Hammond, but in line with what we said in Chapter 1 of this book, we also want to add another feature that we believe is also essential as a core feature of an effective pedagogy. Although most people are no doubt aware of the importance of context, in a relatively general sense, what we have in mind here is a consideration of specific classroom contexts within which learning takes place. This means a systematic appreciation of the classroom as a particular context with particular features, which affect learning and motivation, but also teaching. A key dimension of the classroom is the number of pupils in the classroom (and also the characteristics of within classroom groups, which we discuss in the next chapter).

Class size and teaching

But what do we know from research about any connection between class size and teaching? There have been some studies (for example, Cahen et al. 1983; Bourke 1986) and some reviews (for example, Ehrenberg et al. 2001; Finn et al. 2003), but overall there have been few dedicated studies of class size and teaching and insights from research into class size and teaching are limited. As we have seen, Finn et al. (2003) have argued that one of the problems has been the
methodological limitations of much research on class size and teaching, with much that is anecdotal and informal, with little use of, for example, systematic observation studies to capture aspects of teacher–pupil interactions, which could complement the experiences of practitioners.

For a number of academics, the study of class size and teaching is not seen as worthwhile because class size is not thought to be a main factor in affecting pupil academic standards. This sceptical view about the relevance of class size to teaching was given support by the influential review by Ehrenberg et al. (2001) which concluded that the influence of class size was relatively trivial. Shapson et al. (1980), on the basis of a systematic observation study, found no statistically significant differences between class sizes for most teacher activities, and they also found that teachers did not alter the proportion of time spent interacting with the whole class, with groups or with individuals. Worryingly, they found that these observation results were at odds with teachers’ own views. Finn et al. (2003) argued that class size effects were likely to be mediated through pupils’ engagement more than teaching.

However, common sense and logic might suggest that the number of children in a class will increase the amount of time that teachers spend in procedural matters, like organising books and equipment, and, conversely, decrease the amount of time that can be spent on instruction and dealing with individual children. This is consistent with accounts of teachers’ views (Bennett 1996; Pate-Bain et al. 1992), and some previous research (Cooper 1989; Glass et al. 1982). An American study of pupil–adult ratios (the SAGE study) suggests that the most important classroom process, affected by reduced class size, is individualisation of teaching (Molnar et al. 1999). Other research on pupil–adult ratios suggest that there is a tendency for teachers to devote less time to group instruction and more on individual instruction in smaller classes (Betts and Shkolnik 1999).

Several studies have provided more formal models of class size effects on teaching, as we discussed in more detail in Chapter 2. Zahorik et al. (2002) argue that smaller class sizes mean less discipline/more instructional time, more knowledge of students and more teacher enthusiasm, and that, among other things, this leads to more individualisation in teaching. Anderson (2000) proposes that, among other things, reduced class size allows more instructional time and greater knowledge of students.

These specific class size models, though helpful, do not in our view fully capture the factors related to class size identified in this book or
their interconnections. Overall, there is not a clear empirical basis for conclusions about how class size affects teaching.

Our earlier KS1 study (children aged 5–7 years) examined relationships between class size and teaching (Blatchford et al. 2003a; Blatchford et al. 2002b). To summarise: results from the systematic observation component of the study showed consistent evidence that in small classes children were more likely to interact with their teachers, more one-to-one teaching took place, children were more often the focus of a teacher’s attention, more teaching interactions with pupils took place overall, and children more often attended to their teachers. Results from end-of-year teacher-completed questionnaires and case studies suggested that class size affected the amount of individual attention, the immediacy and responsiveness of teachers to children, the sustained and purposeful nature of interaction between teachers and children, the depth of a teacher’s knowledge of children in their classes and sensitivity to individual children’s particular needs. Overall, we proposed (Blatchford et al. 2003a) that in smaller classes there was more likelihood of what we called teacher support for learning.

In this chapter we extend this analysis from our earlier study, by analysing the more extensive data from the KS2 stage (pupils aged 7–11 years) of the CSPAR project. As described above, the key aim of this chapter is to draw on complementary sources of data in order to provide a comprehensive analysis of ways in which teaching is affected by class size. In presenting our results on class size and teaching, we look first at teachers’ experiences and views of how class size has affected their teaching; second, we turn to complementary systematic observations of teacher–pupil interactions; and, third, we look at results from detailed case studies of different class sizes.

**Results on class size and teaching**

**TQ results**

There were 486 teacher questionnaires (TQs) returned altogether: 206 in Year 4 (8–9 years), 184 in Year 5 (9–10), and 96 in Year 6 (10–11) (see Chapter 2 for details of the sample). In each of these three school years in primary schools, one of the questions asked teachers to comment on whether, and if so how, the number of children in their class had affected their teaching that year. The numbers of responses from teachers could
vary for different questions. For this question on teaching the analysis was based on 394 responses from teachers overall: 115 at Year 4, 175 at Year 5 and 104 at Year 6.

The quotations from the TQ given throughout this book come either from teachers with large classes of 30 or over, or from teachers with smaller classes of 25 or less. Almost all responses from teachers were about the negative impact of large class sizes or the positive impact of small classes. There were very few who were positive about large classes or negative about small classes.

For the analysis of the TQ, a sample of teacher responses was used to devise a coding frame for application across the three school years. In the analysis below, all the quotations were sorted into key categories (‘codes’). It was possible that one response from a teacher could result in several different codes. These code categories referred to the effects of both small and large classes; for example, that large classes presented problems, but small classes advantages, when seeking to maximise individual attention to pupils.

**Teachers’ experiences and views on class size and teaching**

We felt it would be helpful to start by presenting some selected longer quotations, provided verbatim, exactly as written by the teachers. These nicely convey the interconnected ways in which class size has effects on, and implications for, teaching in a general sense.

The first quotation shows how a larger class of 36 means the classroom is always crowded, with negative implications for focused work, pupil concentration, and support for pupils.

> The classroom is crowded. Almost impossible to sit 36 on carpet for aspects of literacy and numeracy for close focused work. When talking to whole class, children ‘at the back’ find it difficult to concentrate. There’s not enough time to get round to 36 children with support/comments.

Many of the problems discussed in more detail later are highlighted in the quotations below, from two teachers who indicate how their task is made more difficult by having a large class (34 and 35 pupils, respectively). For example, the problems for marking, support for reading, setting up practical tasks and more investigative work, pupil relationships with each other, support for children with SEND, the balance of
individual support versus whole class teaching, problems of differentiating work, and stress for the teacher.

Great stress! Cannot manage to mark up to 5 sets of 34 books each day. Cannot keep up with target setting and assessment records/tasks. Cannot hear children read as often as I’d like. Many arguments in class – too many children working too close together. Find practical tasks a trial – sharing equipment. More children therefore more problems with relationships. Cannot always support SEN children appropriately as a large number of children take up more time in helping with problems. (Year 5 teacher)

It is difficult to spend quality time with the individual to enhance their progress. Whole class teaching has been used mainly, although there are clear groups which require differentiation, particularly in Maths and English. This involves time needed to explain what they are to do, either for additional support or for challenges or extension work to push the more able. Children either wait or have a go at what is set through verbal instructions. Difficult to set specified amount of work because so many progress at different rates. Many children require individual attention. Marking has been difficult to do with the children for immediate feedback, and it has taken enormous time and energy, which could be better spent preparing even more effective lessons. Very rigid regime established with 35 in the class; little time or resources available for the more investigative work, although several sessions are set aside each week for this. Would like to do even more. (Year 5 teacher)

Another quotation shows, yet again, how a large class adversely affects the quality of teaching and the social context within which teachers teach, so there is less individual support and more teaching to larger groups, with accompanying loss of concentration and problems with classroom management.

The classroom is quite large so space has not been a problem. With the high number of pupils I can’t give as much individual attention to any one child as I would like. Group work is in fairly large groups which ultimately means some children don’t participate and let others do the work. I have to ensure that all children join in/listen which can be difficult with 35 children. I spend considerable time
checking and tend to lose the thread sometimes when dealing with disruptive children. (Year 5 teacher)

The way that class size affects the balance of social/interactive contexts and the costs in terms of the teacher’s energy, in turn affecting the quality of teaching and the teacher’s relationships with her pupils, is also apparent in the following observation.

As there are 36 children I do find it hard to spend quality time with individuals. Because of this I don’t feel I forge such a good relationship with them. There is less time to set individual targets, to discuss these and their work with them. Groups tend to be large and not as intimate, again I feel this affects my relationship with individuals. Groups rarely all get a chance to report back. 36 literacy, science books, extended writing, etc. takes an enormous amount of time to mark. This leaves you less time and energy to plan which in turn affects the quality of my teaching. (Year 5 teacher)

The responses from teachers quoted above bring out the way that the everyday job of teaching can be intimately connected with the classroom contexts within which it takes place, and in particular with the number of pupils. Already we can see the problem with the view that class size is not as important as the quality of teaching. It is not a question of whether teaching or class size is more important but of how they are connected. We now turn to this question and work through the main sets of categories used to code the TQ responses.

Interactive contexts: Individuals/groups/whole class

The first and most prevalent set of codes relate to what we call the ‘interactive contexts’ within which teaching and learning take place in classrooms. There are three such interactive contexts in any classroom: individual attention, groups and whole class. The results from the TQ make it very clear that the frequency and balance of each are affected by class size. We discuss each interactive context in turn.

Individual attention. The single individual most frequent response to the TQ questions, across the three year groups at KS2, is that class size affects the amount of individualised and one-to-one teaching possible.

Below, we provide just a small sample of the many comments received from teachers with large classes of over 30 pupils.
At the beginning of the year I had 24 children – gradually it has crept up to 32. The quality of learning is far easier and effective when you can talk frequently to children on an individual basis rather than exercise crowd control. (Year 4 teacher)

It has been hard to give children any real one to one time when they have needed it. With so many children, I sometimes feel that I don't even get to speak to certain children before the day ends. (Year 6 teacher)

With a general class of 36 children of mixed ability, it has been challenging this year. More children means each child gets less individual time with you, even to the point that you cannot make 5 groups of maximum 6 children (for, e.g., Guided Reading/Writing). In delivery of lessons size makes no difference but in giving deserved and often needed individual support (e.g., for those with SEN), marking commitment and space considerations, it makes all the difference. (Year 5 teacher)

Conversely, smaller classes were seen by teachers as being much more likely to increase the amount of individual attention.

Small groups have enabled me to be more focussed on individuals – huge improvement, good progression in learning seen. (Year 6 teacher)

I had the ‘luxury’ of teaching 14 pure Year 6 last year for literacy (the Y5 went to another class). What a difference! I was able to spend considerable time discussing children’s written work on an individual basis at least twice a week. I am unable to do so this year. (Year 6 teacher)

We will see later that for teachers with large classes there can be emotional consequences from not being able to spend enough time with individual pupils. And later in this chapter we look at the results from systematic observations on the connection between class size and individual attention.

Groups. The effects of class size were also seen by teachers to affect a second context for learning in classrooms – groups of pupils. This was not revealed so much in the frequency of this particular context for learning but through (1) the way a large class means teachers did
not have time to teach small groups (which for them – like individual attention – is pedagogically desirable); (2) how group size increases with class size, making teaching and classroom management more difficult; and (3) how the quality of group work and teaching to groups is affected by class size. We describe each of these in turn.

1. For some teachers, the consequences of larger classes are that it adversely affects not only the amount of individual attention but also the amount of small group teaching that is possible. So here, the first two quotations indicate that small groups are aligned with one-to-one contexts as pedagogically valuable, and both are seen to be adversely affected by larger class sizes. The teacher in the last quotation feels that a negative consequence of a larger class is that there is less time for quality teaching in small groups, and this in turn means it is difficult to meet all the children's needs, cover the curriculum and do the necessary lesson planning. Underpinning this and many other comments is the strong sense that a larger class means there is less time for teaching and this has a knock-on effect on many essential teaching tasks.

Having only 19 children in my class group (teaching them science and all foundation subjects) has meant that my teaching has been relatively easy and stress free. The class is small enough to give nearly individual attention … Numeracy group teaching has been with 14 less able children which has meant working with small groups or individual children. (Year 6 teacher)

... with a smaller class size can give small groups more attention. (Year 6 teacher)

Children do not receive enough of your quality time in a small group basis. It is impossible to meet all children's needs (academic, social and emotional), cover all the curriculum areas in the detail that is expected and produce planning documents in the detail required with 5 days full-time contact hours with a class. (Year 4 teacher)

2. Other teachers say that because of a large class size they are forced to teach groups rather than individuals, showing that their
preferred pedagogical context is not to groups but to individual pupils. There is then an interesting distinction here between being forced to teach groups at the expense of a focus on individuals because of class size and preferring to teach small groups and doing a better job of this because of a small class. Quite likely the distinction is affected by the size of the groups: those teachers who say they are forced to teach groups probably have in mind the way a large class means they are forced to teach larger groups than they would like. Another set of responses connected to class size and the group interactive context relates to the management difficulties in teaching and arranging groups in a large class size.

More children = less individual time per pupil and small group work in reality becomes medium size group work. (Year 6 teacher)

Little physical room in classroom … Grouping for compatibility both socially and for ability – more difficult. (Year 5 teacher)

3. Another way in which class size can affect the group interactive context is shown by those teachers who comment that setting up group work is more difficult with a larger class, and the quality of work and pupil participation in the groups is adversely affected. This is a theme we pursue in more detail in Chapters 5 and 6.

Much of the teaching had to be done as whole class with me leading session. I have 29 children in a small classroom. Group work is very hard due to lack of space. (Year 6 teacher)

The classroom is quite large so space has not been a problem. With the high number of pupils I can’t give as much individual attention to any one child as I would like. Group work is in fairly large groups which ultimately means some children don’t participate and let others do the work. (Year 6 teacher)

Small classroom means that it has been difficult to make provision for more buoyant group work that is making things, lively group discussions. Disagreements within the class affecting lessons – children more or less on top of one another personal space at a minimum. (Year 5 teacher)
Whole class teaching. The third interactive context within classrooms is the whole class. Though this context was not mentioned specifically that often by teachers, it was in a sense implicit in the large number of comments on individual attention, which we have already seen. In other words, implied in the frequent expressions of concern over the problems in larger classes of attending to individual pupils, is the converse way in which larger classes mean more time therefore necessarily has to be spent teaching the whole class. We have seen a strong preference for teachers to work with individuals and small groups. This pedagogical belief is compromised by large class sizes. This needs to be remembered by those who see no value in smaller classes and who believe that we should even move to larger classes. A large class might not matter if teaching is just about delivering to the whole class, but this is not sufficient or acceptable to many primary school teachers at least.

It is difficult to spend quality time with the individual to enhance their progress. Whole class teaching has been used mainly. (Year 5 teacher)

Much of the teaching had to be done as a whole class with me leading session. I have 29 children in a small classroom. Group work is very hard due to lack of space. (Year 6 teacher)

Interactive qualities of teaching affected by class size

The second main set of responses from the analysis of the TQ concerned comments on how class size has consequences not only for the balance of individual, group or whole class contexts but also on the nature of the teaching that takes place within each context. So, over and above the effects on the prevalence of interactive contexts, there are effects of class size on the type and quality of teaching within each context.

Below, we look at comments on class size and three particular features of teaching, cited by teachers: control/management, live feedback and knowledge of pupils. But first, extra to and separable from these features, were a number of references to the teaching qualities that were affected by class size.

Teaching qualities. We were struck, as we typed out the quotations from the TQ, just how inhibited teachers felt their teaching became in larger classes. In contrast, in a small class, teachers, in their own words, felt that their teaching was more (to give examples) ‘in depth’,
‘higher quality’, ‘effective’, ‘thorough’, ‘better’, ‘varied in teaching styles’, ‘adventurous’, ‘attentive to pupils’ and had ‘more pace’. One teacher put it like this:

After 37 years in this job I know the smaller the class the more effective the teaching, whether to whole class, group or individual. (Year 6 teacher)

In addition to the terms just used, our listing of responses contained the following teaching qualities which were said to be more likely in smaller classes: ‘better quality teaching’, ‘guided work with students’, ‘accessible lessons’, ‘quality time’, ‘ability to listen’, ‘responding to individual pupils more effectively’, ‘pupils focused and engaged’, ‘better pace of teaching’, ‘adventurous teaching’, ‘more thorough teaching’, ‘wider variety of teaching styles’.

Teachers could be rather general in describing or reflecting on their own teaching, with much described in broad terms or implicit. For example, the following comment from a teacher is not untypical:

Mornings have been great – only 20 Yr 6. Felt I have been able to teach! It ensured very good coverage of Literacy and Numeracy in preparation for SATs. Afternoons a nightmare, when 15 Year 5s join us and I have to ‘teach’ all the other curriculum areas. (Year 6 teacher)

Despite the teacher’s emphasis on the word ‘teach’, we are not very clear about what this teacher means by it. In contrast to our data on interactive contexts, we do not have parallel information on teaching quality from systematic observation studies. This suggests further work would need to be done to unpick the qualities of teaching involved.

Nevertheless, as we said in Chapter 2, teachers’ views on their own teaching and the extent to which it is affected by class size are important and were sometimes quite specific. The following responses from teachers provide more detailed comments on how they feel class size affects qualities of their teaching.

Having 22 pupils (instead of 33 – last year) … it has been easier to detect weak areas within literacy, numeracy and science which could be relevant to whole class, groups, individuals and create target areas for focused teaching. (Year 5 teacher)
This comment suggests that for this teacher one benefit of a smaller class is not only that it allows for more individual and small group work with pupils, but that the teacher is also able to use this experience to target areas for more focused teaching. Once again this suggests that teaching is about monitoring and then building on pupils' contributions, as much as simply delivering a lesson.

The following teacher had a similar view about how a smaller class allowed more ‘focused’ teaching.

… used to teaching 35 children but on occasions numbers have been reduced by at least 10 + – has meant increased participation + access to resources for those left as well as the age old issues of more room in the class, more focussed work possible. (Year 6 teacher)

The way that teachers felt that a smaller class allows more flexibility to adjust teaching to enhance learning and engagement is one sub-theme.

… has meant I can teach in a more relaxed manner, tuning tasks/texts etc. to those that I think the group will relate to well and enjoy. (Year 6 teacher)

Another sub-theme was the way a smaller class could allow more adventurous and creative teaching.

A higher number of children … means you feel less fresh to plan and be imaginative. Less children leaves you with more creative energy. (Year 6 teacher)

Control/management. Another subset of responses from teachers referred to the way that increases in class size meant more demands on discipline, control and classroom management.

Having 22 pupils (instead of 33 – last year) has enabled me to focus on individual problems, and spend more time working 1:1 or 1:2. … Less time has been spent controlling, organising and disciplining pupils, so better use has been made of teaching time. (Year 5 teacher)

The higher the number of children – the more time is spent controlling the children. (Year 5 teacher)
As one Year 6 teacher puts it succinctly –

Shout too much!

Indeed, as indicated in the teacher responses below, some teachers felt that with larger class sizes they were forced into ‘crowd control’ mode, with adverse consequences for their teaching.

At the beginning of the year I had 24 children – gradually it has crept up to 32. The quality of learning is far easier and effective when you can talk frequently to children on an individual basis rather than exercise crowd control. (Year 4 teacher)

… Often my role becomes more ‘crowd controller’ than ‘teacher’. (Year 6 teacher)

With more time needed for controlling and managing pupils there is less time available for teaching as such.

Noise levels which causes repetition due to listening problems … Much of lesson time – up to 10 minutes – spent on settling the children down. (Year 4 teacher)

*Live feedback*. Another feature of teaching, seen by teachers to be affected by class size, is the amount and quality of feedback to pupils. There are two main forms of feedback, first, that given on written work from pupils and, second, that given in real time to pupils, on an ongoing basis. The first type we deal with in Chapter 7 when we deal with the administrative consequences of large class sizes. The second we deal with here because it is a feature of ongoing interactions between teachers and pupils, and as such part of the general heading of ‘interactive qualities’. It overlaps with formative assessment. One might call it live feedback. This, like so much else in teaching, overlaps with and interconnects with other aspects of teaching, not the least individual attention.

Approximately 20 per cent of children have poor concentration and are very easily distracted. Due to the various needs of individual pupils and with such a high number of pupils, its often difficult to support each child at the time they require help. (Year 4 teacher)
The benefit of a small class is that it can allow teachers to do a better job of monitoring and assessing pupils’ work at the time they are working on it.

I have 25 children in my class. I think this is the ideal number to have. For English and Maths we set children – so I often end up with even smaller numbers. Having a smaller number in the class makes it easier to get around all the children to check on how they are doing and mark work as they are going along (especially in Maths). Also marking at the end of each day takes less time so more effort can be put into preparation. (Year 6 teacher)

Knowledge of pupils. Another quality of teaching connected to class size, suggested by teachers’ accounts, is the way fewer children in the class allow the teacher to get to know individual pupils more thoroughly. Again, this overlaps with, and is connected with, an increase in individual attention. From teachers’ point of view, having more individual contact with a child means they can get to know the child better. A similar point is seen in teachers’ worries that a large class means that they are not able to make ‘connections’ with each child and develop relationships with individuals.

Smaller number and so feel able to give a lot more individual attention. I feel I am able to ‘listen’ to the children more about things other than ‘academic’. (Year 5 teacher)

As there are 36 children I do find it hard to spend quality time with individuals. Because of this I don’t feel I forge such a good relationship with them. There is less time to set individual targets, to discuss these and their work with them. Groups tend to be large and not as intimate, again I feel this affects my relationship with individuals. (Year 5 teacher)

Class of 36 – greatly weighted to boys too. Sometimes feel that it is difficult to make regular ‘connections’ to each child. Quiet/shy children manage to remain unnoticed too often. More children seems to mean more of everything: including SEN or behaviour problems etc. Just not enough time to share around. (Year 4 teacher)
The smaller number of children has allowed me to have a chance to ‘talk’ on a personal footing because I’m not rushed trying to cope with larger numbers. (Year 4 teacher)

The quality and depth of a teacher’s knowledge of individual pupils can have a knock-on effect on discipline and control.

I do not feel that I have as close a relationship as I would like as so many children increases the necessity for discipline issues. (Year 5 teacher)

We have taken other results from the TQ, that are relevant to other aspects of teaching, to the relevant chapters in the book, that is, quotations connected to task activities and teaching to Chapter 7, quotations on differentiation to Chapter 7 and Chapter 9, and material on types of pupils in the class to Chapter 9.

*Classroom contexts: Physical*

The TQ responses from teachers suggest that class size affects teaching through interconnected effects on other factors, which then influence teaching. We pick up on this point at the end of this chapter and in Chapter 10, but here we concentrate on one of the clearest ways the teachers’ views show how this is evident – in the way that class size affects the physical context of the classroom, which in turn affects teaching and learning. The three main physical context categories that emerged were *space*, *resources/materials* and *noise levels*.

*Space.* There were many comments from teachers about the way that the physical context of space affected a number of aspects of teaching and pupil learning and behaviour. Space available in the classroom is dependent on class size relative to the classroom size of course. Though it is possible for space in the classroom to be independent of the number of children, most obviously when the classroom is very large, and although we did not have an exact measure of classroom size, it is likely that, on average, as class size increases, space tends to decrease. We saw from teachers’ comments how much this affects the day to day activities and teaching that takes place. We see that space affects classroom organisation, pupil behaviour, and also affects which pupils a teacher works with and asks to participate.
Large number of children – relatively small classroom – children have to sit in rows – no room to group tables for small group work. So much ‘stuff’ in such a small space. (Year 4 teacher)

Behaviour is more difficult to manage with a large number of children in a small space because it leads to an increase in contact between pupils as they are moving around … A more crowded classroom means staff are less mobile, also pupils you are most likely to ask to come to the front to contribute to lessons are those that have easy access. Similarly when working with a group space requirements influence which pupil you sit near. (Year 6 teacher)

Here, the teacher feels that class size and space combine to adversely affect the teacher’s ability to support pupils who need her help:

The physical size of the pupils and the size of the classroom means that I have had to teach more from one area of the room, and I’m less able to reach a group that needs my attention/help/intervention. (Year 6 teacher)

The next quotation shows how the large class and the lack of space mean the teacher is forced into whole class sessions leading from the front and problems with conducting group work and managing pupils with behaviour problems.

Much of the teaching had to be done as whole class with me leading session. I have 29 children in a small classroom. Group work is very hard due to lack of space. Also many children with behavioural problems that need to be spaced out around room. (Year 6 teacher)

One teacher shows that the lack of space and the number of pupils means it is hard to set up her preferred spaces for learning:

No extra space for ‘corners’ in the classroom. (Year 6 teacher)

Another indicates that this can also affect the kind of learning activities that are possible:

Having over 30 children in Year 5/Year 6 means that physical space is limited. Opportunities for investigative work & experiments is restricted. (Year 6 teacher)
It is clear from such comments how, although the physical shape and size of the classroom is in a sense a given that can be taken for granted, teachers feel it can have serious consequences for the kind of teaching and learning activities that take place, and these are bound to be exacerbated by increasing numbers of pupils in the classroom. We return to space in the chapter on tasks and the curriculum (Chapter 7).

Resources/materials. A second feature of the classroom environment – the resources and materials used for teaching – also connects with class size and teaching. There is a connection here between resources/materials and task activities. This is because activities, such as practical and investigative activities, usually depend on materials and apparatus to carry them out. But class size can also affect something as basic as the number of textbooks and the number of computers needed.

Resourcing is also a problem. We tend to buy $\frac{1}{2}$ sets of books so there’s never enough to go round. (Year 5 teacher)

In the mornings it has been alright because of the smaller class sizes, but in afternoons when I have all the class there have been behavioural issues and difficulty in teaching ICT due to lack of computers for the size of the class. (Year 5 teacher)

Very rigid regime established with 35 in the class; little time or resources available for the more investigative work, although several sessions are set aside each week for this. Would like to do even more. (Year 5 teacher)

The class is not resourced for 35 children so even with sharing there are not enough books. This means I have to spend longer finding appropriate work in other schemes. (Year 5 teacher)

In the next teacher comment, we see how a large class size can affect access to science equipment and computers, with negative implications for teaching and pupil involvement in the work.

You can’t arrange groups in the way that you want because of the lack of space. You can’t let as many children handle science equipment because there isn’t enough to go round. When we go into the computer suite some children have to go three to a computer instead of two so they have less hands on time. All this leads to the fact that the more able child takes charge and gets on with it whilst
a less able child sits back and doesn’t achieve as much. (Year 6 teacher)

We return to class size and resources in Chapter 8.

Noise levels. A few teachers made the point that as the size of class increases so too do the noise levels in the classroom and that this can in turn affect pupils’ learning.

I don’t think that the quality of my teaching has been affected, but would add that I have a wide range of abilities in this class and it is therefore difficult to teach to all children’s levels during whole class teaching sessions. I firmly believe that a calm and quiet classroom aids concentration and therefore learning. 29 children in one room can contribute to high levels of noise, which are further increased by the number of adults in the classroom as they communicate with their groups, therefore affecting the learning rate of the children. (Year 4 teacher)

Effects on teachers

Even though the question asked in the TQ was about effects on teaching, the responses from teachers showed that there could be adverse consequences of large classes for them as well, in terms of feelings of guilt, stress, tiredness, less creative energy and their health.

One teacher with a large class over 30 put it bluntly:

Low morale, considering resigning. (Year 5 teacher)

In the next quotation we see how a large class of 36 has led to feelings of guilt and tiredness for the teacher, as well as financial and medical problems.

Always feel guilty because we don’t spend enough time with each child. Additional time taken to mark/write reports adds to tiredness. Constantly projecting my voice has caused loss of voice 3 times this year – have to have voice therapy – personal cost – financial & medical. (Year 4 teacher)

Here is an interesting comment from one teacher who is describing a reduction in the class size from 35 to 30 – still a large class to many.
The start of the year saw a class of 35. This caused problems with resources, furniture and especially marking. Now the class has reduced to 30 we all feel we can ‘breathe’, the class is comfortable and relaxed. (Year 5 teacher)

It is rather easy to dismiss this effect of class size reduction as trivial but the result of being able to ‘breathe’ and being ‘comfortable and relaxed’, though hard to measure, can have a positive impact on teacher’s motivation and enthusiasm, and ultimately their teaching.

Results from systematic observation studies (CSPAR and DISS)

So far in this chapter we have looked at the relationships between class size and teaching on the basis of teachers’ own experiences. We addressed the way class size is seen to affect the interactive contexts for teaching and the quality of teaching in terms of, for instance, feedback and management.

In this section we look more precisely, but more narrowly, at the relationship between class size and teaching. We do so through the use of a rigorous observation analysis of the moment by moment presence of a few selected aspects of teacher–pupil interaction. This was the same method as used in the last chapter when observing pupils’ on- and off-task behaviour. As valuable as teachers’ reflections on their own teaching can be, the point of this kind of observation method is that it is designed to be objective and verifiable, and is independent of teachers’ own views.

As we said in the last chapter, our view is that systematic observation is a very useful, if limited, method of data collection. One benefit is that it can test and complement data from other forms of data collection; in this chapter we are particularly interested in the extent to which the systematic observation results agree with those from the TQ. We state at the outset of this section that we were surprised by the strength and clarity of the results we found.

In this chapter we draw on the systematic observation components of the CSPAR and DISS studies. As seen in the last chapter, the DISS study carried out systematic observations in four year groups in 27 primary schools and 22 secondary schools. There were 686 pupils observed and 34,420 10-second observations in total. We have seen that the observation component in the CSPAR study involved observations of pupils in Year 6 (10–11 years). There were 257 children in all, 128 girls and 129 boys, 83 low ability, 87 medium ability and 87 high ability, and
there were 22,312 observations in total with an average of 87 observations per child. There were 42 classes in all, 16 small (25 or under) and 26 large (31 and over), chosen on a random basis from class-size information supplied by the school. In some cases the observers found that the registered class size was different to the class size actually present during the time of observation – so we actually used what we call the ‘experienced’ class size in the analysis (See Blatchford et al. 2005 for more details). In this chapter we draw on both studies to look at whether class size affects two important aspects of teacher to pupil and pupil to teacher interaction: first, the amount of individual attention from the teacher experienced by a pupil, and second, the amount of time pupils actively interacted with their teachers.

As in the last chapter, we think it is important to describe the logic behind the construction of these two categories in order to give the reader a clear sense of their meaning and application. The first set of categories in the observation system involved two mutually exclusive categories (that is, only one could be coded in a time interval): ‘focus’ and ‘audience’. ‘Focus’ was coded whenever the child being observed was being addressed specifically by the teacher, whether it was one-to-one, in a group or in the whole class. By contrast, ‘audience’ was coded when the teacher was directing her attention at all the children in the class or group, or another child. The idea was that these two categories should be used to describe every interaction in which the target pupil was engaged with the teacher, that is, nothing could be left out (technically the categories were ‘mutually exclusive’ and ‘exhaustive’).

The second set of behaviours used in this analysis of teacher–pupil interaction comprised four sub-categories describing the type of pupil behaviour to the teacher (so additional to whether they were the focus or audience). These were ‘initiate/begins’, ‘responds’, ‘sustains’, and ‘attend/listen’. ‘Begins’ was coded when the target pupil (the child being observed) initiated an interaction with the teacher, by word or by gesture. ‘Responds’ was coded when the target pupil responded to a new interaction initiated by the adult. ‘Sustains’ was coded if the target pupil and the teacher continued their conversation over the majority of the 10 seconds and the interaction started in a previous time interval. So if the teacher asked a question of the target pupil, we would code ‘responds’ for pupil, but if the teacher then continues with ‘why do you think that?’ and the target replies in the next interval it would be ‘sustains’. These three categories of teacher to pupil behaviour were by definition seen as active pupil behaviour. ‘Attend/listen’, on the other hand, was by definition classified as passive behaviour. This was coded
when the target was attending to what the teacher said for the majority of the 10 seconds (so called 'predominant activity sampling'). One of these four categories was always coded when the child interacted with the teacher, and, as with focus/audience, the categories within this set were mutually exclusive – only one could be coded.

These two sets of behaviours were coded in both the CSPAR and DISS observation studies. There were several additional behaviours coded. In the CSPAR observation study only, we split the 'focus' category into two finer categories for finer discrimination. It was coded separately as 'short' – not for the whole 10-second interval, or 'long' – the contact continued through the whole 10-second period.

In the DISS study only, there were also two extra categories of teacher to pupil interactions. There was first a category called ‘adult teach', which denoted times when the teacher talk to pupils was directly concerned with the substantive content of subject knowledge, that is, communicating concepts, facts or ideas by explaining, informing, demonstrating, questioning, suggesting. The second category denoted times when the teacher dealt with negative behaviour. This was coded whenever the teacher had to correct the target child or a group within which the target child belonged. The category would not have included simple academic disagreements over an answer from a pupil, but rather times when the teacher deliberately dealt with a child who was considered to be off-task, behaving inappropriately or misbehaving. A summary of these four observation categories is given in Box 4.1.

The basic logic of the statistical analysis of the DISS observations, as described in the last chapter, was to determine whether there was a relationship between class size and the selected observation categories, controlling for other potentially confounding or overlapping variables. As described in the last chapter, the statistical analysis was particularly powerful because it was based on the co-occurrence of the experienced class size and the presence of a behaviour category for each separate 10-second time interval. Both studies analysed the effect of class size differences, controlling for the effects of the other explanatory factors, using multilevel regression modelling (see Blatchford, Bassett and Brown 2011). As described in the last chapter, the graphs later in this chapter show the probability of a behaviour occurring for any given size of class, for example, to compare the probability of a behaviour occurring in a large class of 30 versus a relatively small class of 15.

Taken together, the two studies probably constitute the most thorough observation study of class size effects on classroom behaviour ever conducted – in total there were nearly 60,000 observation points!
**Box 4.1: Summary of observation codes used in DISS and CSPAR studies**

1. **The amount of individual attention from the teacher experienced by a pupil** (focus versus audience):
   - ‘Focus’: when the child was being addressed specifically by the teacher, whether it was one-to-one, in a group or in the whole class.
   - ‘Audience’: when the teacher was directing her attention at all the children in the class or another child.

2. **The amount of time pupils actively interacted with their teachers** (Initiate/begins, responds, sustains, attend/listen):
   - ‘Begins’: when the child initiated an interaction with the teacher, by word or by gesture.
   - ‘Responds’: when the pupil responded to a new interaction initiated by the adult.
   - ‘Sustains’: when pupil and the teacher continued their conversation over the majority of the 10 seconds and the interaction started in a previous time interval.
   - ‘Attend/listen’: when the child was attending to what the teacher said for the majority of the 10 seconds.

3. ‘**Adult teach**’ – teacher talk to pupils directly concerned with the substantive content of subject knowledge; that is, communicating concepts, facts or ideas by explaining, informing, demonstrating, questioning, suggesting.

4. **Teacher deals with negative behaviour** – whenever the teacher had to correct the behaviour of the target child or a group within which the target child belonged – not simple academic disagreements over an answer from a pupil, but when a child was considered to be off-task, behaving inappropriately or misbehaving.

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*Individual attention and active involvement with teachers*

In the CSPAR KS2 study the results showed clear differences between small and large classes (that is, classes of 25 or under versus 31 and over) in the first two categories of teacher–pupil interaction. Two allied behaviours were more common in large classes: first, child to teacher – attend/listen and, second, child is audience. We have seen that the first category – attend/listen – denotes times when the child’s contribution to interactions with the teacher is passive; they are simply listening to her. Child is audience refers to times when they are not the focus of the teacher, that is, they are not singled out by the teacher, either on a
one-to-one basis or in a group or whole class situation. Both therefore describe a passive role in contact with the teacher, and one which is more likely in larger classes. Pupils in large classes are, in other words, one of the crowd.

Conversely, as class size gets smaller there is a greater likelihood of times when the child is the focus of a teacher’s attention, and this is evident in terms of both short (under 10 seconds in length) and long (over 10 seconds), as well as the two added together. Moreover, in smaller classes we find that pupils have a more active role in contact with teachers. We see this in the greater likelihood of active forms of behaviour – initiating and responding to teachers and sustained contact with them.

The results from the DISS observation study were exactly in line with those from the KS2 study, even though they were completely different in terms of the schools, age levels and the years the data were collected. The DISS results, moreover, cover four age ranges over primary and secondary stages.

To be more specific, in the DISS study there was a highly significant association between class size at primary level and the pupil being the focus of a teacher’s attention. Though ‘focus’ did not occur very frequently, it noticeably increased as class size decreased. The results are displayed in graphical form in Figure 4.1. Some measure of the effect can be seen by comparing the amount of focus in a class of 30 compared to a class of 15. Figure 4.1 shows the difference to be about 7 per cent versus 3 per cent of all observations, that is, focus was more than halved in a large versus a small class. This is a significant difference.

There were no differences between different levels of pupil attainment in the relationship between class size and the amount of focus, at either primary or secondary. In other words, the relationship between class size and individual attention was found for children of all attainment levels.

The effects of class size and the amount of pupil active interaction with the teacher at primary level are shown in Figure 4.2. There was a significant negative effect of class size and we illustrate the effect by again comparing 30 versus 15 in the class. We see that the difference in the amount of pupil active behaviour to the teacher is 2 per cent versus 6 per cent of all observations. Though ‘active’ interaction with the teacher is not frequent, there is therefore about three times more in small classes – which is again a very significant difference. There was no statistical interaction with the attainment level of pupils; in other words, the effect was similar for all three attainment groups.
There was a similar, statistically significant effect of class size at secondary level.

Figure 4.1: Class size and pupil focus of teacher’s attention (primary). First published in Blatchford et al. (2011a). Reproduced with permission from Elsevier.

Figure 4.2: Class size and active interactions with the teacher (primary). First published in Blatchford et al. (2011a). Reproduced with permission from Elsevier.
The result was repeated in secondary schools: there was also a highly significant effect of class size on the amount of active interaction with the teacher. As in primary schools there was also less active interaction with the teacher in larger classes.

The results from the systematic observation study are therefore clear and we think unequivocal: the smaller the class, the more individual attention and the more active a role the child has in interactions with the teacher. This gives further credence to the results from the TQ, presented above. The overwhelming view of teachers, that they can give more individual attention in smaller classes, is supported by the results from the objective systematic observation studies. Results from teacher reports and systematic observations are therefore clear and consistent: individual attention, what we have called one of the three main interactive contexts in the classroom, is very much affected by the size of the class.

The overall amount of teaching

In the DISS observation study we examined the effect of class size on the total amount of teaching talk by the teacher, that is, teacher talk to pupils directly concerned with the substantive content of subject knowledge. This is the third category in Box 4.1. There was more teaching in larger classes in primary schools, although this tailed off for much larger classes. There was no evidence of an interaction between class size and attainment group, which means that in a large class, children of all attainment levels experienced more teaching overall.

There was also a significant effect of class size for secondary schools, and again there was a positive association between class size and the amount of teaching (see Figure 4.3). Once more using a comparison of 30 versus 15 in the class for illustrative purposes means a difference between 52 per cent and 45 per cent of all observations – that is, in the smaller class there is around 7 per cent less ‘teach’ occurring.

This finding may appear contradictory as it seems that pupils get less individual attention in larger classes but they also receive more of a teacher’s input overall relating to educational matters, and on the face of it this might seem to mean that larger classes advantage pupils. However, the finding is likely to mean that pupils as a whole are receiving more of a teacher’s delivery to the whole class. This is supported by other results from the DISS study, not reported in detail here, which showed that for primary and secondary schools together there was more whole class teaching in larger classes. Results from the KS2 CSPAR study also
showed that times when the teacher was addressing the whole class (which could cover all types of contact, including procedure/routine) were more likely in large classes. Putting these two main results together therefore suggests that in smaller classes pupils get more individual attention, while in larger classes they spend more time listening to the teacher talk to the whole class. Another way of expressing this finding is to say that they are perhaps getting more educational input in a larger class, but this is at the expense of it being largely passive and received as part of a large group.

Teacher dealing with negative behaviour

Finally, in the DISS study we looked at the effect of class size on the amount of talk in which a teacher dealt with pupil negative behaviour. In contrast to the results for individual attention, the effect of class size varied for pupils with different attainment.

For primary schools there was significantly more teacher dealing with negative behaviour in larger classes for low- and medium-attaining pupils, but no significant effect for high-attainers. The primary school results are shown in Figure 4.4.
The results for secondary schools showed that there was significantly less of the teacher dealing with negative behaviour in larger classes for medium-attaining pupils. Conversely, there was evidence that there was more dealing with negative behaviour in large classes for low-attaining pupils, although this result was not quite statistically significant. There was no significant effect for high-attainers.

Summing up results for teachers dealing with negative behaviour shows that as class size increased it is the low-attaining pupils who tend to be criticised more by teachers.

Case studies of small and large classes

As described in Chapter 2, in the CSPAR KS2 study we conducted case studies in a small number of small and large classes when the pupils were in Year 5 (9–10 years) and Year 6 (10–11). They were conducted in 20 classes in all across England, 10 classes in Year 5 and 10 in Year 6, and in both years there were five small (25 pupils or less, average 20) and five large (31 pupils or more, average 33) classes. Classes were selected at random from the list of class sizes for each year.
As mentioned in Chapter 2, the aim of the case studies was to provide a complementary and more detailed portrayal of individual classes, which would provide the basis for a more interpretive and grounded analysis of factors relating to class size differences and adult deployment in classes. Selected aspects of classroom learning and experience, expected to be connected to class size differences, were defined in advance, and the method comprised whole class and selected child observations in terms of event sampling of significant events; semi-structured interviews with teachers, teaching assistants and pupils; end of session/day comments and judgements by the field worker; summative judgements by the field worker, all organised in terms of the main headings. This component made use of experienced teachers as field workers.

**Organisation of pupils for teaching**

Records were made of time spent in the three main forms of organisation for learning: whole class teaching, individual work, and group work/teaching to the group. The results from this part of the CSPAR study were similar to the systematic observation results presented above. Although classes varied to some extent, the main contexts for learning were whole class teaching and individual work. Whole class teaching was characterised by the teacher talking, more or less without interruption, whilst the pupils sat passively listening. This was more likely in large classes – an average of 158 minutes compared to 126 minutes. The case study visits showed examples of extremely well presented and handled whole class teaching sessions with a clear focus, a high level of pupil engagement, and clear curriculum objectives. These could occur in large and small classes:

The pattern of the work was the same … with the class teacher introducing the tasks to the whole class and then paired or individual work, based on worksheets and/or shared textbooks. The teacher used the projector to good effect, sometimes projecting the page from the pupils’ text/worksheet, and at other times her own material. Pupils interacted with the projector on occasions, either filling in (e.g., coordinates), or telling the teacher what to write. At other times the class read from the text/worksheet and the teacher recorded the main points on the OHP. This approach was versatile and a great aid to focusing the pupils’ attention on
the task. There was no ‘talk only’ introduction or teaching. (Field worker notes, large class)

Individual work was also common, even though in most classes the tables were in blocks, with pupils facing one another. This did not seem to vary between large and small classes.

Collaborative group work was rarely observed in the case studies. When it did occur, group work did not appear to be affected by size of class, indicating that it is not being used by teachers in large classes as a way of making more effective use of pupil and teacher time.

Interviews with the pupils indicated that, regardless of class size, most preferred working with small groups rather than on their own, and they shared the same reasons for this preference, mostly to do with the benefits in terms of help from others, but also social reasons. Most pupils preferred small groups to large groups because of the problems they felt could arise in the latter. We return to pupils’ preferences for working arrangements in the chapter on grouping practices (Chapter 5).

In the case studies, teachers linked the size of group with the amount of time they could give to pupils. Increasing the number of groups was seen as less helpful to pupil progress and also more demanding on the teacher, who would find it increasingly difficult to get round all the groups. Larger groups allow more off-task behaviour to occur and pupils’ needs to be overlooked. This reinforces results from the teacher questionnaires, presented above, and is a topic we again take up in more depth in the next chapter on grouping practices.

The nature of teacher-pupil interactions

During the case study visits, there were main features of teacher–pupil interaction that appeared standard whatever the size of class. Interactions in all classes were almost all brief, seconds rather than minutes, apart from the teacher to whole class interactions, which went on for a very long time, in all but one class. Pupils all used the convention of putting their hands up as the way of requesting help.

But there were other aspects of teaching which did appear to be related to class size. All the teachers in the case study interviews agreed that as the class size increased, the number of interactions with individual pupils decreased. This was in line, as we have seen, with results from the teacher end of year questionnaires (TQs), and the systematic observations. It was also supported by observations conducted for the case
studies. In the small classes, all 15 observed pupils had interactions with their teachers, while in the large classes there were three who did not. It was in a large class that one observed pupil suffered most obvious neglect by the teacher.

Other results from the case studies also complement and support those from the TQ. All teachers and teaching assistants agreed that in larger classes discipline became more difficult and more of an intrusion into the teaching and learning process. Some teachers in both small and large classes also felt that relationships with pupils, particularly the shy ones, suffered as the class became larger. The large class teachers also thought the quality of teaching was adversely affected and teaching assistants agreed with them.

But there were some ways in which teaching did not vary between small and large classes and there were here indications of the way teachers did not always take advantage of the opportunities afforded by having small classes. In one small class, for example, there were unnecessarily long introductions to tasks, combined with loss of focus at times, which contributed to pupil restlessness and teacher interventions to regain control. The pace of work was affected as a consequence and it was the judgement of the field researcher that the high-attainers were not sufficiently challenged for most of the day. With such low numbers, the teacher might have given pupils differentiated work and this would have encouraged more interest and brought out more from pupils. The teacher could have monitored and supported the work in the group contexts more effectively than in the whole class approach which she was using.

Conclusions

In this chapter we have presented results from three detailed methods of data collection – teacher questionnaires, systematic observations and case studies (which involved interviews and observations) – in order to explore how class size and teaching are connected. See the Key Themes box opposite for those key themes that emerged across the three methods of data collection, and Figure 10.1 for the complete model of class size effects.
Key Themes

Teaching: Interactive contexts
- Individual
- Group
- Whole class

Teaching: Interactive qualities
- Teaching quality
- Control/management
- Live feedback
- Knowledge of pupils

Classroom contexts: Physical
- Space
- Noise levels
- Resources/materials

Effects on teachers
- Workloads
- Stress
- Tiredness
- Teacher retention

In this concluding section we first identify the key messages about the connection between class size and teaching and then draw out the main pedagogical implications.

Interactive contexts for learning: Summary of findings

Perhaps the single main result to emerge was the way that class size affects the frequency and balance of the three main social contexts for learning: the class, group and the individual. See the Key Themes box above, under Teaching: Interactive contexts. The clearest result was the way size of class affects one of these contexts in particular: the amount of teacher to pupil individual attention.
Individual attention

There is consistent evidence from the systematic observations, the TQ analyses and the case studies that as class size increases, the amount of individual attention and one-to-one interactions between the teacher and the pupil decreases. The converse also applies: as class size decreases, the amount of individual attention increases. This seems, then, to be a robust and clear result, remembering that the observation results come from two observation studies, the KS2 CSPAR and the DISS studies, which comprise probably the largest ever observational research on class effects, totalling 60,000 observation points.

An allied finding is that the child’s role becomes more passive in larger classes, with a tendency to just listen to the teacher while the teacher talks to the whole class or another pupil. Conversely, as class size decreases there is more likelihood the pupil will be more active, initiating and responding to the teacher’s talk. Both observation studies found a clear effect at primary level (age 5–11) and, in addition, the DISS study found the effect continued into secondary level (age 11–16).

There was little evidence that the relationship between class size and teacher–pupil interaction varied by pupil attainment. In other words the effect was felt by all children in the class, whatever their level of attainment. Though individual attention and active interactions with the teacher were not frequent overall, a measure of the clarity of the findings can be seen in the case of the DISS results where we found that as a percentage of all observations, there were between two and three times more of these behaviours in smaller classes of 15, compared with in larger classes of 30.

Though the relationship between class size and individual attention seems clear it is also affected by, and needs to be understood in terms of, the teacher’s preferred method of teaching. We have seen that for most teachers in the schools studied, their preference is to maximise the amount of individualised attention, that is, to make sure that all children get as much of the teacher’s time as possible, and preferably as individuals. The problem with a large class, from their point of view, is that it compromises this preference – they are constantly frustrated that they are not doing as good a job as they would like, and that pupils are suffering.

Whole class teaching

We have seen from the systematic observations and case studies that there is a tendency for more whole class teaching in larger classes, and
that this is one way that teachers adapt to having more pupils in their class. The effect of larger classes on more whole class teaching was also evident in the TQ study, even though it was sometimes implicit in the stress on individual attention; the increase in whole class teaching is the converse of the more commonly expressed effect of class size on the amount of individual attention. This connection between class size and whole class teaching is also supported by other data from the project, not reported in this book. This stemmed from Year 6 (10–11 years) teachers being asked to complete forms in which they estimated time in different teaching contexts in a given teaching day. It was found that time devoted to whole class teaching increased from 43 per cent for the smallest classes \((n = 15)\) to 60 per cent in the largest classes \((n = 35)\).

It needs to be said that observers witnessed many impressive examples of whole class teaching – they could be extremely well presented and handled, with a clear focus, a high level of pupil engagement and clear curriculum objectives. But teachers themselves, even those who were skilled in whole class teaching, and even, as we saw in the observation results, when the overall amount of teaching as well as whole class teaching goes up in larger classes, seemed dissatisfied with the reliance on this interactive context, and felt that effectiveness in teaching was not expressed in this way. Of course, whole class teaching is a necessary and indeed appropriate interactive context for many topics, but none of the teachers said that whole class teaching is an acceptable alternative to individual support of pupils’ learning.

*Group interactive context*

The effects of class size were also seen to affect a third context for learning in classrooms – groups of pupils. As we saw above, this was not revealed in the frequency of this particular context for learning but through the way a large class means there are restrictions on the time teachers have to teach small groups (even though, like individual attention, this was seen as pedagogically desirable); how group size increases with class size, making teaching and classroom management more difficult; and how the quality of group work and teaching to groups is affected by class size. In different ways, these showed how organising pupils into groups becomes problematic as class size increases.

There are likely to be cultural and country differences here as well. In the UK it is very common for pupils at primary level to be organised into within-class groups. We explore the connection between class size and grouping practices in more depth in Chapter 5.
Interactive contexts for learning: Pedagogical implications

We have then seen that class size affects the balance of the three interactive contexts, with the likelihood of more whole class teaching and less individual attention in large classes. A recurring theme of this chapter has been the value teachers attach to individualisation of instruction, and the way this is compromised by large classes. Rather controversially, perhaps, we query seeing the benefits of smaller classes only in terms of increased opportunities for individualised teaching. Although the TQ results showed that teachers prefer to have more opportunities for individual attention and individual support for children, especially those who are struggling, and though the aim is commendable and the strategy understandable, one might ask whether this is always the best use of their time? We think it is worth asking how best to use time across the interactive contexts. It is worth asking if there are other solutions that might help teachers, especially those with large classes, and better serve pupil learning.

Our systematic observation studies showed that even in smaller classes there is little individual instruction in KS2; whole class teaching and individual work dominate. One solution is to rethink and make more strategic use of the other, third context for learning. If individual attention and whole class size teaching are problematic as a solution to large classes and differentiation, then perhaps it would be helpful to think strategically about teaching to and in groups. We develop this more fully in the next chapters, but here we identify two expressions of such an approach, namely, teachers could first rethink how they teach groups and, second, also use collaborative approaches more. We now say a few words on each of these strategies.

One way that teachers could seek to maximise individualisation and differentiation is by teaching to small groups. Although pupils were often seated in groups, there was little evidence of a systematic teaching approach to groups. This could have the benefits of interactive whole class teaching, with attention to the interactive qualities we looked at above, and return to below, but would be potentially more focused and better differentiated in terms of pupil ability. It is also in groups where one might seek to maximise the effectiveness of individual attention. It would also help teachers lucky enough to have small classes: as Betts and Shkolnik (1999) found, teachers could make better use of small classes if they did not reduce group instruction. We return to this point in Chapter 10.
With regard to the second way of utilising groups, we stress here the value in collaborative approaches, that is, pupils learning together with a deliberate attempt to minimise the teacher’s input and where pupils have more control over the learning that takes place. We develop this line of reasoning in the next chapter and Chapter 10. The promise is that it has benefits for pupil learning and can also help the teacher, especially those with large numbers of pupils, in terms of maximising the teacher’s time with other pupils, and encouraging independence in learning.

Teaching: Interactive qualities – summary of findings

The next part of the summary model in the Key Themes box, Teaching: Interactive qualities, describes the nature of the teaching that takes place in the three interactive contexts. We have seen how teachers felt that with smaller classes there is a higher quality of teaching. Teaching is more: in depth, higher quality, effective, thorough, better, varied in teaching styles, pace, adventurous and attentive to pupils. These are characteristics that many would argue are features of more interesting and cognitively challenging teaching, which in turn will lead to deeper forms of learning and conceptual understanding.

Sceptics about smaller classes will no doubt query the validity of these comments. They will rightly point to the fact we do not have observation results on these qualitative features of teaching (this would be very difficult to set up – systematic observation methods are not well suited to addressing more qualitative, high inference and probably low frequency categories of behaviours). Of course we need to be cautious about using personal commentaries as hard evidence, but we should also consider the point that teachers necessarily have privileged access to their own teaching, and may be aware of the consequences of class size in ways that much research and policy commentary does not begin to touch on.

As we saw above, the three particular features of teaching, cited by teachers when considering the effect of class size were control/management, live feedback and knowledge of pupils.

Classroom control/management/organisation

In some ways, classroom control is the single most important part of the teacher’s job. It doesn’t matter how good the content and approach of a lesson might be if pupils do not attend or engage with it. We have seen
examples in large classes where the teacher has excellent control. Some teachers may have the kind of personality that demands attention, some might work hard at developing control using methods learned from their training and from colleagues in their school. We have been privileged to have sat in assemblies led by one talented teacher where 100-plus pupils listened to a story or a point being made, as if mesmerised. Conversely, we have also sat in lessons, sometimes with small classes, where even with the best of intentions a teacher has not managed to get pupils to attend. It can be just a few pupils who are badly behaved or not listening, but at its worse the lesson can degenerate into a trial of strength that wears everyone out.

However, a key point from this chapter is that, other things being equal, when comparing two teachers with similar levels of expertise, classroom control, and school ethos, etc., class size does make a difference. A subset of responses from teachers was about how as class size increased there was more attention required to discipline, control and classroom management. Teachers described how they were forced into crowd control mode with adverse consequences on their overall teaching. Findings from the DISS systematic observation study showed that there was a consistent trend across both primary and secondary education stages for low-attaining pupils to receive more critical comments from teachers in larger classes.

Live feedback

Another feature of teaching seen by teachers to be affected by class size is the amount and quality of ‘live’ feedback to pupils, that is, feedback on pupils’ work that takes place live, in real time. We made the point that this, like so much else in teaching, overlaps with and interconnects with other aspects of teaching, not least individual attention. According to the reports of teachers, one benefit of a small class is that it allows teachers to do a better job of monitoring and assessing pupils’ work at the time they are working on it. There is much evidence that this is a more effective method, for example, in comparison with comments on work after its completion.

Knowledge of pupils

Another quality of teaching connected to class size, seen in teachers’ accounts in this chapter, is the way fewer children in the class allow the
teacher to get to know each pupil more thoroughly. Logic suggests it will be easier to get to know more about individual pupils in smaller classes and we showed above that this was what teachers felt as well. Knowing children better is likely to mean that teachers have deeper relationships or ‘connections’ with pupils, which from the teacher’s perspective aids teaching. The quality and depth of a teacher’s knowledge of individual pupils is both difficult to measure and easy to take for granted, but can be important to the quality of teaching, perhaps particularly at primary level, not least because it can have a knock-on effect on discipline and control.

Of course, teacher–pupil relationships are to a degree independent of class size. But given that teachers say they know more about individual children in smaller classes and that knowledge of a child is a contributor to having a good relationship with them, it seems plausible that smaller class sizes may help facilitate good quality relationships between teachers and pupils.

Live feedback and class size: Pedagogical implications

At the heart of the problem about providing live feedback in large classes is individual attention, as already discussed. In a situation where the teacher faces a large class, perhaps of over 30, the management of the rest of the children while attending to the assessment of the individual pupil or small group is problematic. It is worth considering whether there are alternative ways of managing feedback and live assessment. During the writing of this book the authors visited a primary school in Oxfordshire, England where live feedback was done in a large class of 34 with groups of four and where assessment was based on teacher and peer judgements about the work on specified criteria. It was school policy for no marking to be taken home by teachers, an interesting approach that prioritised the value of immediate and formative rather than delayed feedback, with the added value of peer involvement in feedback. The school has been complimented for this work, and the authors would concur with this. It must also be said that it worked because of the relationship the teacher had with the children, the wonderful calm of the whole school, the support of the headteacher and the careful use of an experienced TA who took charge of and monitored the rest of the class as they finished off work while the teacher handled the feedback.
Classroom contexts: Physical – summary of findings

The Key Themes box, Classroom contexts: Physical, summarises the physical features of the classroom – space, resources/materials and noise levels. Comments from teachers showed how space in the classroom affected a number of aspects of teaching and pupil learning and behaviour. Space tends to decrease as class size increases, and we saw from teachers’ comments how this affects teaching approaches (for example, a large class and lack of space mean a teacher is forced into whole class sessions and leading from the front). It also affects classroom organisation, pupil behaviour, problems with conducting group work and managing pupils with behaviour problems.

Class size can in addition affect the resources and materials used for teaching. For example, a large class size can affect access to science equipment and computers, with negative implications for teaching and pupil involvement in the work. Noise levels also tend to increase with the size of class, and this can have negative implications for learning.

We come back to issues of space and resources in Chapter 8 and again in Chapter 10.

Effects of class size on the teacher

We saw one final consequence of large class sizes, revealed in the TQ and case study results: the cost to teachers themselves, in terms of feelings of guilt, stress, tiredness, less creative energy and their health. This is summarised in the Key Themes box, Effects on teachers. We need to be cautious about assuming a causal link between class size and teacher stress and satisfaction – many aspects no doubt feed into a teacher’s feelings on teaching. Nonetheless, the strong statements from teachers, seen in this chapter, suggest that large classes can have very real and negative consequences for how teachers feel about their job.

There is a way that effects on teachers’ attitudes about teaching might also help account for a lack of clear effect on academic attainment results. Teachers’ comments suggest they can, in a sense, compensate for the effect of larger classes by taking the strain of the increased demands in terms of classroom organisation, planning, marking, etc. They do this by working that much harder to help individuals, for example, by giving further support during breaktimes. Although largely invisible, in the end teachers can pay the cost personally, and the profession pays the cost through teachers burning out and leaving the profession. As Berliner and
Glass (2014) have said, the problem of large class sizes may in the end come down to teacher workload.

**Interconnectedness**

We end this chapter with a general but key point. We started our description of the TQ results with a few longer quotations from teachers, to help convey something of the interconnected ways in which class size has effects on, and implications for, teaching. The teachers' comments revealed how study of the connection between class size and teaching necessarily involves an analysis of the interconnectedness of a number of factors, rather than in terms of a single line of influence. We saw the interconnections between a large class size, having a crowded classroom, and negative implications for focused work, pupil concentration, support for pupils, and emotional and health costs for the teacher. We saw how a teacher's task is made more difficult with a large class in terms of problems for marking, support for reading, setting up practical tasks and investigative work, pupil relationships with each other, support for children with SEND, the balance of individual support versus whole class teaching, problems of differentiating work, and stress for the teacher. The quotations showed that a large class can adversely affect the quality of teaching and the social context within which teachers teach, so there is less individual support and more teaching to larger groups, with accompanying loss of concentration and problems with classroom management.

We have already noted in this book our view of the limitations of an approach to class size which only considers the connection between class size and pupil attainment. In this chapter we have gained what we think are valuable insights into how class size is interconnected with a number of facets of teaching defined broadly. We feel this helps to extend the theoretical accounts of teaching given at the beginning of this chapter. We need to add a classroom contextual perspective, in order to capture the many ways that we have seen class size and teaching interconnect. In a phrase, we feel an additional social pedagogical approach to classroom learning is needed; we return to this theme throughout the book and draw it out more explicitly in Chapter 10.

**Solving CSC2?**

The essence of class size conundrum 2 (CSC2) is ‘why are effects of class size not more marked?’ In this chapter we have, we feel, begun to develop
an answer to this question. A key insight we derive from the research is that teachers employ complex adaptations, whether consciously or not, to the number of children in their classroom, and this means that the effects of class size are never fixed. The effect of class size, in other words, depends on a network of classroom organisational and interactive compensations made by the teacher. From this point of view there is not a necessary impact of class size on attainment; rather, it all depends on how the teacher manages large and small classes. We have seen in this chapter how teachers faced with large classes can compensate, for example, by spending their own time helping individuals, at some cost to their own well-being. And yet, as we have also seen, teachers in smaller classes may not always take advantage of the opportunities afforded. So this might help account for CSC2, that is, teachers mitigate the potential effects of class size and thereby make them less marked. And this might account for why the effects of class size on teaching are not obviously affecting pupil attainments.

We return to CSC2 throughout this book and sum up our thoughts in Chapter 11.

In the following chapters we develop a better understanding of other classroom processes and then, in Chapter 10, sum up what we know about the overall interconnectedness of class size effects. But in the following chapter we turn to the next classroom process connected to class size: grouping practices.