Professional Learning and Development in Schools and Higher Education 8

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The SPRinG Approach

Springer

Professional Learning and Development in Schools and Higher Education

Volume 8

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With
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Springer

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ISBN 978-94-007-6990-8
ISBN 978-94-007-6991-5 (eBook)
DOI 10.1007/978-94-007-6991-5
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2013941048

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Foreword

The book arises from a long collaboration between Peter Kutnick and Peter Blatchford who first started working together in the mid 1990s. They both had a background in developmental social psychology. Peter Kutnick's previous research was on children's social and moral development within classroom contexts. Peter Blatchford's previous research was on peer relations between pupils at recess/break-time in schools and classroom factors, including teacher's expectancies and classroom interactions, affecting pupils' educational progress. They were both fascinated by the classroom as a social context for educational and social development. In their early meetings they began to develop a simple type of method—the classroom mapping method—as a way of describing the organization of the classroom. This method informed two projects, funded by the UK Economic and Social Research Council (ESRC). The first took place between 1997 and 1999 and used the mapping methodology to describe in a systematic way the grouping practices in primary schools in England. The second project followed immediately after (1999 to 2001) and provided a complementary description of grouping practices at secondary school level. Results from these two studies are summarized in Baines et al. (2003) and the work was consolidated in a special edition of the International Journal of Educational Research—on group work—which they co-edited in 2003. It was on the basis of these two projects that they then collaborated with Maurice Galton—one of the most prominent classroom researchers in the UK, and the director of the well known ORACLE studies (e.g., Galton et al. 1980)—on a successful bid to the ESRC's Teaching and Learning Research Project (TLRP). This body handled the largest Government investment in educational research ever seen in the UK, and the SPRinG project, as it came to be called, was one of the largest empirical research projects they funded and probably the largest single project on group work that has been conducted worldwide. It ran from 2001 to 2004 and there were a number of allied and extension projects thereafter. The SPRinG project therefore brought together three academics with a long standing interest in the classroom and grouping practices and their key aspiration with the SPRinG project, put boldly, was to put collaborative group work on the map, in the UK at least. It is this project which is the central source of date in this book.[1]

[1] Maurice Galton directed the KS3 stage of the project in Cambridge, i.e., over the first three years of secondary school. This book concentrates just on primary schools but readers can find out about Maurice's work in Galton, Steward, Hargreaves, Pell and Page (2009).

The Content of the Book: The SPRinG Approach

This volume is therefore the result of 20-year collaboration between Peter Kutnick and Peter Blatchford. During the collaboration a substantial number of theoretical, methodological and practical developments concerning group work in classrooms have taken place. This book allows us the opportunity to bring together these developments to show how the field has taken shape over the last 25 years, to provide a review of the literature on collaborative group work and in so doing to present the case for what we feel is a particularly strong approach to group work (the SPRinG project) and show how it enhances classroom-based school learning and achievement.

A central justification for this book is that debate, policy and practice related to the grouping of pupils for learning within classrooms has not been informed by a sound empirical research base. To summarize the general thesis developed in this book: in our earliest joint research described above we found that group work as currently practiced was more likely to be set up to serve the interests of classroom organization rather than providing a context for effective learning. Children in classrooms were most likely to be found seated in small groups rather than any other seating pattern. Yet, groups in classrooms are often formed without a strategic view of their purpose for learning, and even though tasks may be assigned to groups of pupils there is little support for interactions within groups to make learning effective. Moreover, pupils rarely receive training in the interpersonal skills needed for group work, and teachers have doubts about, and lack effective strategies for setting up and managing group work in classrooms. Instead, even though seated in groups, pupils are mainly required—and expect—to work individually or as a whole class. Given this situation, it is no surprise if they are drawn off-task by social talk!

This book was driven by the need to bridge the wide gap between the potential of group work and its limited use in promoting classroom learning in schools. We felt that a new and ambitious approach to conceptualizing group work in classrooms was needed in order to integrate group work into the fabric of the school day and understand its effects over time. This book describes the SPRinG (Social Pedagogic Research into Group work) approach, its classroom-based and research backgrounds, as well as a large scale evaluation and implications.

The SPRinG Project was unique in terms of its originality and its scale. To expand on what was said above, it involved teams working in: Brighton (Key Stage 1; children aged 5–7 years) led by Peter Kutnick[2]; London (Key Stage 2; children aged 7–11 years) led by Peter Blatchford; and Cambridge (Key Stage 3; children aged 12–14 years) led by Maurice Galton.[3] The SPRinG project was further strengthened by the Scottish extension (ScotSPRinG) co-directed by Donald Christie, Christine Howe, Allen Thurston, Andy Tolmie and Keith Topping,which worked with pupils aged 7–12 years and was able to introduce added features into the overall programme.

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[2] Peter Kutnick is now Chair Professor of Psychology and Education at The University of Hong Kong.

[3] This volume only reports on Key Stages 1 and 2 that cover the years of the primary school. The Key Stage 3, secondary school study, led by Maurice Galton is reported elsewhere (see Galton et al. 2009).

The SPRinG project as a whole developed, and systematically evaluated, a group work programme by tracking pupil progress over a full school year and comparing it with a control group in terms of (a) attainment, (b) within-group interactions and (c) motivation for group working.

One main result of the SPRinG project was the development of a Handbook (see Baines et al. 2009) which was the result of the collaborative work of teachers and researchers in the exploration of how pupil group work can be made more effective in support of children's learning. 'SPRinG' is based upon the view that effective group work can be facilitated through four key dimensions:

1. Careful attention to the physical and social organization of the classroom and groups
2. The development of pupils' group working skills (based upon an inclusive relational approach)
3. The creation and structuring of challenging tasks that legitimize group work
4. The supportive involvement of teachers and other adults

The project involved 162 classes in primary and secondary schools and 4,259 pupils aged 5–14. The SPRinG approach was particularly distinctive in that it applied group work across the curriculum and over the school year. A strength of the evaluation of the SPRinG programme was its long term systematic evaluation of pupil progress over a full school year which included comparison with a control group in terms of objective measures of attainment and classroom behaviour.

Briefly, we found that, far from impeding learning, effective group work engendered through the SPRinG programme raised levels of achievement. In the early years of primary school, group work helped to improve attainment in reading and mathematics. SPRinG activities for older primary school pupils were targeted at science and led to significantly higher attainment and deeper conceptual understanding and inferential thinking. The Scottish study found that the SPRinG programme was effective outside of the English context where it had been developed, was effective for children in both rural and urban classrooms (where initial relational distances varied between children) and was effective for children in same-age as well as mixed-age classes. Further, despite some teachers' worries that group work might be disruptive, pupil behaviour actually improved in the SPRinG classes. Children were able to take on more responsibilities for their own behaviour and behaviour of their peers—freeing greater amounts of teacher time to observe and reflect upon classroom activities. And, group work doubled pupils' levels of sustained, active engagement in learning and more than doubled the amount of high-level, thoughtful discussion between children. We also found that:

- Teachers' professional skills and confidence were enhanced and their teaching repertoire was extended. There were also unexpected benefits–for example, as pupils developed group working skills, teachers found they were 'freed' from classroom control and were able to spend more time teaching.
- Group work seemed to be most effective when adopted by the whole school, rather than the individual teacher.

- Teachers working in areas of deprivation or in difficult circumstances found that group work could be used successfully and can aid classroom relationships and social inclusion.
- Not all teachers adapted to the SPRinG programme as effectively as others; classes where teachers showed greater commitment were also shown to have higher levels of collaborative communication and achievement gain.

We hope that as readers engage with this volume they will develop an appreciation of the everyday neglect of group work and an appreciation of its potential. Theoretically, we develop the term 'social pedagogy of education' to drive forward the idea that learning and teaching within classrooms must take into consideration the social context within which learning may be promoted or inhibited and emphasize that socially inclusive, positive relationships among children is essential for the development of effective group work.

Who the Book Is Intended to Reach

It is not always easy to get the balance right but we are strongly of the view that this book should be of interest to academics, policy makers and practitioners. In the book we develop what we feel are some conceptually and empirically strong conclusions about group work and some provocative messages about classroom practice and school policy. In order to do justice to these messages, and provide the rationale many readers would expect, we need to describe the results in some detail. Although we have included details of the methodology and analyses, some readers may like to follow up technical information in the cited papers by the authors. Other readers may be more interested in the results and the implications for practice and policy and may prefer to move quickly through the methodological details!

Although the research was conducted in Britain, discussions with colleagues overseas makes it clear that many of the key issues and the huge potential for group work are applicable to many other countries. This is certainly the case in the USA, Australia and New Zealand, where colleagues work, but is also likely in other countries. Subsequent to the completion of the SPRinG project, one of us—Peter Kutnick—has taken up a professorial position at Hong Kong University. This experience has made it clear that the use of collaborative approaches is becoming a key part of educational debate in East Asia (where countries like Hong Kong are already among the highest scorers in international comparisons of school attainment), and we believe that much of the coverage in this book is of relevance there. Continuing work in the Caribbean by Peter Kutnick and colleagues shows progress made by students as a result of participation in SPRinG like group work, suggesting again that the SPRinG programme can be applied to cultures outside of the United Kingdom.

Acknowledgements

In the course of this work, Peter Kutnick (in Brighton) and Peter Blatchford (in London) had the good fortune to work with some talented and committed researchers. One of our most consistent colleagues has been Ed Baines, who had a leading role in the KS2 study (reported in Chap. 5 in this book) and who, in Chap. 7, provides an insightful account of the experiences of children and teachers when they use group work. Later, after the start of the project, we were delighted when we were approached by Andrew Tolmie, Christine Howe, Donald Christie and Keith Topping, who were working in Scotland and wished to extend the SPRinG programme—effectively testing the generalizability of our findings to the culturally different locations of urban and rural classrooms. Andy's account of this work is in Chap. 6.

We would also like to acknowledge our sincere appreciation of the involvement of over one hundred and fifty teachers (and growing) in the development, trialling and continuing use of the SPRinG approach. We further note that the research greatly benefited from the ideas, help and support of research collaborators and research officers. These include: Lucia Berdondini, Anne Chowne, Helen Clark, Helen MacIntyre, Cathy Ota, Christine Rubie Davis, Kay Livingston and Erica Jessiman.

Also in the course of our work we have had the good fortune to discuss our work with colleagues from other countries and have benefited from the research of many people in this field. We would particularly like to mention Noreen Webb from University of California Los Angeles, USA and Robyn Gillies from University of Queensland, Australia, who have both made significant contributions to the study of group work. We have on several occasions together and separately presented papers at the American Educational Research Association Annual Meeting and would like to thank David and Roger Johnson who have so ably chaired the Cooperative Learning SIG, and acted as hosts to a range of other academics in this field.

And finally, the research that led to this volume was supported by three grants from the Economic and Social Research Council as well as supplementary grants from the British Council, the Esmee Fairbairn Foundation and the Nuffield Foundation.

Definitions

SPRinG	Social Pedagogic Research into Group work, the Economic and Social Research Council funded research study into effective group work in primary and secondary school classrooms.

ScotSPRinG	Social Pedagogic Research into Group work undertaken in Scotland as an extension and application of the original SPRinG study.
SPRinGLite	An explanational term used to describe SPRinG teachers who were less committed to the programme than their colleagues; lower levels of commitment were found to be associated with less effective attainment, behaviour and motivational results.
Primary School	A commonly used term across Europe to describe the first stage of compulsory schooling for children aged 5 through 11 years. In North America and other areas, this same stage of schooling is referred to as elementary school.
Key Stage 1 and 2	Organizationally, children's progression in English primary schools is divided into two age-based groupings, Key Stage 1 refers to classes that cover the 5 to 7 year age range, and Key Stage 2 refers to classes that cover the 8–11 year age range.
Year (1 through 6)	Within the Key Stages, individual years in school are identified as Year 1 through Year 7; as such Year in school is equivalent to North American 'grade' in school.
Social pedagogy	A term developed by Peter Kutnick and Peter Blatchford to exemplify and explain that school-based teaching and learning activities (the pedagogy) invariably takes place in a social context. Social pedagogy can enhance classroom learning as described in the SPRinG studies. But, unless teachers and children account for social pedagogy, it is just as likely to inhibit learning.
Composite	A Scottish schooling term that denotes mixed aged classes that often characterize small, rural schools.
Group work	A commonly used term found in school-based learning, where a number of children (usually between 2 and 6 in a group) are asked to work with one another to complete a learning activity. Group work has been used (in the literature and classrooms) in a number of ways: from a naïve assumption that any grouping of children will promote learning; to planned learning tasks that characterizes cooperative learning; dialogue-based learning tasks that characterizes collaborative learning. For SPRinG purposes, we focus on group work with the understanding that children can work together as a group or team for a joint purpose or outcome, that group work can be used across all curriculum areas, and for many different types of task, that group work require a range of support, communication and joint problem-solving skills and that the balance of ownership and control of the work shifts toward the pupils themselves (adapted from Baines et al. 2009).

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About the Authors

Peter Kutnick Professor Peter Kutnick is Chair Professor of Psychology and Education at the University of Hong Kong, Faculty of Education. Previously, he has held professorial positions at King's College London and the University of Brighton. His main area of interest is social and cognitive development of school-aged children within classrooms. He has co-developed social psychology of schooling as a research area, with supporting theoretical concepts (such as social pedagogy) and novel methods research methods. He has published more than 10 books and major reports and over 50 peer reviewed papers. His has researched into effective group work in pre-schools, primary and secondary schools; and this research has been undertaken in the UK, the Caribbean, across Western Europe and in the Asian Pacific. He is currently developing further group work approaches for mathematics education in Hong Kong. This research has received funding from the Economic and Social Research Council (UK), British Council, Leverhulme Trust, Esmee Fairbairne Trust, European Union and the Research Grants Council (HK). He has collaborated and co-directed a number of research projects with Peter Blatchford, especially the ESRC funded SPRinG project (also co-directed by Maurice Galton) which has formed the basis for this book.

Peter Blatchford Professor Peter Blatchford is Professor of Psychology and Education at the Institute of Education, University of London. His main area of interest is social developmental processes in school settings. He has published over 10 books and over 70 peer reviewed papers. He recently completed a 5 year study of the Deployment and Impact of Support Staff (DISS) in primary, secondary and special schools in England and Wales, funded by English and Welsh Governments (2003–2009). This was followed by a Esmee Fairbairn funded project (2010–2011) developing and evaluating alternative ways of deploying and preparing teaching assistants and a Nuffield funded project on the overall support experienced by pupils with Special Educational Needs in mainstream primary schools. He directed a pioneering UK longitudinal large scale research project on the effects of class size differences on academic attainment and classroom and he co-directed (with Maurice Galton and Peter Kutnick) a major ESRC project on developing and evaluating a programme to improve the effectiveness of pupil group work in classrooms (the SPRinG project).

He has an international reputation for work on school breaktimes/recess and peer relations in school.

Ed Baines Ed Baines is Senior Lecturer in Psychology and Education at the Institute of Education, London. He has an extended record in educational and psychological research and has a long-standing interest in teaching and learning and peer interactions in classroom settings. He has undertaken research on grouping practices in primary and secondary schools and was the principal researcher on the Key Stage 2 component of the SPRinG project. He co-wrote the training and resource book for educators on promoting effective group work in the primary classroom. He has also researched and written about peer relations during break- and lunch-times in school.

Andrew Tolmie Professor Andrew Tolmie is Professor of Psychology and Human Development at the Institute of Education, University of London. He is a developmental psychologist with longstanding interests in children's dialogue and its uses within formal and informal educational settings to promote changes in skills and cognitive representations. His interests also include the quantitative modeling of the effects of dialogue. Much of this work has focused on the examination of tutoring and group work processes in primary school science education. During 2009–10, he was an invited member of the Working Group for the Royal Society's State of the Nation Report 3—Science and Mathematics Education, 5–14. He has received research funding and directed research projects in the area of socio-cognitive development He is currently Dean of the Doctoral School at the Institute of Education, Deputy Director of the Institute of Education/University College London/Birkbeck Centre for Educational Neuroscience, and Editor of the British Journal of Educational Psychology.

Chapter 1
Can the Grouping of Children in Classrooms Affect Their Learning; An Introduction to Social Pedagogy

1.1 Introduction

When you walk into most western primary school classrooms, a fairly typical scenario is laid out for any observer. Aside from the colourful displays and activity centres spaced around the room, there will be child-sized chairs and tables (a common feature since the 1960s), many children, a teacher and (possibly) a teaching assistant. A typical 'map' of a classroom (see Fig. 1.1) shows a complex layout of furniture with single tables, groups or rows of tables, different types of learning activities, the location of pupils, and the location of the teacher and her desk. On the map circles have been drawn around various 'groupings' of children working on particular tasks, with some groups working with an adult and some not. Classroom maps of this sort can provide the basis for insights into classroom-based actions that may positively enhance or inhibit learning opportunities. Studies by the authors which have made use of such a methodology (Kutnick et al. 2002, Kutnick and Kington 2005) have led to the main focus of this book: the development of a thoroughly tested approach to effective group working in classrooms based upon an understanding of how learning is likely to take place within the interactions of children and teachers in classrooms.

The map in Fig. 1.1 shows that children are found sitting around a number of small tables, working in particular activity centres (such as the computer table), and, sometimes, when there is limited classroom space, even working in the corridor. From the map we can see a variety of group sizes and compositions, and different curriculum areas being worked upon simultaneously (English, science, history). In other mappings, taken at different points in time, there may be a different constellation of groupings, activities and curriculum areas, e.g., the whole class may be found working within a single curriculum area at the same time or each child can be found undertaking an individualized assignment. When a number of different maps are collected it is possible to build up a general picture of the social contexts and conditions for learning in classrooms.

A few key points about classroom 'groupings' can be made from Fig. 1.1:

1. Group sizes may vary at any point in time—from children working as individuals (with or without the presence of other children, as in groups 5 and 6, but also

P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,*
Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_1, © Springer Science+Business Media Dordrecht 2014

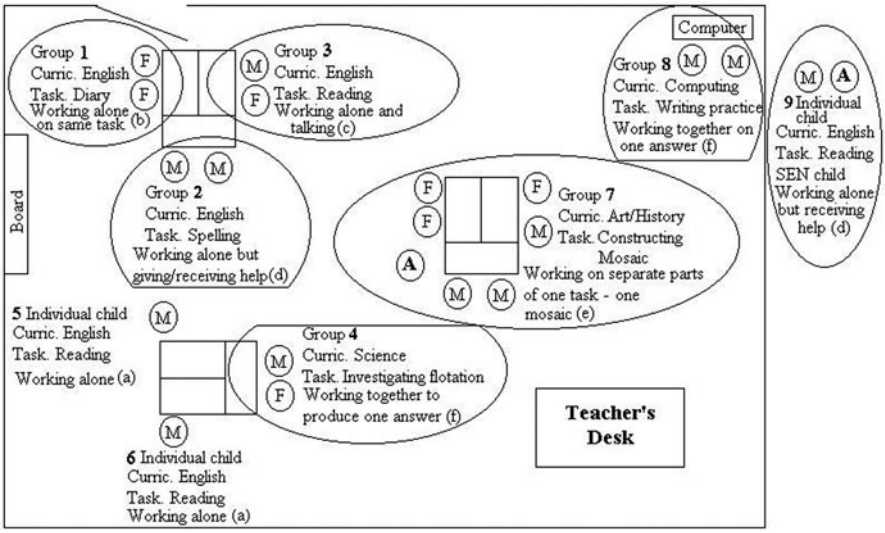

Fig. 1.1 A typical classroom 'map'. (From Kutnick et al. 2002)

groups 1, 2 and 3), working in pairs (groups 4 and 8), and in larger groups (group 7, with this group size ranging between 4 and 10 children at times);

2. Learning tasks being undertaken by the children may be approached individually (groups 1, 2, 3, 5 and 6) or on an interactive basis (groups 4 and 8);
3. Adults are present with some groups (groups 7 and 9) for teaching and remedial purposes;
4. There are a number of groups working without a teacher or other adult present.

When one focuses on each grouping, other features concerning how and when children learn in classrooms can be identified. If one thinks about the classroom as an arena that can promote or discourage social inclusion, then a majority of the small groups (1, 2 and 8) in this classroom are single-sex and may be friendship-based. In this sense, children's learning time in the classroom may be more likely to demonstrate exclusion (on the basis of proximity and sameness) than inclusion. Larger groups, especially those found working with a teacher, tend to have a broader mix of sex and friendships. Hence, some of the smaller groupings may be seen as exclusive (not integrating the range of children in the classroom) and larger groups may be more inclusive (especially those likely to work with the teacher). Gender may be the most obvious way in which groups are exclusive, but there are other criteria as well. Another key criterion is the attainment level of children within groupings which can demonstrate inclusion (mixed attainment groups) or exclusion (same attainment level within groups). And, in the broader ecological context within which this classroom is situated, the actual composition of members of the class will be affected by school policies (such as single-age or mixed-age classes), the community surrounding the school (which may be described in terms of social class, educational advantage, etc.)

and whether the school is found in a city/town or in a rural area (which may affect children's familiarity with one another and types of out-of-school activities engaged in).

The classroom map in Fig. 1.1 can and will change over time—especially with changes in daily learning routines, school policy and context of the school. Change within classrooms is likely to be associated with lesson phases: from introduction to the whole class, to curriculum-based tasks often associated with small groups, to whole class reviews at the end of a lesson or the school day. Changes may be associated with the type of grouping activity undertaken, placement of furniture and quality of interaction planned between children and teacher. All of these points are essential to an understanding of why the grouping of pupils may be successful (learning is promoted) or unsuccessful (learning is inhibited). While a classroom map is easy to draw by teachers and by researchers, the information that can be gained about the learning activities in that classroom is much more complex. Learning is any classroom cannot be seen simply as the teacher transmitting information to the children. Instead, the promotion of learning in a classroom must consider who is in the class, the learning task at hand, how children are grouped and with whom the children can interact. If the role the teacher is not coordinated with the groupings of children, the type of task assigned, children's opportunities to interact with one another, then the potential for learning is likely to be inhibited. An effective pedagogy within classrooms must involve teachers, pupils and a supportive classroom setting.

This book explores a range of issues associated with the effective grouping of children for successful learning in classrooms. We show the value of a social pedagogic approach which identifies classroom contexts, and relationships between key classroom contexts that can promote rather than inhibit classroom learning. This approach takes into account the compositions and relationships among group members, actions and interactions between children and their teachers and types of task engagement. Our understanding of how social contexts within classrooms affect children's learning and development is based in large part on mapping studies and these have in turn led to a distinctive programme (the Social Pedagogic Research into Grouping [SPRinG] programme), which is the main subject of this book and described in detail in Chap. 3.

1.2 How Does the Classroom Context Affect Learning?

Many visitors to primary school classrooms can easily assume that the classroom is in some sense a natural environment for the development of children and their learning. Yet the classroom environment is far from 'natural': it is historically and culturally located and has changed in line with educational policy and social change. Most famously, in the UK, the grouping of pupils was discussed and promoted in the Plowden Report (1967). In contrast to the predominance of traditional, didactic classrooms, where children were seated at individual desks and listened to the teacher or worked individually, the Plowden authors argued that pupils may be placed in small learning groups for two reasons. First, children of similar levels of attainment could

be seated together, allowing a teacher to assign learning tasks tailored to the children's level of attainment. Second, if pupils are seated in these small groups and undertake similar tasks, the teacher could then be free to focus on particular children in need of specific help and support. The Plowden argument was that children who work in small groups will be more focused in their learning activity, have the opportunity to help one another on similar tasks and will be less dependent on the teacher for support and direction of their learning. This move towards the teacher interacting with individual children according to levels of learning need brings the classroom context in line with the notion of the 'Zone of Proximal Development' (Vygotsky 1978), within which the teacher can 'scaffold' (Wood et al. 1976) her knowledge to help the child move forward in their understanding.

A corollary of this view, of importance to this book but not one considered in any depth by Plowden, is that while the child is receiving specific support from the teacher, the other pupils in the class must have the skills and desire to work as a group, independently of the teacher. Research in primary schools after the Plowden Report sought to verify whether and how Plowden's recommendations were implemented. In one example of this research, Bennett et al. (1984) found that children did not effectively engage in group work and large numbers of children remained dependent on the teacher for procedural directions, answers to questions, and the acknowledgement that their learning tasks were complete. Further, Galton et al. (1999) found little evidence of effective group working in primary schools over the last 40 years. Thus a theme developed throughout this book is that children cannot simply be left in groups with the hope that they will work constructively together.

The ways that pupils are grouped for learning has origins much earlier in educational history than Plowden. From an historical perspective, the classroom as we know it has only characterized the educational experience of children for the late nineteenth and twentieth centuries. Prior to this time, only a few children were educated formally. Education before the 19th century was likely to take place in a tutorial situation; that is, children were provided a tutor who was responsible for one-to-one education. This tutorial learning situation related well with early philosophies of education—from Plato's (2007) dialogues (between expert and novice), through Rousseau's (2007) natural education guided by a tutor. Tutorial learning appeared to serve well the limited number of individuals deemed 'worthy' to receive an education. The tutorial system is still strongly embedded in certain higher education institutions such as Oxford and Cambridge. Interestingly, tutorial learning also appears to be strongly tied to the development of early psychological theories of learning (see James 1957; Skinner 1988; Thorndike 1999), and pedagogic applications in the Zone of Proximal Development and Apprenticeship (Rogoff 1990) and remedial help for individual learners.

It should be noted, though, that tutorial learning was not experienced by the great mass of children. The notion of a basic education for all did not arise until the 1850s in the UK (Grace 2006). With the perceived need for universal, basic education, and for a range of economic and political reasons, large numbers of children were required to be educated. This had practical consequences for the type of 'school' that emerged, that is, one made up of classrooms with many children and

one teacher. Initially, these classrooms attempted to maintain a version of the tutorial approach—where teachers 'taught' select high attaining pupils. These high attaining pupils, then, took responsibility for the instruction of small groups of lower attaining pupils. Classmates were expected to behave under a tight regime of discipline (see the use of Lancaster and Madras methods in Kutnick 1988, Chap. 1). As schooling began to affect children's learning experience from the start of the 20th century, social researchers (such as Grace 2006) identified a range of differences between schools—especially schools found in urban cities and towns versus rural schools. Children from different types of community may be offered different qualities in their learning experiences, for example in small multi-age rural schools as opposed to larger and more selective schools found in towns and cities.

The advent of classrooms was further associated with a movement beyond the traditional concerns of education with knowledge. At the turn of the twentieth century, philosophies of education shifted from their focus on the individual learner and tutorial teaching methods to social inclusion and social democracy (for example, see Dewey 2007 in the United States; and the Hadow Reports 1926, 1931, 1933 in the United Kingdom). Psychological theories of learning and development also shifted beyond the individual learner as seen in the early writings of Piaget (1928, 1932), where concepts of socio-cognitive conflict and social experience were considered at the root of equilibration, and Vygotsky's (1978) explanation of development moving from the 'interpersonal' to the 'intrapersonal' within the 'Zone of Proximal Development'.

Thus, from the turn of the twentieth century, classrooms in schools became complex arenas for the education of many children. With this development new concerns about types of teaching and learning in a large group situation arose. The mass of children in any classroom could not be taught tutorially. Classrooms full of children had to be organized for learning purposes[1], with the predominant organizational methods determined by children's age and ability. In addition to finding a range of children in any classroom, there was also a range of furniture (chairs, desks and tables) that could be arranged to promote certain types of learning tasks (see Hastings and Chantry 2002; Hastings and Schweiso 1995), a range of ways to seat children (based on friendship, attainment; see Pollard 1985; Pollard and Filer 1995), and various combinations of seating of children in groups that are determined by the type of classroom furniture available (Dreeben 1984). Doyle (1986) has done much to show how the classroom is a complex social context with a multiplicity of activities and relationships, to which teachers and pupils will have to adjust.

As a result of these changes, many more approaches to teaching and learning have been developed, in addition to the traditional tutorial situation. Some of these additional approaches are displayed in the classroom map in Fig. 1.1—which shows a class of children undertaking a variety of learning and curriculum experiences. Yet,

[1] It can also be argued from a sociological perspective that these early 20th century classrooms were organized for the social reproduction of the dominant economic system as argued by Bowles and Gintes (1976) and others as seen in the social class composition of the school and the community where the school is placed.

Table 1.1 The relationship of group size to effective classroom learning

Group size	Learning task	Knowledge relationship	Working interactions
Individual	Practice, revision	Unequal (teacher: pupil)	Individualized, individuated
Dyad	Incremental, restructuring incremental	Equal (pupil: pupil) unequal (tutor: pupil)	Collaborative/co-operative work brainstorming, joint problem solving peer tutoring
Triad	Incremental, restructuring with computer or other apparatus	Equal (pupil: pupil) with additional pupil working apparatus	Collaborative work, brainstorming, joint problem solving
Small Group	Enrichment, restructuring	Unequal (pupil: pupil) equal (pupil: pupil)	Co-operative group work collaborative work
Large group	Incremental	Unequal (teacher: pupil)	Lecturing, teacher led discussion
Whole class	Incremental practice, revision	Unequal (teacher: pupil) unequal (teacher: pupil)	Interactive lecturing, individualized, individuated

Adapted from Kutnick (1994)

the map does not show all classroom experiences within which the child/learner may be engaged. Our primary school visitor will often find the whole class is grouped together for 'story-time', the assignment of classroom learning tasks, physical education, etc. Some classrooms may be laid out in a traditional manner, within which each child has an individual desk and all desks are facing a black/white board—with the teacher 'teaching' from the front of the room. Children may also be seen working individually at their own desks or assigned places on a table. This range of seating configurations may change in relation to type of learning task being undertaken and time of day within the classroom. The range of these configurations further demonstrates the complexity and multiplicity (Doyle 1986) of teaching and learning situations encountered in classrooms.

1.3 Grouping and Learning: A Preliminary View

At a pedagogic level there are a number of reasons why various grouping types and sizes may be used in the classroom. One early attempt to explain the use of different group sizes was provided by Kutnick (1994) when he synthesized the existing descriptive and experimental literature concerning small groups and learning. Table 1.1 summarizes a range of relationships between group sizes and learning tasks that may be found in primary school classrooms. Both descriptive and experimental studies (discussed in greater detail in Chap. 2) found children seated and working in a variety of group sizes—including being seated and working as individuals, being seated in pairs and working as individuals or collaborative pairs, being seated in small groups of 4–6 children and working as individuals or co-operative groups, and being seated in larger groups or whole class with a predominance of individual work. At the same

time, there are a range of learning tasks that children may be asked to undertake within their groups. One description of learning tasks found in classrooms and can be closely aligned to types of pupil grouping has been originally described by Norman (1978) as: incremental (new cognitive knowledge and skills); enriching (providing greater application to existing knowledge); restructuring (changing the understanding of existing knowledge); practice; and revision. Each of these learning tasks implies a specific knowledge/interpersonal working relationship, and evidence of the continuing validity of these descriptions is found in a number of studies that have used the description to analyze classroom learning activities (for example, Edwards 1994; Gorsky and Caspi 2005). The relationship may be described as expert/novice (as found in Vygotskian notions of the Zone of Proximal Development) or between equally naïve pupils (as found in Piaget's consideration of socio-cognitive conflict) and the individual child drawing from pre-existing knowledge. We introduce Table 1.1 at this early point in the book to indicate that particular learning tasks can be related to specific group sizes, and that we cannot expect that all group sizes are best suited for the full range of learning tasks. A viewing of the data in the Table should be undertaken from the perspective that most children in UK-based primary schools will be seated in small groups around tables in their classrooms. We are not claiming that the relationship between group size and task is an exact one, but the Table identifies that some learning tasks may be promoted in groups of a given size while other learning tasks may be inhibited. A few general conclusions which we derive from the literature are that:

- working as individuals is most effective with regard to practice/revision tasks—putting the child into a dyad or triad may cause learning distractions and 'time-off-task' for this type of learning task;
- working in dyads (and sometimes triads) provides an effective setting for incremental/new cognitive knowledge in which children can discuss and compare their perspectives with a partner in the development of further understanding;
- working in small groups (of around 4–6) helps children extend and enrich their existing knowledge with others; and
- large groups, if well controlled, can respond to teacher directions and stimulate new knowledge or be used for communication of low level procedural information.

We do not wish to over-generalize the information displayed. Minimally, pupils represented in the Table were unlikely to be trained to interact effectively as group members (Kutnick et al. 2002). Yet, in order to understand how effective group work can be promoted one will need to be aware of pupils' cognitive/learning development as well as their social development. And, as pupils will often be asked to sit next to or work with other pupils, an understanding of their emotional/relational development is also necessary. These three types of development (i.e., cognitive, social and emotional/relational) are often looked at separately, but effective learning is likely to be facilitated if they are handled in an integrated manner within the classroom, so that children move seamlessly from one type of grouping to another as learning tasks change over the course of a lesson.

The next two sections describe two general areas that underpin the ideas related to group work developed in this book: cognitive processes and peer relations. We then

go on to introduce social processes underlying group work and why teachers and researchers should consider relationships among children as a fundamental aspect of group work and the basis of effective engagement in group work.

1.3.1 Cognitive Processes and Group Work in Schools

This volume has not been designed to provide a detailed review of current developments in the psychology of cognitive development or peer relationships in classrooms. Instead, we provide a selective look at the role of cognitive development and peer relations in educational practice, and with regard to the grouping of pupils for learning. With regard to cognitive development, we will draw upon current formulations of theory (for example, Goswami and Bryant 2007; Howe and Mercer 2007). In these formulations, the child is seen to be an active agent in the construction and co-construction of knowledge (from Piaget and Inhelder 1972). Development is described as progressing from sensori-motor dominated processes to symbolic and language-based cognitive processes (Goswami and Bryant 2007), but new evidence challenges whether this progression should be conceptualized in terms of 'stages'. Advancement of cognitive understanding follows a process of equilibration, which is described by Piaget and Inhelder (1972) as a dynamic balancing of existing knowledge and the need to change/develop understanding that will allow the child to integrate new knowledge into her/his cognitive repertoire. Equilibration is augmented via social interaction (aligned with socio-cognitive conflict and other cognitive-based social interactions) as described by Doise et al. (1975) and others. The role of language becomes increasingly intertwined and important with development, such that it: allows the child to function at a symbolic level (rather than needing full 'hands-on' experience with objects, people and concepts); facilitates guidance in instruction (from Bruner 1985; Vygotsky 1978); and can be generated in co-operative and collaborative interactions as well as under guidance by a more knowledgeable other (Piaget 1928, 1932). But, while the social interaction and particular focus on language are deemed important in promoting cognitive development that underlies school learning, we make the further (perhaps simple) point that children must want to interact and communicate with one another for effective cognitive development; their interactions require positive and supportive relationships among all members of a classroom.

Updates in cognitive development theory can be considered in relation to the use of groups of children in primary school classrooms. Having moved away from a theory dominated by stages of children's development, there is now a stronger belief that children should be involved in activities, especially with others, such that they can match, compare and challenge the results of these experiences in relation to their existing cognitive understanding. This brings about equilibration that is no longer dominated by the view that children's understanding is limited by their 'stage' of development. In particular, the young child should no longer be described as 'egocentric' or have her/his interaction and ability to undertake complex problems

jointly with peers limited by the perception that 'they are too young'. As Goswami and Bryant (2007) explain, experience lies at the root of cognitive development. More experience offered in an educational environment will cause the child to enhance their neural and social networks. And, they note: 'the frequency with which learning events are experienced is crucial to the acquisition of expertise'.

This 'connectionist' concept in learning is further augmented and promoted by shared activity of the child with adults and peers. Learning can now be seen as a 'function of prior knowledge and the capacity to learn with the help of others'. Many of the examples of learning with the help of others have drawn upon the child's interactions with adults (Rogoff 1990; Wood 1998) and are expressed in concepts such as 'scaffolding' and 'communities of learners'. Socio-cultural views of development see children becoming socialized into their culture and taking on the educational knowledge and values of that culture. Classic studies of learning to talk (Bruner 1983) and learning to learn (Rogoff 1990) demonstrate this point. Socio-cultural studies strongly focus on the role of talk/communication between individuals; hence, in schools, talk between teacher and child or between more experienced peer and child provides a key medium for the shaping of development and understanding. One intriguing question that extends socio-cultural views is considered in Chap. 6, where the make-up of a classroom is considered within the ecological policies of same-age and mixed-age classes and the 'relational distance/closeness' of children that may characterize urban and rural schools.

At the same time, children can and do learn from non-expert, mutual peers, as demonstrated in socio-cognitive theory. Socio-cognitive studies of peer interaction have been inspired by Piaget (see Piaget and Inhelder 1972) and post-Piagetians (for example, Doise and Mugny 1984; Howe and Tolmie 2003; Light and Littleton 1994; Perret-Clermont 1980; Webb and Palinscar 1996). These studies are distinct from 'instructional' interpretations of Vygotsky that focus on the relationship between an expert (knower) and novice (Luria 1976). The socio-cognitive studies focus on the potential mismatch between knowledge-based perspectives of individuals wherein socio-cognitive conflict between individual learners can lead to higher order understanding. As Damon and Phelps (1989) note, when partners are not influenced by an inequality in power/knowledge, the overcoming of differences in cognitive-based perspectives is likely to lead to more complex understanding than either of the partners was able to contribute originally. Hence, cognitively advanced understanding is gained through 'mutuality' and 'connectedness' where (peer-based) social interaction ensures that both partners are equally participative and they maintain a relational obligation to work together. Classroom studies have also shown that cognitive development can be enhanced when activities are undertaken in pairs or small groups and children are able to work independently from their teacher (Cohen and Lotan 1995; Kutnick and Thomas 1990) on joint problem resolution (Howe and Tolmie 2003). And, further studies of how social interaction among peers promotes cognitive development have also shown the peer-based interaction can help to overcome social class and cultural differences that often inhibit children from different backgrounds from working together (Perret-Clermont 1980).

Cognitive development in the classroom is thus facilitated by children's ability to talk among themselves and to their teachers (Mercer and Littleton 2007). Socio-cognitive and socio-cultural theories and related studies (Mercer 2000; Webb 1989) note that talk must encourage children's communication beyond simple description, confirmation or disagreement. This classroom talk can add new and challenging cognitive perspectives and clarify existing information—as long as that talk is undertaken at a level that is 'elaborated' (for example, Webb 1989; Wegerif et al. 1999) and children wish to communicate with one another. Studies that recognize the importance of elaborated talk (Gillies and Kahn 2009; Mercer and Littleton 2007) also recommend that children can be instructed and supported in the use of this particular type of talk. Hence, as identified by Wells and Claxton (2002) and Daniels (2008), development and learning (both inside and outside of the classroom) is shaped and promoted by social and communicative interactions. Knowledge that may be perceived as being possessed individually can be said to be created and shared among members of a community of peers and adults (Howe and Mercer 2007).

1.3.2 Peer Relations

As well as cognitive development, a second general topic that underpins the work described in this book is the general field of 'peer relations'. There are now a number of reviews of research on peer relations (Blatchford and Baines 2010; Bukowski et al. 1996; Dunn 1993, 2004; Gifford-Smith and Brownell 2003; Howe 2010; Howe and Mercer 2007; Ladd 2005; Rubin et al. 2006; Rubin et al. 2005) that provide a comprehensive coverage of current knowledge. Much of the recent research on peer relations has been concerned with difficulties experienced within peer relations in terms of, for example, peer rejection, bullying, victimization and withdrawal. But there is also a well-established position that peer relations have particular value for social and even cognitive development (Blatchford and Baines 2010). In an early, influential book, Youniss (1980) adapted the theories of Piaget (1932) and Sullivan (1953) to show how child-peer relations differed from child-adult relations by showing equality, cooperation, reciprocity and mutuality—all of which make a contribution to social development. This positive view has been given an added dimension with a more recent (though contested, see Howe 2010) theory of socialization which downplays the role of parents and other adults in favour of the important role of the group and particularly the peer group in development (Harris 1995). An understanding of the literature on peer relations is important when considering the classroom as a context for learning. One example of this is research on children's friendships. Although teachers often believe that grouping friends together can lead to more off-task behaviour, research indicates that friendship groups may be good for some tasks and learning situations (Zajac and Hartup 1997). As we shall see in Chap. 6, friendship maintains a 'close relational distance' between peers while acquaintances (that is, children who know one another but have not developed a friendship tie) maintain a more 'extended relational distance'. At the same time, we note that friends tend to be similar to each

other and that there may be problems when friends are antisocial—they may be more aggressive and less stable (Kutnick and Kington 2005). Although this book is not specifically about peer relations, these relations provide a main backdrop to our interest in effective group work and peer relations are a relatively neglected force that can affect social and cognitive development and school learning. Children need to interact and relate positively with one another for development to take place. Further discussion of the importance of positive peer relationships and how they may be facilitated in classrooms are considered later in this chapter and form the basis for our social pedagogic approach to effective group work discussed in Chap. 2. Some strategies adopted by teachers associated with the development of positive peer relations and effects related to pupil learning and behaviour are also described in Chap. 7.

1.4 Social Processes Underlying Group Work in Schools

A clear distinction between cognitive processes and social processes that underlie effective group work in classrooms is difficult to make. Yet there are distinctive social psychological and socio-cultural arguments concerning the value of group work. Social psychological theories draw upon interdependence and joint tasks to facilitate mutual working together (as in co-operative group work; Johnson and Johnson 2003a; Slavin 1995). Socio-cultural theories also draw upon a notion of equality, equity and working together (Reznitskaya et al. 2009) and may be drawn upon to identify why and how social practices can be embedded into classroom activity. Socio-cultural theory has been drawn upon to explain how these practices can enhance interaction among children as well as with their teachers. Socio-cultural theories (mainly derived from Vygotsky 1978; and explained by Howe and Mercer 2007) show that the development of groups and associated classroom knowledge will have been shaped by cultural and historical factors, especially regarding who is present in the classroom and how knowledge is controlled (for example, see Barron 2003; Boaler 2000; Kutnick et al. 2005). We also introduce a new and distinctive 'relational' theory as a main part of our perspective on social processes that underlie group work, to help explain how and why the development of positive relationships within the classroom is fundamental to children's interactions that support cognitive development and classroom learning (we further explain relational theory in Chap. 2 and show how it has been applied in the SPRinG studies in Chap. 3, 4, 5. 6 and 7).

Views concerning the support for the development of knowledge and understanding in classrooms often assume that children can (and will) talk and interact with one another. Yet, as seen in the cognitive section above, only certain types of talk are associated with development and learning. Howe (2010) argues that this talk should involve contrasts of opinion among participants, with children having the ability to share knowledge, challenge ideas, evaluate evidence and seek a range of options. Interestingly, if this type of talk takes place in a classroom, children do not necessarily need to come to a resolution of the problem under consideration (Howe and Mercer

2007); their discussions can set a basis for critically reflecting on their activities and often show a higher level of understanding *after* the interaction has taken place.

Many studies aimed at improving children's understanding and talk have arisen from both Vygotskian and Piagetian perspectives concerning socio-cognitive and socio-cultural development (reviewed in more detail in Chap. 2). These studies often focus on children's collaboration which 'involves the mutual engagement of participants in a coordinated effort to solve problems' (Dillenbourg et al. 1996). Initial studies concerning collaboration appear to assume that children can work together by 'sharing interests, knowledge, personal history and commitment to work' (Barron 2003). Thus, collaborative studies rely on the fact that children can and will share their understanding and experience. While there has been evidence to support the effectiveness of collaboration, a few qualifications may be required. Studies that observed children's naturalistic talk in classrooms have reported that children who collaboratively explained and reasoned with one another showed greater gains in their understanding than children who did not explain (Howe 2010; Reznitskaya et al. 2009; Webb and Palscinar 1996). Yet, in classrooms where collaborative learning was introduced to enhance explanations, not all children were able to benefit from this form of talk and interaction (Barron 2003; Reznitskaya 2009); and children who did not gain from the collaboration often became frustrated, spent time off-task and were discouraged from further participation in this form of learning (Salomon and Globerson 1989). More intensive and inclusive collaborative studies have further explored how particular types of language interactions (see Mercer et al. 1999), interpersonal support for questioning (Webb and Farivar 1994), techniques such as argumentation (Anderson et al. 1997) and computer assisted collaboration (Crook 1998; Lu et al. 2011) can be introduced to benefit learning and collaborative interaction. Thus collaboration—a seemingly ideal way to enhance children's reasoning and understanding in classrooms—has been found to be beneficial in the promotion of understanding. But, collaboration has not been characteristic of all classrooms or of all children within a classroom. Effective collaboration has been dependent on teachers encouraging this form of interaction among children (Gillies and Khan 2009; Webb and Mastergeorge 2003), children's ability to explain and reason among themselves (Howe 2010) and learning tasks designed to encourage collaboration (Barron 2003).

Further, to promote talk and interaction among children (and between children and their teachers) the 'relational' approach descibed below emphasizes that children should *want* to work with one another, and this necessitates their moving their concept of work partners beyond simple friendship preferences such that all children in a class can share knowledge and interaction with all of their classmates. The classroom context, then, is seen to be important sociologically as well as cognitively. In addition to peer-based interactions to support understanding, teachers play an important role in structuring the activities and interactions in the classroom to promote collaboration. Classroom activities have to be designed and supported to allow children's interactions and teachers will need to support children's joint interactions—even if their classrooms may sound 'noisy' (Barron 2003). Without teachers' planning for

joint activities the interactions that take place within the classroom may either promote or inhibit equal or mutual interchanges among children. Further, teachers have been encouraged to consider structuring their classroom groups to allow equal contributions from all children and maintain a close relational distance (often referred to as children having 'equal status' in studies of co-operative learning, e.g., Cohen and Lotan 1995).

Social psychology theories have also been important in explanations of co-operative learning (Johnson and Johnson 2003a; Slavin et al. 2003; and others). Co-operation, as a method to promote learning, is designed to accomplish a specific goal through people working together (Panitz 1997), often by dividing the learning task so that each group member has responsibility (to seek information and explain to the rest of the group) for a separate part of the task (Dillenbourg et al. 1996). Early theoretical approaches to co-operative learning focused on the need to establish a relational basis for group members to undertake 'work' with one another. This relational basis was described in contact theory (Allport 1954) and interpersonal aspects of motivation (Deutsch 1949; and further developed in Johnson and Johnson 2003b). Contact theory identifies four conditions which must be met if individuals are to work together effectively as a group. The conditions include: (1) equal status among all members of the group (and between the groups if there are more than one group in any classroom setting); (2) common goals agreed by all group members; (3) each member of the group able to make an equal contribution to the group task, thereby eliminating competition with a group or a hierarchy of group contributors; and (4) the teacher (or person in authority in the group setting) must ensure that it is appropriate that group contact takes place and supports this contact. Through relationships within a group, interpersonal dependence is developed (where each individual's goals are affected by the actions of others that surround the individual) and becomes fundamental to the working of any group (Deutsch 1949). From a contact theory perspective, it appears that a positive relationship is a pre-requisite for co-operation or the outcome of a successful interaction (Slavin 1995). Slavin also adapts a sociological consideration similar to Cohen and Lotan (1995) in that he recommends that cooperating groups be structured to represent a 'heterogeneous' cross-section of all individuals in the classroom, thus facilitating social inclusion and eliminating status differences between group members. Social psychologists associated with co-operative learning also acknowledge (e.g., Bossert et al. 1985) that the learning tasks drawn upon must be of sufficient (cognitive) challenge to encourage engagement without under- or over-estimating the ability of group members.

Social psychological studies that focus on interdependence have been extensively applied to classrooms, especially in comparisons of co-operative learning to traditional learning. Fairly consistent findings from these studies show classes structured to encourage co-operative learning enhance relational and pro-school attitudes and development among pupils. There are also consistent learning gains across a range of school subjects such as literacy (Mathes and Babyak 2001; Meill and MacDonald 2000), mathematics (Damon and Phelps 1989; Fuchs et al. 1997), music (MacDonald et al. 2002) and science (Howe and Tolmie 2003).

1.5 Relationships among Children as Learners within Group Work

While the research reported in Chap. 4 through 7 in this book is also based upon socio-cognitive, socio-cultural and social psychological theories, we argue that the role of relationships in support of learning and development is an often understated but essential element for use in classrooms. This argument contrasts with prevailing studies of collaborative and co-operative learning as a focus on relationships entails that children must want to work/share with one another before enhanced language, explanation and understanding capabilities of interdependent problem solving can be called upon in classrooms.

The role of interpersonal relationships in group working can be found in various writings concerning 'relational theory' stemming from psychiatric, cognitive and social theories of development. Relational theory places great importance on the development and maintenance of positive relationships in the facilitation of social interaction for productive learning. Relational theory also considers how positive relationships can be facilitated and how these relationships can be integrated in the promotion of classroom dialogue and learning. Positive relationships are essential to a range of school-related developments (Hall 1994).

In line with a number of social and cognitive developmental principles, Kutnick and Manson (1998) have described how a relational approach to enhance cognitive and social development can be engendered amongst children and applied in classrooms to improve the effectiveness of their group working. The relational approach follows a sequence of developments in the interactions of the child with adults and peers. This begins with early sensori-trust and emotional development which then sets the basis for later interpersonal and cognitive, rule-based understanding and support for close relationships. It is argued that the sequence is also a feature of social contexts in classrooms within which children interact. It is important that the relationships engage all of those who populate the classroom—all of the pupils and the teacher. In fact, a number of psychotherapeutic approaches have drawn upon the development of this type of relational sequence in a variety of contexts with young children, adolescents and adults; and relational approaches are often used to help individuals and groups to overcome their social and emotional problems (for example, Pfeiffer and Jones 1976).

The relational sequence is briefly described here, and a more detailed description of the actions and activities is provided in Chap. 3. The sequence leads to children's understanding of close relationships, that have been described elsewhere (Kutnick and Manson 1998) as fundamental to learning and social support among individuals. Drawing from a developmental psychology of close relationships, the start of the sequence is meant to progress from an initial mutual bond that establishes trust, dependency and security between the child and others (peers and teacher), which provides a basis for joint communication, interdependence and further ability to solve relational and other problems (Damon 1977; Selman 1980; Youniss 1980). The initial mutual bond can be described as an attachment-like relationship (Ainsworth et al.

1974) that often characterizes early developments in the home where attachment is found between parent and child. It is the purpose of the relational sequence to mirror some of this early development—but allowing this to take place outside of the home with peers and teachers. After an initial bond of mutual trust, dependence and security is established and the child can move to cognitive understanding of rules for dependence and interdependence, and reflective understanding of the qualities of relationships and autonomous relationships (Kutnick and Manson 1998). This relational sequence, especially as developed with parents and its extension to peers and teachers, has been described as a necessary condition for effective learning (Barrett and Trevitt 1991; Clark-Stewart and Dunn 2006) and further development of relationships with other adults outside of the home. Surveys of the literature rarely find studies of early relational development taking place between the child and peers within Western cultures except in specific regard to friendship (Kessen 1991; Youniss 1978). Yet, from the limited studies available, we find that it is possible for early, close relationships to develop among very young children (Blatchford 1979; Dunn 1993; Howes 1983; Vandell and Mueller 1980).

The development of close relationships with peers or adults can only take place when a child experiences quality interactions with particular adults and peers based upon interpersonal sensitivity, trust, interdependence and communication. While it is normally expected that these experiences will take place with adults in the home, small-scale experimental studies have also shown that the development of these attachment-like relationships may be 'scaffolded' in classroom and other environments amongst children (Hall 1994; Kutnick and Brees 1982; Thacker et al. 1992). These close child/adult and child/peer relationships appear at the root of good quality learning in classroom contexts but may not be a feature of current classrooms.

1.6 The Book

In this book we contrast the under-developed nature of peer-based learning in many classrooms with the potential for group-based learning. We argue that current grouping practices in classrooms are likely to inhibit learning, and these inhibitions may arise from children's own preferences in learning as well as teachers' organization of the classroom and the cultures in which children grow and interact. Our starting point is that there is much potential in peer group learning in classrooms, and the aim is to describe an approach to group work that can be used in everyday classrooms and which can be fully integrated into the curriculum. The main body of the book describes findings from an evaluation of this approach.

In Chap. 2 we provide a fuller review of the literature on grouping practices in classrooms, and describe findings from our own programme of research which described grouping practices in UK classrooms. We also provide the basic ingredients of what we call a social pedagogical approach to classroom learning.

In Chap. 3 we describe the rationale, development and main features of the SPRinG project. By adopting a social pedagogic analysis we show how the social context of the

classroom can be adapted to develop, encourage and support effective group working. To prefigure what will be said later in this book, the SPRinG project proposes four principles to enable effective group work in classrooms:

1. Careful attention to the physical and social organization of the classroom and groups;
2. The creation and structuring of challenging tasks that legitimize group work;
3. The development of pupils' group working skills (based upon an inclusive relational approach);
4. The supportive involvement of teachers and other adults.

We argue in this book that when these principles are incorporated into everyday classroom activity with whole classes, the evidence shows that children's cognitive and social development will be enhanced. Group work will become more effective and the classroom will become a more inclusive and supportive environment for learning.

In the second half of Chap. 3 we describe the methods used in a large scale and systematic evaluation of the programme. This acts as the basis for the methods used in the empirical studies described in Chap. 4 through 7.

In Chap. 4 we provide results from the main evaluation of the SPRinG project involving the younger children in the study (aged 4–7 years) and in Chap. 5 we provide results from the older pupils (7–11 years). The studies took place at two different sites (Brighton and London respectively) and as described in later chapters had slightly different methods and aims. The results from these two chapters are the heart of the empirical test of how well the SPRinG project worked. Results from these two chapters probably represent the largest study to date concerning the effective use of groups as a context for everyday learning in primary school classrooms. In addition, the two chapters assess the role and effects of the relational approach in promoting effective group work on classroom learning generally and within the specific science curriculum. And, the development of effective group work is further assessed in relation to the development of children's communicative and support skills as well as the role of the teacher in adapting and implementing the SPRinG approach to group work in classrooms.

In Chap. 6, the Scottish extension of SPRinG (ScotSPRinG) provides an examination of the extent and generalizability of the SPRinG approach to effective group work in Scottish primary school classrooms. The background and data analysed in Chap. 6 extends contextual issues of schooling and children's backgrounds that had not been accounted for in the KS1 and KS2 studies reported in Chap. 4 and 5. Schools, teachers and children drawn upon in the previous chapters were all from the southeast of England and were mainly found in urban schools. Extending the SPRinG approach to primary schools in Scotland allowed the researchers to examine whether similar results characterize a different school system (Scottish primary schools), classes in both urban and rural schools and same-age and composite (mixed-age) classes. While identifying that SPRinG results are generalizable to other primary school contexts, the ScotSPRinG chapter also provides new and extended insights with regard to:

concepts on 'relational distance' (or how familiar children are with one another before and after undertaking the SPRinG approach); and whether effects of the SPRinG approach are solely limited to children's working relationships within the classroom or may be seen to extend to their friendship and play relationships (which take place outside of the classroom).

In Chap. 7 we get closer to the reality of implementing group work in the school context by describing results on the experience of teachers and pupils. This chapter is distinct from the preceding chapters in that it uses predominately qualitative methods and is more reflective in approach. The chapter is based upon teacher and child reflections on the implementation of SPRinG in their classrooms—as such it allows the reader to get a more nuanced understanding of the reality of group work to complement the larger statistical studies described in Chap. 4, 5 and 6. The descriptions and reflections provided in the chapter were made by experienced teachers and their pupils. Teachers provided valuable comments on the broader school context within which the SPRinG programme was developed, explanations of successful learning in these classrooms and reminders that such an approach to effective group work requires constant attention and support by all members of school and classroom. Some key issues considered in the chapter include: a programme such as SPRinG is facilitated as a 'whole school' enterprise—where the school leaders are strongly supportive of the approach and teachers have colleagues with whom they can share experiences and ideas; each of the four SPRinG principles need to be integrated into the approach; not all teachers can/will implement the approach in the same way—and those teachers who cannot support the approach wholeheartedly see fewer positive effects in their classrooms; but in classrooms where SPRinG is effectively implemented, children's learning and behaviour show a range of improvement at the expected level of academic achievement and at the unexpected level of social behaviour and classroom inclusion.

Chapter 8 provides a summary of main findings and then concludes the book with a discussion of key themes that have arisen within the reported studies. The chapter seeks to identify what the SPRinG project has contributed to knowledge on collaborative group work; examines the credibility and 'warrant' of the methods used; explores what we have learned about the key components of the SPRinG approach; and ends with a further look at how the SPRinG project helps clarify the details of a broader social pedagogy of classroom learning.

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Chapter 2
Groups and Classrooms

2.1 Introduction

In Chap. 1 we saw evidence that children in primary schools spend the majority of their classroom learning time sitting in small groups and working with the teacher in various sized groups. Yet studies of classroom activity in primary schools considered in detail in this chapter provide evidence that peer-based learning and group work is rarely used. This situation is compounded by the concerns of teachers, children and parents that children's learning can be inhibited and distracted by their surrounding peers. When discussing the possible benefits of peer and interactive learning, we have often encountered a resistance to the idea that pupils can have a productive learning relationship with each other. It is of little surprise, therefore, if the practice of group work in primary school classrooms often falls far short of its potential to extend children's cognitive development and work with classroom peers in an inclusive manner.

In this chapter we first set out what currently characterizes learning and development in classrooms with special regard to pupil groups. The bulk of the chapter then describes knowledge about group work in terms of two main forms of research approach: firstly, experimental studies concerning co-operative and collaborative groups and, secondly, naturalistic studies of groups undertaken in 'authentic' classrooms. We then continue to report on further studies that describe characteristic classroom social pedagogic contexts of learning for children.

2.2 Background Issues in Promoting Development and Understanding via Effective Group Work in Classrooms: Understanding Pedagogy and Opening the 'Black Box'

Resnick (2000) proposed an approach to pedagogy that she hoped would act as the basis of a new drive in educational reform. This approach should help to raise the cognitive competence and educational achievement of pupils in any classroom, especially the least educationally advantaged. Resnick identified two core features of

P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,*
Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_2,

this approach to pedagogy: first, 'knowledge-based constructivism' that captures the interpretive, inferential basis of learning and provides learners with high quality material; and, second, a combination of social developmental and motivational theory which she describes as 'effort-based learning'. Essentially, these features cover cognitive development and motivation respectively. Resnick argued that it is important not to socialize learners into unproductive views of their own learning and intelligence but to provide social space within the classroom where children's learning can be supported incrementally via interactions with their teachers and peers. It is, thus, important for learners to acquire robust and enduring 'habits of mind' in which effort and the ability to learn from others are naturally seen as important in learning. Achieving a strategic balance between these 'habits of mind' in the classroom is vital for effective teaching and learning but is one of the most difficult dilemmas facing today's teachers (Baines et al. 2003).

In addition to the two features of pedagogy identified by Resnick, we emphasize a third feature. Pedagogy in a classroom context is not just about the teacher enhancing the learning of a single person; it includes all pupils in the class and takes place within particular social, learning and physical constraints (e.g., such as class size and composition). While we acknowledge the importance of Resnick's focus on cognitive development and motivation, this additional feature involves a systematic appreciation of social contexts within classrooms. For the most part the importance of this third feature has been given little thought beyond pleas to create positive classroom climates (Barron 2003), yet it is vital that the organization of pupil learning must be strategically constructed in relation to social interaction with teachers and peers as well as particular learning tasks. As a result of the concern regarding the role of social context in learning, this chapter develops the idea of a social pedagogy of classrooms, that is, a framework for understanding how the social context of relationships can support or inhibit learning (Blatchford et al. 2003; Kutnick et al. 2002).

As we discussed in Chap. 1, and based on the mapping results described there, classroom contexts encompass a number of dimensions including: the number of children within a classroom, where children are seated, the size of seating-based pupil groups, the composition of pupil groups, the nature of the interaction between members within any classroom group, and the type of learning task that is being undertaken by a group. From our social pedagogic orientation all these dimensions are important in affecting the nature and quality of the teaching and learning experience for teachers and pupils. In particular, if these relationships are planned strategically then learning experiences are likely to be more effective. Without strategic planning, these contexts may actually hinder the effectiveness of learning experiences. Unfortunately, naturalistic studies of classrooms, described below, suggest that the relationships between social contexts and learning are often unplanned and the 'social pedagogic' potential of classroom learning is therefore unrealized.

This chapter introduces a further concern: Our knowledge of and strategic planning for group work should to a large degree be based upon 'authentic' classroom studies. Although there have been a number of insights from more 'experimental' studies of group work and learning, a number of such studies tend to be based on

relatively artificial situations and thus may have limited relevance to everyday classroom activity. We argue that attention to the everyday classroom context is important because it allows recognition of the complex nature of actions in classrooms and acknowledges what is happening to pupils and the teacher at the same time, rather than artificially created situations or situations relating to only a small portion of the pupils in the classroom. Authenticity also allows for recognition of the multiplicity (Doyle 1986) of events happening in classrooms at any point in time. Attending to 'authentic' classrooms also acknowledges that classroom actions and activities are built-up and developed over a long period of time (as described by Boaler 2000; Howe 2010; and others)—certainly over a term or school year rather than a two to four week intervention. Put another way, an authentic approach sees group working within the classroom as a social pedagogic (Blatchford et al. 2003) context for teaching and learning.

2.3 Experimental and Naturalistic Studies of Group Work in Primary School Classrooms

Reviews of group work in classroom studies can be divided into two broad categories: experimental approaches and naturalistic descriptions (Baines et al. 2008). Experimental approaches tend to focus on the use of co-operative or collaborative learning strategies and often evaluate learning related to a specific, short-term intervention. Naturalistic studies describe the activities and interactions that characterize authentic classroom life, allowing an assessment to be made of the relationships between seating, grouping arrangements, types of learning task and interpersonal relationships.

2.3.1 Experimental Research

Experimental studies tend to be informed by predominantly social psychological and socio-cultural orientations (as introduced in Chap. 1) and tend to be characterized by co-operative and collaborative learning studies. As we will show, while co-operative learning studies may provide positive educational effects for children, there are some serious limitations in the structure of the studies and in the generalizations that may be made about the outcomes of these studies. From these limitations, we move to less traditional experimental studies that involve the development and use of collaborative learning strategies amongst children, primarily in classrooms. From an authentic classroom perspective, these collaborative studies also have their shortcomings.

Co-operative learning research has demonstrated that co-operative approaches can produce positive learning effects on pupil achievement, promote positive attitudes to schooling and improve social climate within classrooms (Johnson and Johnson 2003a; Pepitone 1980; Slavin et al. 2003). The majority of this research

is based on the use of small groups in a classroom or non-classroom setting, and explores the effects of a highly structured co-operative framework within which a particular curriculum topic is introduced for learning. These studies typically structure children into particular types of grouping. Groupings are often composed to represent a heterogeneous cross-section of all children in a class—with a mix of males and females, high and low attainment, and a mix of ethnic and racial groups to promote classroom inclusion and overcome status differences between children (Cohen and Lotan 1995). These studies have been evaluated in a number of meta-analytic reviews (Kulik and Kulik 1992; Lou et al. 1996; Roseth et al. 2006) which provide evidence of the beneficial effect of co-operative group work on pupil learning. Classroom-based studies of co-operative learning (see Slavin 1995; Johnson and Johnson 2003b) consistently show advantages for co-operative group-based learning in classrooms, especially when compared to 'control' classes where the pupils study the same curriculum topics but under traditional, teacher-directed learning practices. Two of the most consistent findings from these comparative studies are that: a) pupils learn an equivalent amount of curriculum material in co-operative learning as opposed to traditionally taught classrooms—and sometimes more learning takes place in co-operative classes; and b) development of within-class friendships and positive attitudes to schooling are significantly more likely to take place in co-operative as opposed to traditionally taught classes.

Readers must be mindful that co-operative learning studies and approaches to classroom teaching are not as simple as placing children in heterogeneous groups and asking pupils to undertake a learning task. Teachers usually require a high level of training for co-operative learning (Gillies and Kahn 2009; Webb et al. 2009) such that they can structure their classes and learning tasks to be undertaken in a co-operative manner. Teachers must create heterogeneous pupil groups and be able to break down aspects of the learning task such that each group member has a clear learning role and is able to support and share knowledge with other members of the group. The teacher will also need to model co-operative behaviour and provide support for children when they engage in positive co-operative learning practices. Moreover, teachers who use co-operative learning approaches in their classrooms will need to explain and support their actions to their colleagues who may criticize co-operative learning classrooms as noisy and disorganized when compared to traditional classrooms (Cowie and Rudduck 1988).

While there may be a range of positive benefits to experimental co-operative learning in and out of classrooms, there are also a number of limitations associated with these studies. Kutnick et al. (2005) argue that classroom-based studies of co-operative learning tend to be undertaken over a relatively short time period (of days or weeks) rather than over school semesters or even a full year in school. Co-operative learning studies tend to be based on input-output models (sometimes referred to as 'black box' studies) which do not explain why co-operative learning may be effective. A further limitation of co-operative learning studies has been recognized in the meta-analytic reviews described above. These reviews often did not distinguish between different curricula contexts and task demands—factors that may

partly explain different levels of reported success (Creemers 1994). Little attention has been given to variations between the different ages of pupils within groups (Lou et al. 1996) and this may be because very few co-operative learning studies have been undertaken with children younger than 9 years of age and no differentiation is made between children's initial levels of cognitive development before engaging in the co-operative learning activity. Also, consideration of the age at which co-operative learning may begin will require a distinct motivation for children to learn with/from others (as opposed to learning motivation in traditional classrooms, Ames 1981), and the implementation of co-operative learning will require that children demonstrate skills of speaking and listening with peers (Barron 2003) and sharing their interpersonal space (Teasley and Roschelle 1993). Unless a motivation to learn co-operatively is supported by the teacher and interpersonal communication skills are taught within the class, co-operative tasks will have limited effects on learning (Gillies and Kahn 2009). Finally, experimental studies provide insight into a range of co-operative learning approaches and techniques associated with the enhancement of cognitive learning amongst children working in small groups in the classroom, but, importantly, the imposed co-operative grouping and task structures may not always meet the needs of teachers operating in authentic classroom settings where multiple groups and learning tasks may be undertaken simultaneously (Blatchford et al. 1999; Galton et al. 1999). The complexity of actions and interactions in authentic classrooms has led Doyle (1986) to argue that many classroom teachers may avoid co-operative learning tasks because of management problems that they are likely to encounter when considering the learning of all pupils in the classroom.

An allied form of experimental research is found in studies that address aspects of collaborative learning. As opposed to the interdependence, quality contact and a joint end product that characterizes co-operative learning, collaborative learning studies engage children in working together in the development of joint communication and support (introduced in Chap. 1). Such collaborative activities, often in the form of problem solving, have been found to encourage high levels of explanation through vehicles such as 'elaborated' talk. In one sense, collaborative learning studies move beyond the co-operative learning 'black box' as these studies focus on process models wherein the use of hierarchical and/or mutual scaffolding bring about cognitive enhancement within groups (Rogoff 1990; Rosenshine et al. 1996) and the extent to which pupils accept ownership for the consequences of joint decisions (Galton and Williamson 1992).

A number of innovative collaborative learning studies address interpersonal communication and talk among group members (for example, Webb and Mastergeorge 2003; Howe and Tolmie 2003; Mercer 2000) and quality interactions between classroom teacher and a particular group of pupils (Adey et al. 2002). From descriptive and correlational studies, early research on collaborative learning (for example Eggleston et al. 1976; Forman and Cazden 1985) found that children who shared information between themselves were likely to increase their (often subject-based) understanding. As previously noted, further studies have identified that children who shared explanations and made reason-based judgements in their interactions were more likely to enhance their cognitive understanding. Yet, as noted by Reznitskaya et al. (2009),

children rarely use these types of communication in their classrooms; and this has led some researchers (especially Mercer and Littleton 2007; Webb et al. 2009) to initially undertake an approach that helped them ascertain what types of communication children use in classrooms and how this communication could be changed to support increased understanding among children. Mercer (2000), in particular, reported that among the three predominant types of interpersonal child-based communication that characterized primary school classrooms, 'elaboration' was least likely to be found; and elaboration was the one form of communication most likely to be associated with children's cognitive understanding. In a similar manner, research by Howe and colleagues (see especially Howe et al. 2000) found that the use of explanations between children was highly associated with cognitive development, but explanations were rarely found in the classroom. From this approach, programmes to enhance the use of collaborative learning were created. These programmes drew upon encouragement of elaborated talk (Mercer et al. 2004), helping behaviour (Webb and Mastergeorge 2003), argumentation (Anderson et al. 1997; Mirza and Perret-Clermont 2009) and supportive questioning among children and teachers (O'Donnell and King 1999). And, while a number of successful studies support the relationship between raising the levels of elaborated/explanational talk among children and their increased levels of understanding (identified above), we are reminded of the point made in Chap. 1 that there are few rigorous or controlled studies of collaborative learning (Reznitskaya et al. 2009) that actually demonstrate that a collaborative problem solving approach will be successful in all classrooms (Barron 2003; Hogan et al. 2000; Sfard and Kieran 2001)

Another important point has arisen from the above studies. In collaborative learning studies that have been applied in classrooms, there is a requirement that the teacher introduces collaborative techniques in a supportive manner and that the teacher serves as a good model for collaborative behaviours in the classroom. Teachers, as reviewed by Webb et al. (in press), can help to encourage children to explore their own thinking (from King 1999); encourage dialogue by interacting with children (from Gillies 2004); can promote explanations via questioning (Kazemi and Stipek 2000); as well as prepare programmes that support elaborated talk (Mercer et al. 1999). Yet, as noted by Gillies and Kahn (2009), teachers will have to be mindful that the model that they present to their class can be transferred and used by children with their peers as well as between children and their teacher. Gillies and Kahn (2009) and Kutnick and Berdondini (2009) also recognize that teachers who have been introduced to or trained in collaborative or co-operative learning techniques for their classrooms will be more likely to take on ownership and effective practice. However, there is a large amount of variation in the effectiveness of results in these teachers' classrooms which appears to be related to the extent to which teachers are committed to the values and practices embodied in their training. We note two further limitations to the generalizability of co-operative and collaborative learning approaches in classrooms. First, a number of approaches tend to focus on the teacher's interaction with one small group at a time and do not tend to consider what is happening with all of the groups that populate the classroom. In order for the non-teacher directed groups to work autonomously from the teacher, the pupils must have the skills to help one another

and scaffold each other's activity. Without this ability to work autonomously from the teacher, children may repeat the actions described by Bennett et al. (1984) over 25 years ago—that is, when they encounter a problem, pupils will go directly to the teacher and this action will distract the teacher from the work that she may be undertaking with her focus group. The second limitation, identified only recently (Salonen et al. 2005; Kutnick and Berdondini 2009), is the implicit expectation that children working in co-operative and collaborative approaches will relate positively to all members of their learning group. Salonen et al. (2005), in an explanation similar to Barron (2003) regarding the ineffectiveness of many co-operative and collaborative learning studies, identify that social/interpersonal relational issues can (and often do) inhibit cognitive-based communication between children in classrooms. Further, as will be seen in the description of naturalistic classroom studies, children rarely display this positive relationship with all children in their class, and tend to focus on preferred friendships when they need to work with other children. We argue that attending to potential limitations associated with the use of co-operative and collaborative learning approaches helps in the creation of a programme for more effective group work in whole classes, and this has informed the SPRinG approach described in Chap. 3 through 7. Before studies of effective group work are addressed, however, we turn to the second main form of research: naturalistic studies of classrooms in primary schools.

2.3.2 Naturalistic Studies

By way of contrast to experimental studies, naturalistic studies have been designed to account for the whole class context and include a number of sociological concerns, especially regarding social inclusion and participation of all children within the classroom. Naturalistic studies do not involve experimental imposition of a particular approach to classroom learning but provide a naturalistic view involving all children and the teacher. As such naturalistic studies therefore add much more insight into the multiple activities that may take place in the classroom as well as the social pedagogic complexity that characterizes everyday classroom learning. We divide our description of naturalistic classroom studies into two phases: studies between 1980 and 2000 which identify problems associated with group work in classrooms, and post-2000 studies which identify classrooms as a social pedagogic context.

2.3.2.1 First Phase of Naturalistic Classroom Studies

By way of an initial summary, three key themes arise from the first phase of naturalistic classroom studies: (1) while children experience much of their classroom learning activity seated in groups, these groups may vary in size and with the phase of the lesson; (2) often children do not work productively in their seating groups; and (3) teachers have little training or confidence in establishing and supporting group work within their classrooms. These themes were recognized in the UK over 30 years

ago (e.g., Galton et al. 1980) and were similarly recognized in other countries (for example, in the US—Peterson et al. 1985). The themes appear to persist over time—this was confirmed when Galton and colleagues undertook a repetition of their 1980 study 20 years later (Galton et al. 1999) and found few differences in the classroom settings observed.

In both of Galton's studies, and in line with what we saw in Chap. 1, classroom groups typically included: large groups, such as the whole class or half of a class assigned to undertake a single activity; small groups, usually 4 to 6 children, seated around a classroom table; and pairs or triads, sometimes sharing a table with other pairs. Additionally, pupils were also found working as individuals, sometimes working in their own 'space' but more often sharing table space with other individuals. It was often observed that several different sizes of pupil groups could be found in a classroom at any time (similar to the map in Chap. 1). In this connection, Galton et al. (1980) identified a key social pedagogic concern that will be considered throughout this chapter: While over 80 % of children's classroom time is spent seated in a small group, in only 5 % of this time were groups asked to undertake a co-operative or collaborative learning task! Galton et al. (1980) further found that approximately 85 % of children's learning activities were assigned to the individual child—another instance of classroom seating contrasting with ongoing learning practices.

From Galton's study (as well as others, for example, Blatchford et al. 1999), we are also made aware that different group sizes tend to be associated with distinct phases of a lesson. Classroom lessons are often typified as taking place in three phases. Large groups or the whole class are brought together by the teacher at the beginning of a lesson to introduce lessons, draw children's knowledge together and for general instruction. The central 'work' aspect of a lesson often involves children seated or working individually in smaller groups. The final part of the lesson often involves whole class recap and revision. If there are more than three phases to a lesson, this is usually because the teacher has called the whole class together during the work phase to keep the class on track or to reorient the class into a new work direction. As we will see, simple descriptions of lesson phases do not do justice to our social pedagogic understanding of the complexity of grouping and learning in primary school classes.

Naturalistic studies have found that all types of learning tasks previously described in Chap. 1 (incremental/cognitive, enrichment, restructuring and practice) can be identified in primary school classrooms (Bennett et al. 1984; Galton et al. 1980; Mortimore et al. 1988; and Tizard et al. 1988). Yet, children are most likely to be found seated at relatively small tables and in small groups. This finding indicates that teachers may not have considered a pedagogic relationship between group size and learning task within their classrooms. A predominance of small group seating may hinder children's approach to a number of learning tasks, especially practice tasks where talk amongst children seated in small groups may distract them (Kutnick and Jackson 1996). Another concern connects group size and distribution of furniture in the classroom. Dreeben (1984) found that children's reading groups were not composed in relation to pupils' reading task, but by the number of tables and children found in the classroom. If there were twenty-five children in a class and five

tables, teachers simply seated five children around each table. Hastings and Chantry (2002) also observed that teachers tend not to move tables around in their classroom and, therefore, offer little opportunity to accommodate individual, paired, small or large group seating for diverse learning tasks—the same small group of four or five children may be asked to undertake an enrichment/co-operative task and later the same children seated in the same positions may be asked to undertake an individual practice task. Other studies such as Ireson and Hallam (2001) noted that seating in small groups is often associated with differentiation of pupils by attainment; that is, children are often seated with others of a similar level of attainment which may or may not help their approach to learning tasks. This is discussed more fully later in this chapter.

Taking this lack of pedagogic connection between group size and learning task into account, it may not be surprising to find that many children and teachers do not like being seated in or working in groups (Cowie and Rudduck 1988). Children can feel insecure when told to work in groups (Galton 1990). Pupils who feel threatened by the presence of peers often respond by withdrawing from participation in their groups or relying on the teacher to give legitimacy to their behaviours within groups. Similarly, many teachers do not like group work because they are concerned about loss of classroom control from increased talk and the potential for disruption and off-task behaviour by pupils. Teachers appear to be very conscious of how their colleagues may feel about these 'weaknesses' in their teaching (Cowie and Rudduck 1988). Teachers have further expressed the view that pupils, particularly boys, will misbehave during group work and that discussion within group work may cause conflict between pupils (Cowie 1994). Teachers have a belief that some children are not able to learn from one another (Lewis and Cowie 1993). According to Lou et al. (1996), some teachers feel that only the more academically are able to profit from group work unless teachers take the time and precautions to overcome challenges of status hierarchies and lack of children's support for group work in the classroom (Cowie and Rudduck 1990; Cohen and Intilli 1981). Group work has been seen to be very time consuming and it is difficult to change individually-based assessment to group-based assessment (Plummer and Dudley 1993).

When teachers were specifically asked whether they had been trained to make use of the various pupil groupings in their classroom, Blatchford et al. (1999) found that exactly one-half of teachers questioned said they had received training regarding group working, and this was mainly in their initial teacher training courses. Importantly, less than a third of teachers actually provided any group work training for their pupils. When children are assigned to work as groups they are unlikely to be provided any training for group work even though group assignments regularly involve simple sharing of resources and low quality talk (Bennett and Dunne 1992). Similarly, Galton and Williamson's study (1992) noted that little attention was given to setting up groups, guiding group planning or generally enabling children to function as a group within the classroom. Rather, pupils were assigned to groups with an emphasis on the task outcome rather than on the processes whereby the outcome could be achieved. And teachers themselves reported problems that included concern about the selection and design of effective

tasks and task structures that support or legitimize group interaction (Bennett and Dunne 1992). Results from the first phase of naturalistic studies therefore sharply contrast with the relative success of experimental studies concerning group work, reviewed above. This phase identified problems in the effective use of groups which stem from lack of coordination between the size of groupings, their composition, pedagogic purpose of learning task and interactions among group members.

As a result of the above studies, we have identified five core dimensions that are fundamental to our view of a social pedagogy for effective learning in the classroom. The core dimensions are: the size and number of groupings in the class; the working arrangement between grouping members; adult support of groupings; grouping composition; and the curriculum area and task type undertaken by the grouping. These dimensions will provide the basis for our discussion of the more focused phase one naturalistic studies.

Size and Number of Groupings in Classrooms

We have already seen that a variety of group sizes may be found in classrooms and that many of these group sizes may be evident in one class at the same time. The sizes include: individuals, pairs, small and large groups and whole class. The presence of these groups does not mean that teachers effectively co-ordinate their teaching and learning tasks with them. Phase one studies show a number of problems associated with a simplistic use of small groups. When new cognitive knowledge and skills is introduced into the classroom, children have been found in a variety of group sizes (Bennett et al. 1984; Galton et al. 1999) and it was most likely that the teacher was the person who introduced and controlled discussion with regard to this new knowledge and skills, thereby limiting the use and effects of peer discussion. Further, if children need to share and co-develop perspectives to enhance their cognitive understanding, they must be able to use exploratory talk (Mercer 2000) and elaborating and support skills (Webb 1989), yet these skills do not appear to be common among primary school children and there is little evidence that pupils have been trained to enhance the use of these skills. Thus, from phase one studies our knowledge of the number of groupings and their sizes in any classroom carries few implications for effective learning activity, and the role of adults as scaffolders and directors of pupil learning has to be more fully considered. An analysis of grouping size and number is also important in relation to the working arrangements of the group and the task that is undertaken (as identified in Table 1.1).

Types of Working Arrangements

Phase one studies identified that learning tasks take place within social and interactive contexts (Bennett and Dunne 1992; Galton and Williamson 1992; Kutnick and Rogers 1994). Sebba et al. (1995) have described social and interactive contexts in classrooms thus:

1. individualized work: where children work on unique individual tasks designed for their specific needs;
2. individuated work: where children are assigned the same task but are expected to work alone;
3. individuated work with talk: where children are assigned the same task, are expected to do the work alone but are allowed to talk about the task with others;
4. peer interactive work: where children either work on separate sub-components of one task or work together on a single task with a shared goal and are expected to talk and interact within their group; and
5. work with a teacher either as a whole class or as a group.

These interactive contexts help provide insight into processes previously hidden within the 'black box' of classroom interactive contexts for learning such as teacher-child and child-peer scaffolding (Doise and Mugny 1984; Forman and Cazden 1985; Rogoff 1990; Topping 1994; Wood 1998). There are, of course, settings where group work is *not* the most productive setting for learning. Individual work, for example, is more productive than group work in situations where children have already attained cognitive knowledge and need time to practice without distraction (Kutnick and Jackson 1996), allowing children time to reflect on ideas and knowledge (Howe et al. 2000). It might also be noted that a few large groups in a classroom may allow for more control of behaviour and attention as well as enabling the targeting of guidance and support by the teacher (Merritt 1994) where the predominant role of teacher presence appears to maintain the children's focus on the learning task. Equally, classroom management may be difficult when a large number of small groups are working at the same time, particularly when children have difficulties working together on tasks (Bennett et al. 1984). If they are unable to demonstrate autonomous working skills, children will constantly demand the attention of their teachers. These naturalistic studies therefore indicate that within classrooms a number of features may inhibit learning interactions from taking place in the classroom and some strategic control may be required.

Adult Support of Groupings

Much of the experimental cognitive/socio-cognitive literature focuses on the interaction of peers (with no adult or expert) while the socio-cultural literature often draws upon the Vygotskian notion of the 'Zone of Proximal Development' where an expert (usually the teacher) is essential for guidance, scaffolding, instruction and support for learning. Application of either socio-cognitive or socio-cultural approaches will still require a teacher to prepare the classroom groups, interactions and tasks for effective learning. But the types of group used within the classroom may or may not require an adult to be a participant in the group's interactions. The presence of the teacher with a group will affect interactions between children: the teacher may be highly directive as in an expert-novice relationship; reactive, only providing information when asked; or supportive, reinforcing positive elements of group interaction and helping to identify where group interaction is not positive. There may be a

number of beneficial effects of an adult 'scaffolding' learning when interacting with an individual or small group (Tharp and Gallimore 1988; Wood and Wood 1996). Effective scaffolding, though, requires intensive interaction between the expert and novice—and a whole class context may not be the ideal setting for this interaction. Undertaking a learning task in a large group may mean that the engagement and participation of all children will be difficult.

In a similar vein, research by Galton and colleagues found that teachers spend most of their time interacting with children, although each pupil (on average) received no more than ten minutes of focused teacher attention and support per day (Galton et al. 1980, 1999). Despite the crucial role of teachers in relation to groupings used in classrooms, there is little research that has explored how teachers can support groupings of different sizes and compositions and in relation to different curricula and tasks and across different year groups.

Group Composition

We emphasize that the grouping of children within the classroom is a much more serious matter than simple assignment to a seating place. An important consideration should be how each group is composed. Composition of pupil groups is often dominated by the attainment level of the children, with a clear preference for organizing groups around a single attainment level, i.e., homogeneous attainment grouping. While attainment may be a convenient method for group composition, there is disagreement over whether it promotes or inhibits children's learning. In the socio-cognitive literature, peer interaction should support cognitive conflict and this requires a difference in perspective among group members most likely to be found in mixed ability grouping (Doise and Mugny 1984; Perret-Clermont 1980). Peer tutoring requires a difference in ability (Rogoff 1990; Topping 2005), and is thus a particular form of mixed ability grouping. Webb's (1989) research on peer helping suggests that homogeneous attainment groups are most likely to be effective for mid-attaining children only. High- and low-attaining groups often have problems interacting and sharing information. Webb recommends that mixed ability grouping be used in classrooms which bands high- and mid-attaining pupils and mid- and low-attaining pupils together. However, this evidence based preference for the mixing of attainment levels within pupil groups is contradicted by many government recommendations for homogeneous attainment groups (for example, OFSTED 1998; DfES 2006). These recommendations appear to be based on focused curriculum learning for each attainment level while neglecting the fact that the lowest attaining children may, as a result, receive the least teacher attention/support while the high-attainers will receive a very high proportion of teacher attention (Hallam and Toutounji 1996). Further, advocates of co-operative learning (for example, Slavin 1995) also recommend heterogeneous groups in order to allow all class members an opportunity to achieve interdependently. These heterogeneous co-operative learning groups, according to Cohen and Lotan (1995), help to overcome status hierarchies and promote social inclusion in the classroom. Thus, the grouping by attainment that

characterizes many phase one studies contrasts sharply with the experimental studies that were taking place at the same time.

With regard to the composition of pupil groups, we have already mentioned that positive relationships are important. A number of researchers have noted that friendship groups may provide for relational security and support for cognitive enhancement (MacDonald et al. 2002; Zajac and Hartup 1997) that fulfils this positive relationship requirement. A cognitive rationale for grouping by friendship contrasts with a social psychological perspective. Social psychological studies, in particular, note that friendships are often stereotypical in that they can be gender and attainment dominated (Kutnick and Kington 2005). And, while certain high performing friends may provide a good argument for a positive relationship between friendship and academic performance, there is evidence that friendship pairings among low academic performers (especially boys) can hinder their cognitive development (Webb 1989).

Curriculum Area and Task Type

Classroom studies have also noted differences in learning activity that are, in part, explained by curriculum area. Researchers have found that particular curriculum/subject cultures are associated with different teaching and learning practices (Goodson and Managan 1995) and these practices may conflict with grouping arrangements associated with effective learning (Bossert et al. 1985; Doyle 1986; Galton and Williamson 1992). Certain subjects (e.g., literature studies) require children to discuss topics among themselves, but this is unlikely to happen if children are seated individually. In mathematics with young children, much time is spent on 'drill and practice' learning tasks, which is best supported by individual seating, yet children are often seated at a table with other children and this is likely to lead to off-task conversation (Kutnick and Jackson 1996). Science in primary schools often requires the use of equipment for experiments, but there is rarely enough equipment provided for every child. Children are often grouped to share the equipment and this grouping can, potentially, allow for cognitive-based dialogue (Eggleston et al. 1976) although this dialogue will only take place if learning tasks are not individuated.

Summary of Phase 1 Studies and Some Concerns

Thinking of groups in classrooms in a social pedagogic manner indicates a range of complex interactions between the groups, their interaction and tasks. As described in Chap. 1, many sizes and forms of pupil grouping in the classroom may be asked to undertake learning tasks that include practice and revision, extension of previous knowledge, applications of previous knowledge and new cognitive knowledge. We are concerned that the potential for learning may be inhibited as well as promoted by the current use of pupil groups in many classrooms. Further, the structuring of group learning tasks requires that teachers pay attention to a complex range of seating and grouping compositions within the classroom. With regard to interaction, groups

must have the ability to work autonomously from the teacher. Autonomy within the group and from the teacher requires that children can work without immediate teacher attention and that pupils within these groups demonstrate further interactional skills such as trust and support that are often lacking in classroom groups (Galton 1990). Group members will need skills to engage in productive dialogue, not simply disputational and cumulative classroom talk (Mercer and Littleton 2007). Children must be able to promote and seek help (Webb and Mastergeorge 2003), use consensus when discussing a topic (Howe and Tolmie 2003), and draw upon questioning skills (Rojas-Drummond and Mercer 2003) and argumentation skills (Schwarz 2003). It is a concern in this review of phase one studies that an effective social pedagogy of groups in classrooms has not been demonstrated in the studies described. In fact, while there is ample evidence of the existence of small group seating there is little use of groups for effective learning.

2.3.2.2 Second Phase of Naturalistic Classroom Studies

The second phase of naturalistic studies provides a much clearer understanding of the bases for success and failure of group work and learning in the classroom. Within this phase, studies provide greater focus on the social pedagogic relationships between pupil groups (their size and composition), learning tasks, supportive interactions with peers and teachers, and whether pupils have received training for effective group working. This section also provides the reader with a description of classroom grouping in UK classrooms.

Much of the research described in this phase draws upon the 'mapping' of classrooms introduced in Chap. 1. This was specifically developed for classroom research by the authors as it obtains valuable information at classroom level that captures ongoing actions, interactions and contexts in authentic classrooms. As described in Chap. 1, mapping allows insights to be gained from the whole class rather than particular groups (or sole focus on the teacher). Mapping was designed to bring together the strengths of a large-scale survey and an intensive observational approach. Classroom mapping allows researchers to identify both number and types of classroom learning actions while generating a depth of finding that avoids simplistic oppositions such as sex or attainment differences; and allows us to see how multiple actions in the classroom take place at the same time as suggested by Doyle (1986).

The following section combines results from five studies undertaken by the authors in over 700 classrooms during the last decade. Classrooms were mapped and observed in pre-schools, primary schools (covering early and later years in primary schools) and secondary schools (covering the early years of secondary schools) throughout England. The classrooms were selected as representative of the various types of learning and social pedagogic relationships. Our approach provides a developmental picture of the social pedagogy of classroom groupings from pre-school through the start of secondary school (see Baines et al. 2003; Blatchford et al. 2001; Kutnick et al. 2002, 2005, 2006, for fuller analyses).

The Attainment Context Within the Classroom

In this section we consider how grouping by attainment may set a social pedagogic background for learning in classrooms. Attainment, as previously noted, has been one of the most frequently used criteria for the grouping of children—either at the whole class level or within small groups (Ireson and Hallam 2001). At the whole class level, attainment grouping is described in the UK as 'setting' (by a particular school subject) or 'streaming' (placement in an attainment group for all subjects). Within class attainment grouping may take place formally when teachers assign children of a similar attainment level to sit and work together in groups or informally when children choose to sit or work with others who are at a similar level of attainment. As one might expect, the role of attainment grouping becomes more important in classroom management and seating as children get older, as is seen in the extensive use of setting and banding by year group (Kutnick et al. 2005). While in the early years of primary school, children may sit and work in mixed attainment groups, as they become older and move to the oldest age groups in their primary schools it is likely in the UK that some form of grouping based on attainment will be used in the core curriculum subjects (especially mathematics and English). Yet in contrast to current practice (and Government policy), there is little solid evidence to support placement of children in classroom groups based on attainment in preference to mixed attainment groups. Studies consistently show that children perform equally well in attainment-based or mixed attainment classes (Baines 2012; Hallam et al. 2004; Ireson et al. 2002; Ireson and Hallam 2001; Kutnick et al. 2006).

In our studies, all school children aged 4–5 (in reception classes) and the vast majority of Year 2 and 5[1] classes were composed of a mixture of attainment. No classes in the primary schools were streamed and only a quarter of classes experienced any form of 'setting'. Where setting took place, it was most likely to be in classes of older primary school aged children. As many as 44 % of the oldest classes in the primary school were set for mathematics or English. Thus, younger children were likely to be in classrooms that mixed all attainment levels while older children spent much of their classroom time in core subjects with children of a similar attainment level.

Group Size and Number, and Classroom Seating and Working Arrangements

While our studies found a range of group sizes in all classes observed, there were certain general points that we can draw upon that tell us about how groups are used in classroom. The average number of groups in classes increased with pupil age, particularly through primary school. The number of groups in any class is important when considering learning contexts for a number of reasons. The fewer the number of groups in a class, the larger each group will be. In the early years of primary school,

[1] Year levels in English primary schools include: Reception (children aged 4–5 years old); Year 1 (children aged 5–6); Year 2 (children aged 6–7); Year 3 (children aged 7–8); Year 4 (children aged 8–9); Year 5 (children aged 9–10) and Year 6 (children aged 10–11). For ease of reporting, we will refer to Year level through this and successive chapters.

pupils tended to be seated in whole class and large groups. Large groups encourage dependence on the teacher for direction and support and also make it difficult for every child to participate. Thus, large groups of children are associated with fewer groups per class and more time for the teacher to focus on each group.

Two predominant seating arrangements (Kutnick et al. 2006) characterized the youngest (reception) classes. When children worked with their teacher, they were likely to be observed in large mixed (gender and attainment) groups of 6 or more children. Children, though, were likely to spend more of their learning time when the teacher was not present in their groups—and these learning groups were likely to be pairs of children who were the same sex and friends[2]. On average, though, and when compared to types and size of groups found in the older primary and secondary school years, the youngest pupils were most likely to be observed in large groups.

Small groups usually consisted of between 4 and 6 children seated around a table, and this was the predominant seating/working practice found in the middle and later years of the primary school (Years 2 and 5) as well as the early years of secondary school. Small groups accounted for approximately 60 % of the observations made in these classes. Most of these small groups would have to work without a teacher present because with many small groups in a class, the teacher would only be in a position to work with one group at a time; thus most of these older children will therefore have more opportunity for peer-interactive learning as the teacher will be working with other groups. There were some further differences between early and later years of the primary school with regard to the use of other group sizes. In about one-third of our observations, Year 2 children were seated in large groups of 7 to 10 children and in Year 5 approximately 15 % of observations found children seated in traditional rows. It was also interesting to find that within secondary schools pupils were most likely to be observed seated in rows; this seating arrangement centred pupil's visual focus on the front of the classroom but allowed children to work with pupils they sat next to.

By way of summarizing this section on characteristic seating pattern, group size and potential working arrangements in primary and early secondary school classrooms, we make the following points:

1. There are differences between early years, mid- and later-primary years and secondary years in their seating arrangements;
2. There appear to be similarities between reception classes and secondary school classes, in that the predominant seating arrangements appeared to be whole class (seating together in the reception class and in rows in secondary school classes) and pairs (when not working with the teacher);
3. The middle and later years within the primary school appeared to be dominated by small group seating.
4. Each of these seating arrangements will have different pedagogic 'potential' in that the dynamics of interaction between pupils themselves and between pupils

[2] We also note that children spend proportions of their time as a whole class (storytime) and some children worked as individuals. The small, teacher-oriented group and paired peer-oriented group were most characteristic of classroom learning time.

with teachers. The dynamics will also differ with respect to whether learning task that the pupils are asked to undertake can be done autonomously—with or without the presence of a teacher and whether pupils have the skills to work without a teacher present.

Working Interactions Within Groupings

The types of working interactions within groups that were set up and encouraged by teachers varied with the age of the pupils. In reception classes children undertook teacher assigned learning tasks in pairs or teacher-led larger groups. In either of these groups children were free to talk with one another and exchange information. On the other hand, in neither of these groups did teachers specifically ask the pupils to interact or discuss the learning task with their peers. The main organized interaction in each of the groups was talk in response to the teacher—and this teacher-focused talk characterized learning tasks associated with cognitive/incremental development and practice. Within the primary school generally, most of the learning tasks assigned by the teacher were not focused on the group although most children were seated in small groups. Assigned work tended to be individuated, that is, all children in the group undertook the same task but were asked to undertake this task as an individual. Another interactive setting characteristic of the primary school was the whole class wherein the teacher would lead class discussion by raising a question and allowing one child to respond at a time. Peer interactive work such as co-operative or collaborative discussion was observed infrequently—a similar finding to phase one studies by Galton and colleagues. There were few instances of individualized work where each child was assigned a unique task identified for that child's learning profile. By comparison, within secondary school classrooms, pupils were likely to experience higher levels of peer interactive work when compared to primary classrooms. This interactive increase may be associated with an increased potential for sharing of knowledge among pupils. At a general level, secondary school pupils appeared to be more active participants in their work than primary school children.

Number of Adults in Classes and Adult Role in Relation to Groupings

While it may seem logical to assume that every primary classroom would not be complete without an adult, phase two observations qualify this assumption by noting that teachers may or may not interact with pupils and that it is very likely in the UK that a teaching assistant will also be present in the classroom. The assumption that we will find more adults in the classrooms of young pupils, when compared to older pupils, generally holds true. In our observations, reception classes had more than 2 adults present in the class while there were likely to be two adults in other primary school classrooms and only one adult in secondary school classes. Generally, the role of adults changed with pupil age and, correspondingly, with the number and size of pupil groups in the classroom. In the lower years of the primary school (reception through Year 2), adults were able to work with at least half of

the children in the classroom at any one time; this was mainly due to the large group sizes and lower level of children with special educational needs (SEN) having been identified in the classroom[3]. In the later years of the primary school and early years of the secondary school, any adult other than the teacher in the classroom was likely to be a teaching assistant—and this was associated with a different approach to the support of children's groups than found in the early primary school years. In upper primary and secondary years, teachers were only able to work with about one-third of the groups, as there were more and smaller groups. Teaching assistants were commonly used to support pupils with SEN and lower attaining pupils, and at primary level this was usually in small groups in their classes. These groups tended to be separated from the teacher and there was evidence that teaching assistants tended to dominate the pupils' learning and stressed task completion rather than pupil understanding (Blatchford et al. 2012). With regard to the teacher's role in both primary and secondary schools, we consistently found teacher presence to be associated with the introduction of new knowledge and skills; that is, teachers were directing new cognitive/incremental understanding for their pupils and not encouraging children to develop their understanding within their groups. Teachers were rarely found observing their pupils or responding to children's concerns. And, as previously suggested, associated with the increased number of small groups observed in the older classrooms was the finding that teachers were less likely to work with each of the groups in the classroom; that is, if there were six groups found in a Year 4 classroom, the teacher could only be found working with one group and the other five groups had to work autonomously—without a teacher.

Grouping Composition

Group composition varied across the Years in primary and secondary school and pedagogic context. As the size of a group increased there was a greater likelihood that it would be more representative of a cross-section of the class and therefore became more heterogeneous. As we have identified, the larger groups were most likely to be found working with a teacher. Hence, in reception classes, large groups working with a teacher were likely to be composed of an inclusive mixture of boys and girls, children who were friends and non-friends, and children mixed by attainment and ethnically. The alternative small, peer-oriented groups, found in reception classes when not working with the teacher, were virtually the opposite in composition to teacher-oriented groups. Pairs were mainly exclusive and defined by single-sex, friends and the same attainment level. The pedagogic worlds of the reception class could be described as socially inclusive when working with a teacher and socially exclusive with working with peers—and there are implications that may be derived

[3] Once pupils were identified with special educational needs, there was an increased likelihood that a teaching assistant would be assigned to the child. That adult's role would, most likely, be focused on the SEN child only or the group in which the SEN child was working (see Blatchford et al. 2012).

from this finding with regard to the display of gender differences in learning in the later years of primary and secondary schools.

In the older primary and secondary school classes, the smaller groups found within the classrooms were most often composed with regard to the level of attainment—with a greater likelihood that small groups were of a similar (homogeneous) level rather than a mixture of levels. Even though most primary school classes were not set by attainment (see previous discussion of attainment within the classroom), it might be said that much of the pupil's learning experience was undertaken in exclusive small homogeneous attainment-based groups; and these groups may be found from reception classes (Kutnick et al. 2006) through to the oldest years in primary schools. Teachers will therefore need to be aware that the majority of their children's learning activity is likely to take place in this homogeneous context which separates children by sex and attainment and may affect pupils' identities as learners (Kutnick et al. 2005).

Learning Task Type

Within the Phase one studies, we noted that there are a variety of learning tasks that have been observed in classrooms. These tasks included: incremental/cognitive, enrichment, restructuring and practice (from Norman 1978; Edwards 1994). With age, subtle differences in the types of task assigned to pupils became evident. Practice and revision tasks were the most common task found in reception classes and the early years of the primary school—although there was some new knowledge and skills in each of these Year levels. By the later years of the primary school, learning tasks focused predominantly on new cognitive/incremental knowledge and the application/enrichment of existing knowledge to new areas of thinking, with practice and revision tasks still evident. Tasks that typified the secondary classrooms were predominantly enrichment/application of existing knowledge, with a smaller proportion of cognitive/incremental knowledge and low levels of practice/revision. Thus, with age, children's groups were likely to be assigned tasks that evolved from practice through new cognitive/incremental learning and then enrichment/application of existing knowledge to new areas—with less time given to practice and revision. While primary and secondary schools are often perceived as being responsible for the introduction of new cognitive/incremental knowledge, this type of learning task was most characteristic of the middle years of the primary school—although this type of task was found to a lesser extent at all age levels. Thus, as children progressed through their schooling, our studies show that they were likely to find themselves in smaller groups and likely to undertake cognitively-based new knowledge and application tasks.

Learning Task Type in Relation to Grouping Size

In primary schools, most learning tasks were conducted in the predominant seating position of small groups. In contrast to the relationship between group size and learning task previously identified (see Table 1.1, Chap. 1), there appeared to be no

clear pedagogic or social pedagogic relationship between group size and learning task in the classrooms that we observed. We did find there was an interaction between group size and task, with large groups in the reception level likely to be engaged on tasks involving the introduction of new cognitive information with the presence of a teacher. In the middle years of the primary school, dyads/pairs of pupils were likely to work on enrichment/application of skills tasks. And, throughout all year levels in the primary school, very large groupings/whole class were observed to be undertaking new cognitive knowledge under the guidance/scaffolding of the teacher.

The findings with regard to secondary school groupings and learning tasks showed some relationships between task type and grouping size. Still, these relationships were not as clear or as consistent as one might expect when compared to Table 1.1. Large groupings/whole classes were most likely to be observed undertaking the introduction of new cognitive knowledge tasks led by the teacher. Application of existing knowledge tasks was mainly related to commonly found dyads and small groups. Practice and revision tasks were most often conducted in dyads or very large groupings/whole class.

Overall, therefore, there was a disappointing and arbitrary relationship between group size and learning task in our observations. We can speculate that a large group or whole class actually allows inclusion for all pupils to engage in new cognitive knowledge/skills tasks, especially when directed by a teacher. But it may be naïve to expect that large groups will involve all pupils in a learning activity, as children have to compete with one another to gain the teacher's attention. On the other hand, the small groups/dyads that have been found to be important for dialogue and comparison of perspectives in experimental studies might provide a better context for new knowledge. Our observations, though, found that small groups and dyads were rarely used for cognitive/incremental tasks. We also found that practice and revision tasks were undertaken in a large group/whole class groups when experimental studies have shown this context to be less productive than individuating the learning task and learning interaction. Large group/whole class settings for practice tasks may allow social distraction to disturb this reinforcement of existing understanding.

Interaction Type and Curriculum Area

Observations relating curriculum area and assigned interaction within groups were similar in the later primary years and secondary schools. Different core curriculum subjects (English, mathematics and science) maintained distinct pedagogic 'styles'. Science was the main curriculum area where pupils were asked to work together in groups, although there was little or no evidence that this group work was planned to encourage co-operation or collaboration through pupil discussion. The subject most inclined towards individuated work was mathematics. Children in primary and secondary schools were rarely encouraged to discuss the topic of their lesson among themselves and were highly directed when discussing mathematics with their teachers. English, at the primary school level, rarely involved children working together but was increasingly likely to involve peer interaction via classroom discussion in

secondary schools. We can speculate that the relative lack of pupil collaboration or co-operation within each of the core curriculum subjects is probably associated with the teacher's dominant presence when new cognitive knowledge and skills were introduced. Teacher domination of new cognitive activity allowed only limited time for pupils to share perspectives and challenge one another cognitively. Similarly, even when a relatively large number of practice tasks were initiated across subjects, the teacher still dominated these learning tasks.

2.3.2.3 Some General Conclusions from Phase 2 Naturalistic Classroom Studies: Findings from Classroom Mapping

Having conducted maps of over 700 classrooms from the reception level through the first half of secondary schools, we have identified certain consistent patterns of activity that may promote or inhibit learning processes in the classroom. The mapping method used has allowed a social pedagogical analysis of how the social context of the classroom may be linked to learning/pedagogic processes.

There are several worrying conclusions that may be drawn from these naturalistic studies. Considering that most children, no matter what their age, were observed to be seated or working in pairs, small or larger groups, we feel that the social pedagogic potential for learning in classroom groups has been overlooked by many teachers—especially as pupils in these groups were rarely asked to discuss topics or work collaboratively with one another. There was little relationship between the size of groups and the learning tasks/interaction assigned. Especially when new knowledge and skills were being introduced in the classroom, teachers appeared to dominate the learning activity; they rarely offered opportunities for pupils to co-construct and further develop their own new knowledge. Also, within the predominant paired and small group contexts in which children were assigned to undertake their learning tasks, there was a strong possibility that these grouping contexts were socially exclusive rather than inclusive—as the composition of these groupings was dominated by homogeneous, same-sex friendships and similar attainment level. Teachers, and other adults in the classroom, often worked with individuals—even within a whole class context. These adults left most of the small groups to work autonomously from teacher or adult support; yet less than one-quarter of the teachers who completed maps stated that they had introduced any training for their children in skills for effective group work or the ability to work autonomously from the teacher. We expand these concerns in further sections that focus on classroom pedagogy, social pedagogy and the role of the teacher below.

On the basis of the findings reported above, especially the findings from the phase two studies, we identify three concerns regarding the ways in which children are grouped in their classrooms to undertake learning tasks:

1. *Pedagogy in the classroom*: Few previous studies have explored assigned tasks, patterns of interaction, the placement of the teacher and the role of children's groups in the promotion of classroom learning in schools. Our research has confirmed that lessons tend to be presented in three phases and that lesson phases

have implications for pupil grouping size and teacher intention for the use of groupings. Classroom learning tasks varied by age of child, with young children most likely to be assigned practice tasks, other primary pupils assigned new knowledge and skills and older/secondary school pupils assigned application and extension tasks. Seating and interaction patterns did not consistently relate to the learning tasks assigned to pupil groupings. Planning for purposeful interaction within classroom groups to draw upon discussion, co-operative and collaborative skills did not appear to exist.

2. *Social pedagogy*: The identification of seating pattern, learning task, group composition and interactions in the classrooms allowed consideration of the social contexts likely to promote or hinder classroom learning and achievement. We argue that current patterns of seating and learning task assignment do not promote effective classroom learning. Pupils were given few opportunities for interactive tasks where they could work autonomously from the teacher, yet only a few pupils could gain the attention of the teacher when they undertook their learning tasks. Teacher domination of new cognitive knowledge in large groups may not allow all children in a class to participate—nor does it not allow intensive cognitive and communicative interaction between pupils. Practice and revision tasks were least likely to take place in an individual setting as children were rarely seated as individuals and this seating in groups may encourage conversation to wander off-task. Teachers rarely provided support or training for group working skills. And, lack of training for group work meant that most of children's learning experiences were undertaken in small groups whose composition was dominated by socially exclusive/homogeneous aspects of gender, attainment and friendship.
3. *The role of the teacher and 'control' of classroom knowledge:* Phase 2 studies showed that teachers were central to setting learning tasks, patterns of interaction and composition of the groupings. Yet teachers rarely introduced practices that supported or encouraged collaborative group working. Constant teacher presence during cognitive tasks, in particular, suggests that teachers have control of knowledge. While teacher presence during cognitive tasks may represent one version of the 'zone of proximal development' or scaffolding, it would be difficult to establish and maintain this relationship within a classroom of 25+ pupils and concerns have been expressed as to which pupils teachers are most likely to focus their attention upon (Younger et al. 1999). From a different perspective, high levels of teacher presence during cognitive tasks would appear to militate against pupils mutually developing new knowledge with their peers—and this is at the root of co-operative and collaborative learning practices likely to support children's cognitive development.

2.4 Chapter Summary

We have seen in Chap. 2 that there is now a large research literature indicating that co-operative and collaborative group work has the potential for positive effects on pupils' academic and other outcomes. While co-operative and collaborative studies

provide a sound theoretical basis for the assumption that various types of children's interactions can be structured into primary school classrooms with the intention of promoting cognitive understanding and school achievement, there are few large-scale or rigorous studies that show that this experimentally-based approach can positively effect all children in the classroom. Moreover, the positive picture generated by experimental studies contrasts with accounts of the use of groups in the UK and other countries which have consistently shown that little group work takes place and still less is of good quality. We also noted in this chapter that our programme of descriptive research on grouping practices in UK primary and secondary school classrooms has provided insights into why group work is rare and ineffectively used in schools. A main finding was that groupings in classrooms are not often formed on the basis of a strategic educational view of their purpose, and teachers showed little awareness of the social pedagogic potential of various grouping arrangements. Little attention was paid, for example, to group size or composition when approaching tasks as diverse as cognitive problem solving or repetitive practice, and there was little support for pupil-pupil interactions within groups. Teachers' grouping practices were, to a large extent, an adaptation to the demands of maintaining pupil attention and classroom control. Overall, teachers had little faith in pupils' ability to work in groups. All these endemic problems have to be overcome if effective group work is to take place in classrooms. In the next chapter we describe a programme—the SPRinG project—which was designed to help teachers create the conditions for high quality group work.

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Chapter 3
The SPRinG Project: The Intervention Programme and the Evaluation Methods

3.1 Introduction

Central to our description of the limited use of group work in primary school classrooms is the problem that current notions of 'pedagogy' are inadequate as they have at their heart the teacher-child relation, and are rarely extended to allow for relations involving co-learners or peers. The importance of this extension to include peers is supported by studies, reviewed in Chap. 2, which show that pupils spend greater amounts of their classroom time with their peers than with their teachers; yet teachers typically plan for their own interactions with pupils but not for interactions between pupils. Thus, there is a need for an appreciation of group work as part of a teacher's general approach to classroom organization and learning. And to support such a view we need to revise theories of learning and approaches to pedagogy in order to provide more appreciation of the social pedagogical characteristics of classrooms that can be studied under rigorous and authentic conditions.

As we also identified in Chap. 2 another main reason why group work is rare in British schools is that there are a sizeable number of pupils and teachers who have difficulties working with and within classroom groups, and do not appear to have specific preparation in the use of group work. These problems suggest a need for improved pupil training in group working skills under normal classroom conditions. More importantly, these problems also suggest that little improvement will take place unless researchers work in partnership with teachers so that these concerns are fully taken into account and appropriate ways of dealing with them developed that are applicable to authentic classroom settings. It is the principles of partnership and authenticity that govern the approach to be advanced in this book. And, if this approach is successful and able to be implemented in classrooms, then we would expect the approach would have similar positive effects for group work in all types of primary school—no matter which socio-cultural context characterizes the school.

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Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_3,

3.2 The SPRinG Project

The main impetus for the SPRinG (Social Pedagogic Research into Group work) project was to build on our earlier descriptive research and address in a rigorous and authentic manner the wide gap between the potential of group work to influence learning, motivation and attitudes to learning and relationships, on the one hand, and the limited use of group work in schools, on the other. Overcoming this gap suggested to us that a new approach to conceptualizing group work in classrooms was needed if there was to be any chance of more fully integrating group work into the fabric of the school day, and also provide a more sustained use of group work beyond the life of the actual research project. We therefore embarked on an ambitious and extensive project which sought to develop with teachers a programme of group work that could be successfully integrated into primary and secondary school life, and then evaluate the programme in a systematic way by examining pupil progress over a full school year and in comparison to progress made by pupils in a control group. We were also interested in ascertaining whether the programme (based on the SPRinG approach) could be generalized to other schools and whether effective group working would overcome socio-cultural problems of the location of schools in urban and rural areas, mixed-/single-age classes and different 'relational distances' between children in classrooms.

The nature of the group work encouraged in the SPRinG research may need some explanation before we go much further. By group work we mean pupils working together as a group or team. The teacher may be involved at various stages but the particular feature of group work—perhaps its defining characteristic—is that the balance of ownership and control of the work shifts toward the pupils themselves—although we acknowledge that group work can never exclude the teacher who bears responsibility for planning and supervising learning tasks as well as the grouping of pupils in her/his class. Group work should involve children as co-learners (Zajac and Hartup 1997), not just one pupil helping another. Further, we have an inclusive view of group work—and would include what is sometimes called co-operative and collaborative group work—but see the importance of a relational basis for classroom learning extending beyond these particular approaches. For group work to be effective in the way that we envisage it must be based on rigorous research evidence applicable to all groups within whole classes, where groups may be used for multiple learning purposes and groups may be structured with a variety of methods.

The research and evaluation underlying this and succeeding chapters was funded as part of the Teaching and Learning Research Programme (TLRP), a ground breaking UK Government initiative managed by the Economic and Social Research Council (ESRC[1]), which was designed to develop research capacity and impact of educational research. The SPRinG project was one of the largest empirical projects funded as part of the TLRP. The co-directors of SPRinG were Peter Blatchford, Maurice Galton and

[1] The ESRC is the government-based organization responsible for competitive funding of high quality research in the social sciences and one of the few funding organizations that support research in the field of education.

Peter Kutnick who worked together and designed this project because of their shared belief that it offered a unique opportunity to co-develop a coherent approach to group work for everyday classroom activities, and then test the efficacy of this approach in a systematic way. Approaches and materials were originally developed on three sites, with each site representing a distinct stage in children's schooling: early years of primary school (also known as Key Stage 1(KS1), covering 5–7 years); later years of the primary school (Key Stage 2(KS2), covering 7–11 years); and early secondary school (Key Stage 3(KS3) covering 11–14 years). This book is just concerned with the primary school years, i.e., KS1 and KS2.

Following the onset of the SPRinG project there was a connected extension in Scotland (ScotSPRinG). The co-directors of the Scottish project were Donald Christie, Christine Howe, Allen Thurston, Andrew Tolmie and Keith Topping, all of whom had a good deal of experience in previous research on collaborative and co-operative learning. Thus, in addition to the original SPRinG sites, the TLRP/ESRC also agreed funding for an extension of the research, where our original results could be evaluated for their generalizability to other socio-cultural contexts. The ScotSPRinG extension was able to evaluate generalizability to another country (Scotland) as well as potential differences in the application of SPRinG principles in urban versus rural schools, same-age versus mixed-age classrooms and with regard to school achievement and social relationships (including relational distance).

The key aims of this large scale study and research collaboration were to:

- Develop a programme of group work, with suggested approaches and activities, stressing a relational approach, organizing classroom contexts for learning and ways teachers can support group work;
- Evaluate the programme in a rigorous way, to produce a high standard of evidence on its effectiveness, followed by exploration and evaluation of different applications of group work.

The project was organized in three phases over a three-year period:

1. *A development phase* where the team worked with teachers at each site to develop an approach to group work. The social pedagogical model came out of this year-long phase. This phase also helped to develop the Handbook (see below);
2. *An evaluation phase* for another year (and in some sites over two years); and
3. *An applications phase* where the team developed group work in different kinds of context, e.g., working in schools that are operating in exceptional circumstances.

At the time of writing this book, the SPRinG project represents, as far as we are aware, the largest and most thoroughly researched approach to group working in schools—and here we include schools in England, the rest of the United Kingdom and (to the best of our knowledge) the rest of the world. This chapter will explain to the reader the size of the study (involving nearly 3.000 children in over 100 classrooms), its experimental design, the length of the study and its particular approach. No previous study of group work in classrooms had been undertaken on this scale, incorporating as many measures of evaluation (including school attainment, classroom behavior and motivation), or over such a lengthy period of time. And, as we show in later chapters,

there has been no previous study that has provided such comprehensive and rigorous results that show so many positive effects of group working in everyday classrooms. In addition, we also feel that the actual implementation of the SPRinG programme in classrooms should be described in more than traditional statistical terms, Hence, Chap. 7 provides a qualitative description of implementation, concerns and practices of teachers involved in the programme of research.

3.2.1 The SPRinG Approach: Building on a Social Pedagogy of Classroom Learning

There are a number of ways that teachers can be encouraged and supported in their use of group work. One way is to give them lesson plans that outline and incorporate group work. Apart from being very time consuming to construct, such an approach limits teachers in their freedom to adapt group work for different purposes and contexts. The approach we took was based on Galton and Williamson's (1992) suggestion that teachers need to take 'ownership' of the implementation of group work into their classrooms. We considered the teacher's role in relation to the SPRinG programme in terms of Gage's (1978) seminal definition of pedagogy as both the 'science' and the 'art' of teaching. In other words, researchers can present information based on the best research evidence available (the science), for example, on the importance of key skills for effective group work, such as negotiation (Cowie et al. 1994). But the manner in which these ideas are implemented and developed and the exact way group work is set up will be a matter for teachers to decide since they are the best judges of what works in the specific context in which they practise (the art).

With this approach in mind, the development phase of the initiative was a year-long collaboration between the research team and teachers at each of our three sites. The collaboration involved regular meetings with teachers, activities constructed by the team being tried out and evaluated by teachers and pupils, discussion of emerging principles concerning effective group work, visits to classes to observe and discuss, and continuous feedback on activities and further work to improve the activities. Though the teams made use of some existing materials and classroom strategies much was developed from scratch. In the course of the year, valuable lessons were learned about, for example, group size, group composition, what activities worked well and what strategies needed to be adopted to encourage good working habits in groups. The SPRinG programme used in the evaluation was set out in a 'handbook' for teachers, subsequently amended and published in 2009 (see Baines et al. 2009).

In order to be successful, such a group work intervention programme would need to overcome many of the difficulties that schools, teachers and pupils have with group work (described in the Chap. 1 and 2). The aim of the development phase was therefore to co-develop with teachers a pedagogical approach that accommodated the value of co-learning and the value of—rather than the problems caused by—interactions between pupils. We developed this not so much as an alternative pedagogy but as an extension of the more typical pedagogies expressed predominantly through teacher

instruction and individual work. The basic logic is that teachers need to encourage high quality group work by thinking strategically about setting up the classroom and groups for group work, developing and using group tasks and lessons involving group work, how to help pupils develop their group work skills and how to support pupils during group work. This social pedagogical approach builds on the discussion in Chap. 2 and is organized in terms of four key principles with practices associated with each:

1. *Preparation of the classroom context for group work*
2. *Preparation of lessons and activities involving group work: curriculum and group work activities*
3. *A relational approach to facilitate group working, and*
4. *Involvement of teachers in the support of group work*

We now describe each of these principles in turn, concentrating on the implications for teachers and classroom organization.

3.2.1.1 Preparation of the Classroom Context for Group Work

Our social pedagogic approach rests on the view that group work must be considered in the wider context of the whole classroom. There are 'fixed' factors such as the physical layout of the classroom and class size and more adjustable factors such as seating arrangements and characteristics of groups such as their size and number, their composition and stability. The teacher has a key role in adapting to fixed factors and adjusting the more flexible factors in a strategic way in service of effective group work.

Class Seating Arrangements

There has been a tradition of research that has studied the effect of different seating patterns, typically rows versus tables, on pupil attention (e.g., Axelrod et al. 1979; Bennett and Blundell 1983) but these are short term interventions, involving practice type tasks and do not bear directly on classroom organization in relation to group work. Seating arrangements are important in supporting working arrangements. Flexible use of furniture and seating can make a big difference (Hastings and Chantry 2002), and using the physical layout and space to encourage pupil interaction in different working situations is important. Seating patterns need to be consistent with learning aims, so that when asked to conduct group work children need to be seated around a table, facing each other, rather than the more common practice of allowing them to sit in a row as if they were required to face the teacher.

Group Size

Most research on grouping examines composition rather than size (Webb et al. 1997), although Lou et al.'s (1996) review suggests that size may also be an important

factor for effective learning. There is some evidence that larger class sizes result in larger within-class groups, even though for group work smaller groups are preferable (Baines et al. 2003; Blatchford et al. 1999; Lou et al. 1996). Larger groups of 6–8 pupils may have difficulties functioning independently of adult help and may in reality undertake classroom tasks as smaller working groups, such as pairs. Some likely ways in which groups of different sizes affect classroom learning were described in Chap. 1 (see also Kutnick 1994). But group size, like other classroom contextual features, needs to be considered in relation to classroom processes as a whole. The size of groups will need to be appropriate to the age and experience of pupils, the purpose of group work and the task at hand. There are limitations in research that seek to isolate the benefits of one group size over another. A small collaborative group may be successful when taken in isolation, but unsuccessful from a whole class perspective (it may, for example, be too demanding of teacher time).

The Number of Groups in the Class

One inevitable consequence of organizing classrooms into smaller groups is that it will result in more groups in the class, and this can place heavy demands on the teacher. In a class of 32, a decision to use groups with four children in each would mean the teacher having to plan for and monitor eight groups. It might be tempting for a teacher to seek to maintain a smaller number of large groups, but these may result in pupil passivity, squabbling or 'free-riding' and may ultimately result in negative feelings towards group work. If the number of groups poses a particular problem, the teacher can think about working in ways that allow only a few groups to work at one time while the remainder of the class work individually. As seen in Baines et al. (2003), by the end of primary schooling and on into secondary school, a class may work well in pairs and here the challenge will be to provide them with skills to work autonomously from the teacher as well as setting them tasks at an appropriate degree of challenge that does not require constant teacher presence.

Group Stability

As far as we are aware, this feature of groups has not been researched. Lack of research probably reflects a focus on short-term interventions (as in much research on co-operative group work) rather than an interest in group functioning over time. The stability of groups over time has emerged in our work as a crucial aspect of successful group work, particularly at primary school level, where children tend to stay together as a class for the whole year and for all subjects. There are many things to consider when deciding on the relative merits of changing groups vs. maintaining stable groups. Much will depend on the characteristics of the children, the success of the work the groups engage in, the dynamics of the class, the willingness of the children to work with assigned work partners as well as close friends, and so on. However, we would suggest that that it is advantageous, where possible, in maintaining stable

groups—especially when these groups have received/developed a range of group working skills that can be employed in their interactions. It is widely assumed that groups go through stages in their development and functioning. One well-known sequence is 'forming', 'storming', 'norming' and 'performing' (Tuckmann 1965). These are rather idealized stages, not necessarily the case in reality. The stages are helpful when considering likely changes to group dynamics over time, and these changes will have consequences for how teachers deal with groups. For example, in the face of new challenges, groups can revert to forming and storming modes and the longer the group has been running the less likely this is to happen. By changing group membership there is risk that groups do not overcome insecurities and conflict. It is thus important to give groups the opportunity to build up trust, sensitivity, and respect for each other, and to resolve conflicts through repeated opportunities to work and have fun together. While this final point may appear obvious, our surveys have shown that teachers tend not to plan for group development. Also, while it may appear a contradictory sentiment, teachers should also think/plan for group working skills that can be developed among all of the children in a class—so that any changes between group members or restructuring of classroom groups will not be met with too long a time between forming and norming stages.

Group Composition

We have seen that most research concerning group work has focused on the attainment mix of groups, but groups will vary in terms of other factors, including the gender balance, the mix of friends and non-friends, and whether same or mixed ages. One particular concern when teachers consider the groups to be used in the classroom relates to the extent to which different types of pupils benefit equally from group work. Many teachers feel that it is only the more academically able who will profit from group work or that the academically able may get held back by having to work with pupils who have more ground to make up. Teachers also hold the view that some pupils, particularly boys, will misbehave during group work and that this will adversely affect others and the quality of group work and its performance. However, these views which challenge the benefits of group work for all children contrast with results from, Palincsar and Herrenkohl's (1999) study which found within their Collaborative Problem Solving in Science (CPS) programme for Grade 6 pupils, that there were no differences between ability groups and boys and girls; and Slavin and Chamberlain (2000) study which found that children from all ability levels gained equally from cooperative group work. Hence, we see that grouping pupils by attainment or gender may tend to serve classroom management rather than learning purposes (Kutnick et al. 2006).

Group work necessarily involves a certain amount of ability mixing, though again this will be affected by the ability range that characterizes the whole class and school policy with regard to same-age or mixed-age classes. The issue of pupil choice over the composition of groups is also problematic. Allowing children to select who they work with can reinforce social divisions (e.g., on the basis of gender, friendship,

age and ability) and isolate children who are not chosen. Perhaps the obvious compromise is that children should be consulted when their teachers make decisions about criteria to use when composing the groups. And, teachers may consider strategies such as banding of high-to-mid and mid-to-low attainment groups (from Webb 1989) as well as other heterogeneous approaches such as mixing boys and girls, friends and acquaintances, ethnicities (Slavin and Chamberlain 2000) and attempts to overcome classroom status hierarchies (Cohen and Lotan 1995). And, while we have just referred to group stability, we should also recognize group flexibility when considering composition—grouping can be planned to enhance discussion among members as well as to provide direction and support. Thus, groups can be composed in such a way as to allow breaking out into paired work for some activities followed by re-integration into the small group.

3.2.1.2 Preparation of Lessons and Activities Involving Group Work: Curriculum and Group Work Activities

One common assumption, which we have often heard from teachers and which can hinder the development of group work, is the view that the demands of the curriculum mean there is not enough time for group work. This concern is understandable given the heavy demands in the UK and other countries to cover core aspects of the curriculum and the way that mandatory subjects like literacy and numeracy dominate the working day. These pressures on teachers should not be underestimated, but the view that there is no time for group work can be a consequence of thinking that group work is something different from or marginal to the pressures to cover main curriculum areas. In contrast, group work can be viewed in relation to, and as central to, the curriculum. This central point is made by Webb and Palincsar (1996), who conclude that it is important that we do not examine small group learning independent of the curriculum and the culture of the classroom. In a similar vein, Slavin et al. (2000) argue that there is now a need to research the intersection of co-operative learning and the curriculum. Much research on group work, however, has tended to be rather curriculum domain specific whereas our aim has been to encourage the development of group work skills that are both generic and also applicable to all curriculum areas.

Previous research would suggest that if effective learning is to take place in the classroom the relationship between the task and the quality of group interaction is important (Bossert et al. 1985). This relationship is especially important when group interaction tasks have inherent ambiguity and carry high risk of failure (Doyle 1986) since these conditions can give rise to insecurities among group members. Research suggests that whole class and individual learning contexts are most suited for teaching procedural knowledge but are less conducive to solving complex problems that require pupils to monitor and regulate their thinking (Good and Brophy 1994). Yet designing tasks that encourage group work is difficult. It is important that the task is set up in a way that encourages all members to talk and work together, does not actually encourage individual working, and is within the Zone of Proximal

Development of the children. As Bossert et al. (1985) point out, tasks that are too simple or too demanding will not engage children working in groups.

Hence, an important choice facing the development of the SPRinG programme was whether to embed the training activities and lesson plans within the curriculum or to treat them separately. While an embedded approach would be more likely to have success in use and implementation, and such a programme could relate directly to the scheme of work used in every school, this was impractical given that schools and year groups vary in their coverage of the curriculum. On the other hand, a training programme that was completely separate to the curriculum would put pressure on teachers' time and school timetables. Our compromise was to adopt an infusion approach (from McGuiness 1999) which involved making the training activities relevant to different parts of the curriculum where both group work skills and content are covered simultaneously. Teachers were encouraged to cover the SPRinG training during time allotted, for example, for Personal, Social and Moral Education and 'circle time' or to build the activities into the curriculum in their own way. Some of the physical activities could be initiated in physical education. In addition, teachers were also encouraged to increasingly use group work within the curriculum such as developing communication skills within curriculum areas that benefitted from discussion—especially within literacy and science; ideas on how to do this were a main part of the principles and implications part of the SPRinG handbook (Baines et al. 2009). The relationship between the SPRinG programme and the curriculum was twofold: to ensure that children were introduced to basic group working skills that would enhance their work with peers and the teacher and to gradually integrate these skills into normal classroom use within a range of curriculum subjects. The aim of SPRinG was to reinforce and utilize group working skills within the everyday activities of the classroom.

3.2.1.3 A Relational Approach to Facilitate Group Working

Teachers' concerns that pupils have difficulties engaging in group work are not unfounded and perhaps the most well established conclusion concerning effective group work is that g*roup work skills have to be developed* (Barron 2003; Cohen 1994; Reznitskaya et al. 2009; Webb and Farivar 1994). As many teachers and researchers have concluded, we cannot just put children into groups and expect them to work well together. There is no doubt that working well in a group does not come easily to many children, and it is well known (see Gillies 2003) that pupils need to have the skills to communicate effectively through listening, explaining and sharing ideas. But effective group work involves more than this: pupils have to learn to trust and respect each other (Galton 1990; Kutnick and Manson 1998). They also need skills in how to plan and organize their group work so they work more autonomously from the teacher and engage actively in learning; making considered group decisions; and reaching a compromise and avoiding petty disputes.

The approach adopted by the SPRinG project organized training activities for group work around a developmental sequence likely to enhance the quality of social

relationships between all pupils in a class. The sequence begins with an emphasis on social skills (such as social support, trust and sensitivity), followed by communication skills, and finally leads to the development of more advanced group working and collaborative problem-solving skills. Development of these skills is achieved through a cycle of reflection, experience, evaluation and adaptation so that pupils become 'metacognitively wise' about their group work skills. The approach combines post-group work processing (Johnson et al. 1990) with preparation for relational support and communication, and encourages children to explicitly think about particular interpersonal knowledge-sharing skills and how these can be achieved in practice. The approach is based on a naturalistic study of close social relationships (Kutnick and Manson 1998), and has been devised to overcome problems associated with simplistic, single skill social skills training programmes (Ogilvy 1994). Pupil skills for group work also need to be considered in relation to the wider classroom context as they are unlikely to be long lasting if they are approached in isolation and specific just to group work. These group working skills will not happen all at once; rather, they have to be introduced and developed over time. As group work skills are developed in a classroom, there will be greater emphasis on the social skills of trust, sensitivity and support. As the teacher and class return to further develop communication skills, they may need to 'take a step back' and repeat some of the earlier social skills to reinforce children's sensitivity and trust of their classmates. Gradually, as the teacher and children become more confident with the activities of the early part of the developmental sequence, they become better prepared to move to mid- and later parts of the sequence. The programme's use of 'metacognitive' reflections is not left to the final stage of the sequence; reflection on activities is meant to take place after each group work activity is used in the class. As with every educational issue, both children and teachers benefit from reflecting on what they have done—where they have succeeded and what they would like to repeat as well as where they did not succeed and how the sequence can be improved. Being 'metacognitively wise' also means that you are an active contributor in your own learning and the learning of others. And, as the class becomes more adept with their developing group work skills, it will also be beneficial to integrate what has been developed into more general rules and ways of behaving in the class; indeed, such integration can create classroom norms for productive learning and social inclusion.

Connected with the issue of how a relational approach may be developed and used in classrooms, we also need to consider when a relational approach should take place within a school year. It seems logical, and this is supported by our review of the literature, that supportive relationships should be planned to precede group working and take place at the start of a school year. At the same time, other researchers have questioned whether a relational approach (and consequent training of pupils in their classrooms) should characterize only the beginning of a school year or be seen as a developmental process that unfolds throughout the whole of a school year (Jarvelä et al. 2000; Kreijns and Kishner 2005; Kutnick and Manson 1998). With this relational question in mind, we needed to explore with teachers the best placement of relational training in the SPRinG studies—and assess whether the effects of relational training at the beginning of a school year simply provides children with

access to supportive relationships and learning—or whether relationships are continuously developed throughout the school year. Within this consideration, our studies should help to ascertain whether and how children draw upon mutual and equally shared knowledge and skills (as posed by Damon and Phelps 1989) within a wide, classroom-based Zone of Proximal 'Interpersonal' Development.

A central aim in effective group work is the development of pupil interdependence with a shift in responsibility for learning from teacher to pupil. Fulfilment of this aim may be difficult because of a common misconception, at primary school level at least, that children are not able to work together interdependently. Every teacher knows that some pupils have conflicting personalities, some children may disrupt classroom activities, and solitary or very quiet children may hinder the group. But one message that has emerged strongly from our work is that it is important not to allow personality types or group conflict to dictate the success, or failure, of groups. Pupils should be encouraged to work in groups whatever the personality types involved and to resolve their problems together. If these misconceptions are not addressed directly then difficulties between pupils may lie below the surface and inhibit classroom learning. So, paradoxically, the setting where difficulties in children's behaviour and relationships are most evident may be where such problems are most effectively dealt with.

3.2.1.4 Involvement of Teachers in the Support of Group Work

A major part of the SPRinG programme was the need to develop classroom and interactive strategies for teachers to promote and support high quality group work processes. We suggest several ways of conceiving how teachers can make group work productive. One way is by lowering the risk for pupils, while ensuring the challenge remains high, through a process of 'scaffolding'. The term, first used by Wood, Bruner and Ross (1976) within the context of mother-child interactions, has a central place in Vygotskian accounts of learning based upon interpersonal support. Scaffolding, when it comes to supporting group work, has not been fully researched but will involve adapting and structuring the group work context and the task (see Palincsar and Herrenkohl 1999; Tolmie et al. 2005). The teacher will need to structure lessons carefully to facilitate learning in groups. On the basis of our work to date, we recommend that all lessons involving group work should include briefing (before the activity) and debriefing (after the activity) to enhance meta-cognitive reflection and help develop skills. The aim of this group work scaffolding is to help pupils, as much as teachers, develop the capacity to reflect on how the group is working. When it comes to the supporting of group interactions it may be helpful to think of the teacher as *a guide on the side, not a sage on the stage* (King 1993). If we are serious about transferring more control of learning (at least in some contexts) to the children, then we need to consider how best to achieve this. Central to teachers' supportive role is an understanding of pupils' skills and thus it is important for the teacher to find time for observation of pupils and for her to spend time monitoring their behaviour. And, as borne out in our discussions with teachers, the more skilled that children

become in their group working, the less reliant they will be on their teacher. With pupils being less demanding of their teachers, the teacher does have more time to undertake observations, monitor and focus on particular children or groups that may be in need of the teacher's attention.

3.3 Evaluation of the SPRinG Programme: The Intervention and Research Design

As we noted at the start of the chapter, the SPRinG programme was undertaken over a number of years, working with teachers to develop the particular SPRinG approach for classrooms and then evaluating the approach in a number of different settings in primary (and secondary) schools in England and in Scotland. This part of the chapter will explain how the full programme was planned and developed. Readers may wish to follow up detailed reports of the work in academic journals (e.g., Baines et al. 2003; Baines et al. 2007; Blatchford et al. 2006; Howe et al. 2007; Kutnick et al. 2008; Kutnick and Berdondini 2009) and practical applications in the handbook written for teachers (Baines et al. 2009). These papers also give fuller details on the research design and methods that we introduce below.

3.3.1 The SPRinG Programme and How it was Implemented

The intervention programme that took place in the early and later years of primary schooling (hereafter referred to as Key Stage 1 (children aged 4 to 7 years, and referred to as 'KS1') and Key Stage 2 (children aged 8 to 11 years, 'KS2')) involved the researchers working with a new group of teachers (after the development phase) to support them in their implementation of the SPRinG programme. At both Key Stage sites teachers were made aware of the project through presentations to local school networks and, if interested, they agreed to commit to the project for the school year. Teachers were given a handbook which had been developed and trialled in the previous year in collaboration with a different group of teachers. The ideas presented in the handbook were based on research evidence as far as possible but also teachers' practical experiences and recommendations during its development. The handbook involved a set of key principles and practices to support teachers' use of group work in class, the fostering of new social pedagogic practices, and a set of lesson-like activities for teachers to use to develop pupils' social, communication and advanced group work skills. These activities were designed to support teachers' understanding and implementation of the SPRinG principles and practices (described below). The intervention programme was further supported by 6 meetings (2 per term) with teachers to discuss key issues, ideas, practices and problems, and by visits to teachers' classrooms at least once per term to offer independent feedback and discussion on their use of group work in their classrooms. As we have previously noted, these group work skills were developed through a teacher-facilitated cycle of

experience, evaluation, reflection and adaptation. Activities were implemented over the course of 14 weeks—starting at the beginning of the school year, with one training session (lasting approx. 1 h) and a minimum of one reinforcement session per week. Teachers, with their classes, continued to use and further develop these activities throughout the rest of their school year where they could focus on particular group working skills and discover ways within which these skills could be integrated into their curriculum/learning tasks. As we shall see, research findings suggest that SPRinG pupils were very successful in developing these social and communication skills (which we later refer to as 'group working skills').

There were two main parts to the initial handbook developed with teachers and used by teachers in the evaluation phase of SPRinG.

3.3.1.1 Principles and Practices

The programme aimed to offer teachers principles and suggestions for practice based on prior research and teachers' experiences during the development phase of the project. In line with the discussion above it covered:

a. how to set up the classroom and groups for group work (covering class seating, group size, number of groups, group stability and group composition);
b. how to develop pupils' group working skills (organized in terms of a developmental sequence with an emphasis on social skills, communications skills and advanced group working skills);
c. how teachers can support pupils doing group work (being a 'guide on the side', monitoring groups, modelling and reinforcing group work skills, coaching);
d. how to best organize group work activities (covering types of outputs, time for planning, designing types of task, structuring group work activities, and group roles).
e. how teachers and pupils can evaluate group work;
f. how teachers can integrate group work in to the curriculum; and
g. an extensive section on 'Troubleshooting' which addressed some common problems experienced by teachers and some possible ways of dealing with them.

3.3.1.2 Training in Social, Communication and Advanced Group Working Skills

The second main part of the programme was a sequence of classroom lesson activities for developing pupils' group work skills. The activities were organized sequentially into:

a. social skills training activities which start with an activity to develop rules for working together, and then activities to build up trust, mutual respect and tolerance;
b. communication skills and advanced group work skills training activities covering skills in listening, asking questions, giving instructions, helping skills, speaking

in a group, giving reasons and weighing up ideas, making suggestions and speculating, reaching a consensus and compromise, being persuasive, roles within group work and planning group work; and

c. joint problem-solving skills where pupils were presented challenging tasks that required the sharing of ideas, consensus reaching, discussion and support within groups.

For each activity there were suggested group sizes, session lengths, learning objectives, tasks, briefing and debriefing suggestions, points to aid evaluation, and follow up activities; this programme is now published in Baines et al. (2009).

3.4 Evaluating the SPRinG Project

The main aim of our evaluation (reported in Chap. 4, 5 and 6) was to test the effectiveness of SPRinG by comparing pupils trained with the SPRinG programme with pupils who were not. The main research question was whether the effective group work programme led to:

1. increases in learning/attainment,
2. more co-operative/behavioural and collaborative/dialogue patterns supportive of learning,
3. more 'favourable' motivational patterns and attitudes to learning

In line with the aims of the SPRinG project the evaluation study involved an intervention over a longer time frame than many previous studies. The choice of a full school year helped overcome criticisms of short-term interventions that characterized co-operation and collaboration studies, and allowed us the opportunity to see whether children really did develop intellectually, behaviourally and motivationally over time—rather than short-term before and after evaluations that characterized previous intervention studies. Actual evaluation methods varied slightly between the two primary school sites and between the primary and secondary school sites, but at all three sites pupils were assessed in terms of the three outcomes related to attainment, behaviour and motivation.

In this chapter, we will only refer to the evaluations that took place at the two main primary school sites, i.e., pupils aged 4–7 years (KS1) and pupils aged 8–11 years (KS2). In addition, there was a follow-on study based in Scotland (7–11 years; and referred to as ScotSPRinG) which was particularly interested in effects of differences explained by types and locations of school as well as single-/mixed-age classes, and a study of teachers' perceptions of group work.

3.4.1 Research Design

The main evaluation at KS1 and KS2 involved a quasi-experimental comparison of pupils who took part in the SPRinG programme with pupils who did not. In

educational research there is often a tradeoff between precision of experimental control on the one hand and the validity and authenticity of the educational intervention on the other hand. Ideally, in order to test the causal role of the group work intervention, a randomized controlled trial would be best, with random allocation of teachers and pupils to the SPRinG (Experimental) group and a Control group. But there were several features of the SPRinG project that made such a research design impractical. The main factor was the general nature of the programme in that SPRinG was not a time constrained curriculum intervention which would have been relatively easy to organize and allocate teachers and pupils. Rather, the SPRinG intervention was a general programme deliberately inclusive and applicable across the curriculum and the school year. Moreover, involvement in the programme necessitated a prior commitment and interest from teachers and schools. The reason for random assignment in randomized controlled trials is to avoid the possibility of an unplanned, extraneous variable affecting results and the possibility of drawing misleading conclusions about causality. The SPRinG project made use of a quasi-experimental design within which great care was taken to ensure that effects were not attributable to extraneous or confounding factors extra to the programme itself and which was designed to allow whole classes to be compared over a full year in school.

The most obvious quasi-experimental design might be to set up two control groups: an alternative intervention group and a naturalistic, non intervention group. This dual control design would allow us to test for the possibility that there might be a Hawthorne effect, i.e., it was involvement in, and perhaps enthusiasm for, the experiment, rather than its particular characteristics, which were the main reason for better results[2] However, in the real world of education this kind of experimental design is difficult to maintain—minimally it would require a large number of extra classes (and associated expense), and an alternative intervention that was similar to but not the same as the SPRinG intervention. It became apparent early in the research that there was little sense in setting up a non-intervention group when teachers in the control group were as intent on working hard to improve pupils' academic attainments and behaviour; teachers, perhaps especially in the UK at the time, always seemed to be involved in a Government, Local Authority or school inspired intervention! And, many of the teachers in the control group would be likely to have organized some form of grouping and group working in their classes—possibly including co-operative and collaborative learning situations. The point of the SPRinG project was to bring teachers on board in a project that they and the researchers believed in. A commitment to the improvement of the teaching and learning situation in their classrooms would also be required for the control group but it was unclear whether we could devise an alternative programme for a whole year that promoted a different way of educating pupils, even if we could then convince teachers to take part in it. Our original plan to get control teachers to concentrate on whole class teaching would have been hard to sell; moreover we knew that teachers already spent much of the time teaching to the whole class.

[2] The possible Hawthorne effect is more fully considered and discussed in Chap. 8.

Table 3.1 SPRinG and Control school characteristics by Key Stage

	School Roll		FSM		Statements		SEN	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Key Stage 1								
SPRinG	[a]	[a]	12.56	12.83	1.49	1.40	20.27	9.33
Control	[a]	[a]	12.44	4.29	1.12	1.0	19.62	5.79
Key Stage 2								
SPRinG	319.6	98.6	35.8	20.2	3.8	3.4	26.9	10.5
Control	322.9	126.4	34.0	16.9	2.0	2.9	23.3	7.9

[a] data not collected

The choice of control groups differed a little between KS1 and KS2. To ensure that the SPRinG and Control teachers and pupils were equivalent, schools at KS1 were matched for proportions of children being provided Free School Meals (a proxy for family income), children having been 'statemented' for a Special Educational Need and children with English as an Additional Language. In fact, when we made a statistical comparison of the similarities/differences between SPRinG and Control schools, the few differences that were found indicated that the SPRinG schools would provide more difficult conditions for our work to be successful. There were slightly higher proportions of Free School Meals, pupils who were Statemented or diagnosed as having Special Educational Needs in the SPRinG schools than the Control schools (see Table 3.1).

At KS2 we were able to take the further opportunity provided by a project involving a group of teachers and pupils in a parallel project on peer relations and classroom engagement. These teachers and schools were as committed to the research process and received as many visits from the research team, and experienced the same forms of data collection (see below) but differed from the SPRinG teachers in they had not received the SPRinG handbook or attended meetings. There were no constraints on what teachers and pupils did in those classes. Though the Local Authorities (equivalent to school districts elsewhere in the world) and schools were broadly similar in social background (in terms of school roll, percentage of pupils, etc.), differences in social background were taken account of in the statistical analysis to be sure that they did not affect the results with regard to the intervention. In fact, statistical analyses showed that none of the social background indicators influenced the effect of the intervention on pupil outcomes, as we shall see in Chap. 5.

3.4.2 Samples

At KS1 there were 19 classes and 474 pupils in the Experimental group and 18 classes and 506 pupils in the Control group. At KS2 there were 32 classes and 849 pupils in the

Table 3.2 SPRinG and Control numbers by Key Stage

	Year	Schools	Classes	Pupils
Key Stage 1				
	1		9	213
SPRinG	2		10	261
	Total	*	19	474
	1		8	235
Control	2		10	271
	Total	*	18	506
Key Stage 2				
	4		11+	265
SPRinG	5		13*+	295
	6		13*	289
	Total	17	32	849
	4		21&	486
Control	5		22&	541
	6		0	0
	Total	19	40	1027

* Schools numbers are not listed here, as the range includes infant, first and primary school types
Data includes * = 3 × Y5/6
+ = 1 × Y4/5
& = 3 × Y4/5

Experimental group and 40 classes and 1.027 pupils in the Control group. Table 3.2 displays actual number of classes and pupils by Key Stage and SPRinG/Control. Readers will note that we have not included the ScotSPRinG sample numbers here. There were a further 653 children involved in ScotSPRinG, but because of the different methods used in the Scottish study, we more fully report on the sample in a separate section below and in Chap. 6.

3.4.3 Methods of Data Collection: Measures of Pupil Attainment, Classroom Behavior, Motivation/Attitudes to Learning and Classroom Implementation

To evaluate the effectiveness of the SPRinG approach required a comparison of pupils trained on the SPRinG programme with pupils in Control classes. As we have said, the main evaluation questioned whether the group work programme led to increases in learning/attainment, behavioural and dialogue patterns supportive of learning, and more 'favourable' motivational patterns and attitudes to group-based learning over the school year. Measures of these three components had to be developed with regard to children's age and the focus at each of the sites in the study. Specific developments are introduced here and adaptations for each site are explained more fully in the following chapters (4, 5 and 6). In order to evaluate the SPRinG approach over the school year, most of the measures described below were undertaken at the

start and end of the school year. It was expected that most children (whether SPRinG or Control) would progress in their attainment, behaviour and motivation over a year, but the comparison with Control classes allowed us to identify how much contribution the SPRinG approach might add to that found with normal schooling approaches.

3.4.3.1 Pupil Attainment

Measures were covered by both 'macro' and 'micro' instruments, which were different at the early and later stages of the primary school (KS1 and KS2, respectively). Macro measures designated general levels of learning and understanding in relation to relevant curriculum subjects at each site (and national testing within England and Scotland). At KS1 the focus was on reading/literacy and mathematics, while at KS2 the focus was on science. ScotSPRinG (see below) also focused on science and on pupils of the same age as the KS2 study (i.e., 7–11 years). Given the timing of the studies and the need to provide curriculum assessment at the start and end of a school year, we were unable to use Government designed national assessments, which were only set up to assess pupils at the end of Years 2 and 6. Attainment measures were designed to be appropriate to the age of pupils and the content of subjects in the English National Curriculum.

Key Stage 1

Attainment at the start and end of the year was measured by the PIPS (Performance Indicators in Primary Schools) developed and standardized by the Centre for Evaluation and Measurement CEM) based at the University of Durham. PIPS is used specifically to provide year-on-year comparisons of children's school achievements in the UK and internationally. PIPS tests for Years 1 and 2 mainly cover curriculum related areas concerned with reading, vocabulary and mathematics. For the purposes of this research, we agreed with PIPS designers to focus on a limited number of the test items that would allow for reliable scoring on literacy/reading and mathematics. Administration of the PIPS tests varied slightly from CEM recommendations in that research assistants were employed to conduct the tests with small groups (between 4 and 5 children) outside of the classroom—so that normal classroom activity was not disrupted. Testing at the beginning of Years 1 and 2 had to be slightly staggered through the term, again not to disrupt normal teaching activities. Staggering the testing meant that some of the late autumn scores had to be 'corrected' for test date (by means of regression per week in school). End-of-year (summer term) testing was, again, staggered in the final few weeks of the school year, and this was also 'corrected' in the scores reported in this report. Test items were reliable (Cronbach's alpha for Year 1 reading = 0.89, for Year 1 mathematics = 0.95, for Year 2 reading = 0.98, for Year 2 mathematics = 0.90). The research assistants who administered the PIPS tests were not informed whether classes were Experimental or Control. Scoring of the tests was undertaken (independently) by the CEM Centre, which was not informed whether classes were Experimental or Control. More details of the tests and classrooms activities that characterized KS1 classes are provided in Chap. 4.

Key Stage 2

A practical difficulty encountered at Key Stage 2 was the increased use of setting[3] classes by attainment for particular subjects (most usually mathematics and English). Setting complicated matters because it was possible that a class teacher might not teach her own pupils in either mathematics or English. It would therefore be difficult for teachers to implement a group work training programme for her whole class, certainly one covering these subjects. Furthermore, using test scores for the class under these circumstances would constitute a poor evaluation since in all probability these pupils would have been taught by another teacher not involved in the research. Thus, although the KS2 programme encouraged and helped teachers to implement group work across the whole curriculum, for the purposes of the evaluation at KS2 we decided to focus on teachers' use of group work in science. We therefore developed general macro science assessments (drawn from previous Key Stage 2 School Achievement Tests [SAT] assessments and made appropriate for Years 4, 5 and 6) and micro group work lessons with teachers' notes and pre- and post-tests on the science topics of evaporation/condensation and forces (based on curriculum guidance given out by the relevant Government agency at the time [see for example DfEE 1999 and associated Qualifications and Curriculum Authority Schemes of Work—Science] and consistent with expected coverage of these topics). 'Macro' attainment measures in science were collected at the beginning and end of each school year over KS2. Science tests did not exist for Years 3-5 and so three specially designed macro tests were constructed. These tests were based on items drawn from Government devised national tests. All items related to the themes of 'physical processes' and 'materials and their properties'. The tests were designed to cover all types of knowledge and required interpretation of diagrams, tables and graphs and characteristic areas of the science curriculum recommended by the government in the National Curriculum for Science.

At KS2 micro-activities were designed to assess pupil progress following specially designed lessons involving group work on the two science topics of evaporation/condensation and forces (explained more fully in Chap. 5). These micro group work lessons accompanied by teachers' notes and pre- and post-tests were developed and piloted with the help of teachers during the development phase of the research. Lessons were based on Government guidance at the time on the National Curriculum in England (DfEE 1999) and were consistent with expected coverage of these topics in the school year when the research was undertaken. The lessons designed for the two science topics were consistent with SPRinG principles and made extensive use of group work for learning, thinking and practical activities. In the evaluation phase of the study, these topic lessons were conducted during the spring and summer terms

[3] Setting, also known as tracking in the United States and elsewhere, re-arranges all classes within a specific Year level and in relation to a specific subject (for example, mathematics) by the attainment level of children. In UK primary schools, children may spend most of their learning time in a mixed-attainment class for most of their subjects, but it is likely that children will be set for mathematics and English as they approach the top Years in school.

respectively; we note here that this curriculum application took place after the initial introduction of social and communication skills activities in SPRinG classes during the autumn and early spring terms. Teachers in Control classes covered similar science topics to those in the SPRinG group, including evaporation and forces, but the main difference was that their pupils did not receive training in group work skills. Group work may have been used to some extent in the Control classes but not as extensively or formally as in the SPRinG sample. More details on the macro and micro assessments at KS2 can be found in Chap. 5.

3.4.3.2 Classroom Behaviour Measures

In order to ascertain whether involvement in the SPRinG programme affected children's interaction and behaviour in school, we conducted two main forms of observation study in SPRinG and Control classes: systematic 'on-the-spot' observations in classrooms and an analysis of dialogue within groups.

Systematic Observation

At each Key Stage we used an 'on-the-spot' (OTS) systematic time sample observation method of recording pupil behaviour and interactions when the class undertook learning tasks. The schedule was based on those used in previous research (Blatchford 2003; Blatchford et al. 2006; Galton et al. 1980, 1999; Tizard et al. 1988). Teachers were asked to provide an assessment of their pupils which divided the children into three attainment levels: low, medium and high. Researchers then randomly selected six 'target' children from each SPRinG and Control class such that the six pupils represented a boy and girl at each of the three attainment levels. A target pupil's behaviour was coded every other 10 seconds for a set of 8 observations at a time (thus for 2 minutes 40 seconds) and over a number of observations per visit. At KS1 there were 4.561 observations in total, 2.065 in the SPRinG sample and 2.496 in the Control sample. At KS2 there were 12,961 observations in total, 7,023 for the SPRinG sample and 5,938 for the Control sample. Observations were made of pupils in the SPRinG and Control classes over the course of the 3 terms in the evaluation year; KS1 observations were undertaken in each of the three terms while the KS2 observations focused on spring and summer terms—that is after the intervention had started.

The OTS observation schedules used at KS1 and KS2 were identical. The schedules were comprised of mutually exclusive category sets that provided a description of time spent in different work settings; school subjects; and how children behaved when in three social 'modes', that is, with their teachers, with other children and when not interacting with others. Within each of these three 'modes' were categories that covered: on-task, procedural, social and off-task activity. All observations were focused on the 'target' child. Teachers and other children were observed only when they came into contact with the target children. The schedule employed a form of

predominant activity sampling in the sense that behaviours, within categories, were selected on the basis of which occurred for the longest period within the ten-second interval. Brief definitions of these categories are:

1. Learning Context: Individual, peer co-learning, adult-led group, whole class, pupil plenary, other
2. Subject: Mathematics, English, Science, Other
3. Individual task behaviour: *Target activit*y (e.g. on-task, task preparation, procedure, social, off-task active, off-task passive)
4. Adult-pupil interaction: *Type of adult*, *Adult's audience* (target is focus, target is audience), and *Adult's activity* (e.g. on-task, task preparation, monitor/observe, social, and other), *Target to teacher interaction* (e.g. begins, responds, sustains, attend listen, other), *Target activity* (On-task, task preparation, procedure, social, off-task active, off-task passive)
5. Pupil-Pupil Interaction/dialogue: *Target activity* (On-task, task preparation, procedure, social, off-task active, off-task passive), *Involvement in interaction* (e.g. substantial, intermittent, attend listen, non-verbal, other), *Talk quality* (High level vs. low level)

Observers were all experienced researchers, familiar with working in schools. All observers received initial training in which they were provided with an observation manual of categories, conventions and procedures, as well as tips acquired during previous use. Conventions were discussed and reliability of observation was checked via the use of videotapes of classroom settings. Periodic checks of accuracy and understanding of categories were made. Initial assessment for reliability was followed by at least a day's observation in a class not involved in the study, and then a follow-up training session to discuss field visits. Reliability coefficients for KS1 and 2 for main sets of behaviours were high (ranging from .7 to .9).

Pupil Group Work Dialogue Analysis

Additional observations of dialogue were undertaken in each class to provide information concerning the type of language being used within the group work only. These observations differed between the KS 1 and 2 classrooms but both observations emphasized collaboration and supportive discussion between children when working on a learning task.

At KS1, classroom dialogue was observed and recorded for analysis during the spring and summer terms in both SPRinG and Control classes. In order to collect a true record of actual talk between pupils when undertaking a form of group work, all teachers agreed to put their pupils into pairs, and asked each pair to develop a concept map that described the pair's understanding of a current curriculum topic. Concept maps are usually undertaken with individual children in their classrooms and are used to identify level and extent of pupils' cognitive understanding. We adapted the use of concept maps for pairs of children as this would provide a good opportunity to explore the range and quality of their talk and other learning interactions. We

videotaped one randomly selected pair per class in order not to be too disruptive in the classroom. Analysis of video tapes of interactions while developing their concept maps thus focused on 23 pairs of children (11 SPRinG, 12 Control). Coding of the videotapes drew upon Fogel's relational coding system (Fogel 1993), a system of analysis for interpersonal activity that noted time on/off-task, whether speech was reciprocated (co-regulated) or controlled by one individual, and whether partners did/did not work with each other (i.e., whether engaged or disengaged). The same pairs were recorded in the spring and summer terms. Video-recording in each of two terms allowed comparisons between SPRinG and Control classes as well as insight into how verbal and non-verbal interactions and dialogue developed over two-thirds of the school year.

At KS2, detailed analysis of pupil talk and involvement in group work was conducted on video tapes of researcher-designed group work activities. These were videotaped in the summer term and involved groups of 4 pupils working on the group work activity within their normal classroom context. The video analysis tested whether SPRinG and Control pupils differed in predicted ways when involved in the same selected group work task. This analysis allowed a more fine-grained description of classroom talk and group working than provided by the OTS study. The tasks were specially designed non-curricular tasks. One concerned 'Who should get the pay rise?' and the other 'Who should be the class representative' (further details can be found in Baines et al. 2009). The activity involved a short piece of background, a description of several people who were possible contenders, and the task was to discuss and agree on who should be chosen and why. The activity took about 20 minutes. A total of 31 SPRinG and 29 Control groups were videotaped. Observation categories related to groups and covered: a) the degree to which all participated within the group and are engaged on-task, b) socio-emotional (group maintenance vs. blocking), c) sustained topic focus vs. changeable topic focus, and d) pupil-pupil interaction/dialogue (in terms of collaborative discussion (inferential talk vs. text based talk), meta-group talk, sharing information, disputational talk, procedural, reading out task, off-task). The videoed interaction was coded every 20 seconds. The video-recording took place in the summer term and comparisons made between groups in the SPRinG and Control classes.

3.4.3.3 Motivational/Attitudinal Measures Regarding Classroom Learning

These measures came from pupil self-completed questionnaires involving Likert scale items which, when added together, formed a number of scales. The individual items were developed, as reported in Pell et al. (2007), on the basis of pupil interviews and then piloted at each year level. The questionnaire items formed the following scales:

1. Attitudes to Group Working (three items: "I like group work"', "Group work is fun", "I work hard in a group");
2. Personality (six items: "I am quiet", "I am always thinking", "I like listening to stories", "I am happy", "I play by myself", "I play tricks on others"); and

3. Peer/Self Learning Orientation (four items: "I work hardest", "I learn most", "I think best", "I like most").
4. Liking or particular school subjects (four items: "I like mathematics", etc.).

At KS2 the items were expressed in terms of five point scales (Strongly Agree, Agree, Not Sure, Disagree, Strongly Disagree). For the KS1 pupils there were a reduced number of questions (there were no questions concerning liking of the various curriculum subjects that children were taught); and a shorter, three point Likert scale (Agree, Not Sure, Disagree). Additionally, KS1 children completed the questionnaire in small groups rather than as a whole class and Year 1 children completed the 'working well' section by placing stickers on a page rather than ticking boxes.

For both KS1 and KS2, each measure (Personality, Attitudes to group work, Peer/Self Orientation to learning and Liking for particular school subjects) was assessed for reliability. We only report results in Chap. 4 and 5 were reliabilities were sufficiently high (.7 or higher).

3.4.3.4 Classroom Rating Scale (S-TOP) of Classroom Implementation

An additional instrument was also designed and implemented in the KS1 classrooms. To assess how teachers implemented the SPRinG ideas and the extent to which pupils engaged in positive forms of group work, researchers completed a set of high inference, reflective ratings at the end of each visit. The premise underlying the reflective ratings was adapted from Berliner (1987), wherein teachers or observers could make a summative judgment of classroom practice or sets of behaviours judged to be components of a particular teaching approach. This rating scale was constructed to monitor key aspects of the SPRinG approach and focused on how well teachers prepared the classroom context and the tasks for group work as well as how the teacher supported group work and pupils' interactions. Aspects of the SPRinG training were grouped into eight categories concerning: (1) 'Classroom conducive to group work', (2) 'Group size/composition conducive to group work, (3) 'Tasks conducive to group work', (4) 'Teacher encourages group working of pupils' (encouraging collaborative behaviours for group working), (5) 'Pupils actually engaging in group work', and (6) 'Pupils encouraging group work amongst their peers. In addition, and for SPRinG classes only, there were two scales that rated 'Teacher's implementation of the training programme', and 'Teacher's ability to articulate why the programme is needed/working'. Each of the categories was rated on a 1–5 point scale (1 = not applicable, 5 = highly characteristic of the classroom) and averages were calculated for the eight categories. Rating scales were completed by researchers once they had completed a full set of systematic observations (OTS); the S-TOP ratings were undertaken in the spring and summer terms only. The use of the rating scales was not to compare between SPRinG and Control teachers, but to focus on SPRinG teachers themselves. Undertaking rating in the spring and summer terms allowed us to ascertain how teachers implemented the SPRinG principles over time and compare for differences between these teachers.

Statistical Analyses

Analyses will be more fully explained in each of the following chapters. Key issues that we faced as researchers were primarily directed at modeling and comparing relative progress over the duration of the evaluation phase for the SPRinG and Control classrooms. Statistical analysis for both KS1 and KS2 was undertaken using multilevel modeling that standardized (by year in school) attainment outcome scores and modeled effects of experimental versus control main effects, controlling for pre- test scores. A number of other variables were also factored into the model (e.g., pupil gender, initial attainment level and year group) to examine main independent effects on outcomes and possible interactions with condition (Experimental versus Control), e.g., to see if the effect of SPRinG varied by gender or initial attainment level. In Chap. 4–6 we refer to effect sizes in terms of standard deviation units and eta-squared. These statistics are defined when they are used.

3.5 The Scottish Extension: ScotSPRinG

The ScotSPRinG extension provided a further evaluation of the generalizability of SPRinG results to Scotland. This extension allowed comparisons between urban and rural schools, single- and mixed-age classes and additional attention to the possible importance of 'relational distance' with regard to classroom work and out-of-class social relationships. This part of the research project was initiated after SPRinG had already collected its initial results and the funding only allowed for one year of research. Hence, there were no 'development' or 'application' phases. With the initial results from SPRinG already collected, the Scottish research team was able to draw on the existing SPRinG development work and include additional aspects of data that had not been included in the original SPRinG design—especially with regard to the socio-cultural elements of location of school, make-up of classes and relational distance in work and social interactions among children. ScotSPRinG was also able to draw upon the already developed teacher's handbook (Baines et al. 2009) to facilitate and provide activities in the implementation of the project extension.

With limited time and funding (compared to SPRinG), the ScotSPRinG team drew on many of the SPRinG instruments and also developed some focused instruments of their own. The extension used the structure and location of primary schools in Scotland to conduct a natural experiment within which comparisons were made with regard to: rural schools where there was a high likelihood of close relational distance and mixed-age (composite) classes; rural schools with close relational distance and single-age classes; urban schools with greater relational distance and mixed-age (composite) classes; and urban schools with greater relational distance and single-age classes. The team focused on older primary children (similar to the SPRinG KS2 study) and also focused on the two science themes (forces and evaporation) as the basis for an evaluation of the effectiveness of the programme on pre-/post measures of school achievement.

3.5.1 The Sample

Overall, 24 classes agreed to be included in the ScotSPRinG extension, and a further 3 classes agreed to act as 'Control' classes for comparison purposes where appropriate. All classes were in the top three years of the primary schools. In total 575 children participated in the ScotSPRinG classes and a further 78 children were in the Control classes. Teachers in the ScotSPRinG classes received training and support in the SPRinG/relational approach. Teachers attended three professional training days, mainly taking place in the first third of the school year. Teachers were encouraged to introduce at least an hour of group work training in their classrooms from the start of the year and to gradually focus the group work within science activities—a similar development to that described with regard to the London based SPRinG study at KS2.

3.5.2 Methods of Data Collection: ScotSPRinG

Within its limitations, ScotSPRinG was able to undertake a range of pre- and post-measures that would identify children's and teachers' development over the school year. Generally, children's attainment, their behavior in class, dialogue in class and relationships in and out of class were measured over the year. Teachers' classroom activities in preparation for and encouragement of group work were also measured over the year. These measures allowed for statistical comparisons over time for children and teachers, between children in same-age and composite classes and between children in urban and rural schools.

With regard to attainment, ScotSPRinG followed the SPRinG KS2 measures of pre- and post-test of science knowledge with regard to curriculum topics of forces and evaporation. After it was ascertained that the English-based tests were valid for use in Scotland, the pre- and post-tests previously described were used. One interesting addition to the various measures described above, was a new instrument entitled 'People in your class'. Again, this was a pre- to post-measure, but focused on who and how many peers a child liked to work with (in class) and play with (outside of class). Classroom observations drew upon aspects of the SPRinG 'systematic, on-the-spot (OTS)' instrument and observations of classroom dialogue (developed by Tolmie et al. 2005). The ScotSPRinG observations were made when classes undertook various group work and whole class sessions through the year. As with SPRinG, 6 'target' children per class were selected and observed in various settings (working on their own, with a teacher, with a particular group, with other children), but actual observations focused on children's collaborative dialogue. Finally, measurement that involved teachers was undertaken in two ways: at the classroom level, researchers completed Classroom Rating Scales (otherwise referred to as S-TOP, see above) that rated quality of group work management, organization and encouragement; and at the end of the research period, teachers were asked to complete a questionnaire which allowed them to reflect on the impact of the group work that took place in their classes. All measures were statistically analyzed in a manner complementary to the SPRinG analyses.

3.6 Insights into the Implementation of SPRinG: A Qualitative Approach into Whole School and Within-Class Implementation

The SPRinG project evaluation, as described above, focused mainly on quantitative aspects of change over time in children's academic attainment, skills in interpersonal dialogue, teachers' approaches to effective group work, and motivation for learning in group work. As we worked over the three-year period of the project, we found that teachers, other staff in schools, and pupils each provided valuable insights into the establishment and implementation of the SPRinG programme. We recorded meetings with teachers that took place over the course of the project and were further able to undertake interviews with teachers and teacher facilitators in schools. As will be seen in Chap. 7, teacher reflections added a great deal of insight into how the implementation process took place, concerns and successes expressed by the teachers. The chapter complements much of the numerically grounded evidence presented in Chap. 4, 5 and 6.

Chapter 7 focuses on KS2 (or upper primary) schools in the main. Teachers from seven schools participated in the interviews, and provided a range of experience from a general classroom orientation to a school-facilitator orientation (to be explained in Chap. 7 in relation to whole school support for SPRinG). The 21 teachers were mainly female and experienced classroom practitioners. The seven schools within which the interviews took place were mainly in urban areas with one school in a rural location. Most teachers were interviewed individually, although some circumstances required a group interview. Interview questions were thematically-based, the main types of question were drawn from the literature concerned with implementing group work in classrooms and particular elements of the SPRinG programme that were introduced into the teachers' classrooms. Analyses took place at a general thematic level, and provide insight into the implementation and support processes for SPRinG from across the range of the seven schools.

3.7 Chapter Summary

In this chapter, we have described the reasons for the initial SPRinG study and its extension by ScotSPRinG. We trust that the information presented in this chapter is a comprehensive presentation as to why and how the studies were undertaken—but this is only the beginning! In each of the next four chapters, the authors explore in detail particular methodological and sample aspects and significant outcomes of the studies as they pertain to young children and their general attainment and behaviour in classrooms (KS1; Chap. 4); older primary children and their science attainment and behaviour in classrooms (KS2, Chap. 5 and 7); and older primary children in Scotland and their science attainment and behaviour in an out of classrooms (Chap. 6).

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Chapter 4
SPRinG at Key Stage 1: Effective Group Work with Young Children

4.1 Introduction

The opening chapters to this book considered broad theoretical and practical reasons for the development of effective group work in classrooms. The evidence that we reviewed has identified cognitive, behavioural and motivational aspects of ineffective group work and suggested ways in which group working and school achievement could be improved. The SPRinG programme, which formed the basis of this evaluation chapter, is based on the view that effective group work is most likely to occur when attention is focused on four key aspects of group work: a relational approach, classroom organization, tasks and the curriculum and the role of the teacher. This chapter focuses on group work in classes of young children and provides evidence of how effective group work can be planned and the cognitive, behavioural (including collaborative communication) and motivational effects of implementing the SPRinG programme with children in the 5–7 year age range.

4.2 Ineffective Group Work

The earlier chapters of this book have repeatedly made the point that pupils are placed in some form of grouping within classrooms throughout their years of schooling. Being seated in a classroom group actually involves many complex actions and interactions concerning the relationship between the pupil, grouping and learning. Unless teachers and pupils can work together to move from group seating to effective group working, then the interaction and learning expected to take place between pupils, their peers and teachers may be limited. We are concerned to overcome the hindrances often associated with ineffective planning for group work in classrooms.

In the previous chapters, our review indentified many instances of unplanned grouping of pupils that were likely to inhibit effective learning. These instances included a lack of relationship between group size and learning task, unequal gender balance, seating arrangements that may inhibit communication between children, poor communication skills between children and tasks that do not encourage group

P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,*
Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_4, © Springer Science+Business Media Dordrecht 2014

working. And, when these unplanned instances characterize a classroom, children are likely to show little trust and support among themselves and maintain an over-dependence on teachers to support their learning. On the other hand, there have been a number of co-operative and collaborative studies that show pupils are capable of effective group work. To be effective, these studies often provide some form of pupil training in communicative and support skills in order to promote context-sensitive, curriculum-based collaboration (e.g., for music composition, mathematics and science problems). We have seen that many of these studies have only been implemented over a relatively short time and effects of the training/implementation have not been considered over a time period as long as a whole school year. Moreover, previous studies tend to focus on particular skills that may enhance aspects of group working, such as the quality of talk, and do not tend to consider the development of supportive relationships which we see as the root of effective group working.

4.2.1 Are Children too Young for Group Work?

There have been very few studies that explore group work, co-operative or collaborative learning in young children in primary schools (aged between 5 and 7 years). Most studies that focus on children in the early years of the primary school identify that: (1) teachers are responsible for classroom pedagogic (as opposed to social pedagogic) planning, and most consideration of the learning environment focuses on relationships between individual children and their teacher (Bennett et al. 1984; Galton et al. 1999); (2) naturalistic studies of young children in nursery and reception classes similarly note the pedagogic relationship between teacher and children (Bennett et al. 1987; Meadows and Cashdan 1988; Ofsted 2003; Siraj-Blatchford and Sylva 2004; Tizard and Hughes 1984) but rarely acknowledge that most of the children's classroom time is spent in the presence of classroom peers (Kutnick et al. 2008; Tizard and Hughes 1984; Tizard et al. 1988); and (3) only a limited number of experimental studies have asked young primary school children to undertake co-operative and collaborative tasks (for example, working with literacy strategies, Mathes and Babyaks 2001; and use of mathematics skills, Fuchs et al. 1997). These experimental studies, like previous critiques of co-operative learning studies, tend to be short-term and with a limited focus on specific skills for children.

Three reasons may explain why there are so few group work and collaborative/co-operative studies undertaken with children in the 5–7 year age range. The first reason, as we have noted, is that studies of young children in school tend to focus on teacher-pupil relations and overlook the fact that children spend most of their classroom time with their peers and away from the presence of the teacher or other adults in the classroom. The second reason is derived from studies of pre-school children, where teachers consistently perceive that their responsibilities are most strongly related to cognitive learning and this learning may be decontextualized from the social actions and interactions that support the learning. Issues of social competence and social development are left for the children to develop themselves, and are likely to be

perceived by teachers to occur during 'playtime' rather than within the classroom learning time (Kontos 1999; Kontos and Wilcox-Herzog 1997). The third reason for lack of group work studies within this age range is derived from a misperception of theories of child development—especially Piaget's theory (Battistich and Watson 2003; Davis 1991; Littleton et al. 2005). One classic misperception of theory relates to the term 'egocentrism'—the belief that young children's understanding is dominated by thoughts and understanding of the self. Piaget (1928, 1932 and elsewhere) used this term to differentiate between children who were able to communicate with, adapt to and assimilate understanding with others (sociocentrism) and those who were dominated by self views. While Piaget's studies described how experience and interaction with others helped the child move from egocentrism to sociocentrism, he often showed changes in the same child over time—using ages of the child to denote the passage of time. As Davis (1991) pointed out, while the ages identified were just approximations, many people have misperceived Piaget's theory to assert that children remain egocentric until they are seven years old—hence they would not have the communicative, relational or cognitive skills to engage in group work until eight years of age! The perception adopted in our study is that children's development is based on access to and interaction with others rather than their absolute age. Group work, co-operation and collaboration will be a matter of experiencing these interactional and communicative contexts in the classroom—and the earlier that pupils are given access to this experience the sooner they are likely to show co-operation and collaboration in their group working.

4.2.2 Quality of Talk Within Groups

In Chap. 2, we identified the importance of talk in socio-cultural and socio-cognitive studies of classroom learning. As a background to the research reported in this chapter we refer again to two types of talk-based study that have identified promoters and inhibiters of cognitive development in primary schools. The first study draws upon Mercer and colleagues' research (see especially Mercer and Littleton 2007). Through a series of studies over the last twenty years, Mercer identified three types of 'classroom talk' (disputational, cumulative and exploratory) and related these to cognitive learning in classrooms. He noted that there were very high frequencies of disputational and cumulative talk but exploratory talk needed to be further developed as it was only demonstrated infrequently in classrooms. To improve communication in the classroom, a special programme of 'Thinking Together' (Dawes et al. 2000) was designed to encourage the greater use of exploratory talk among children and their teachers. The second programme of study has been led by Howe and colleagues (see especially Howe 2010) and has focused on the particular types of language associated with improved cognitive understanding, especially with regard to the science curriculum. Howe and Tolmie explored the types of language used in peer-based discussions when cognitive enhancement had taken place. When small groups of primary school-aged children were given cognitively challenging learning

tasks, it was the groups that posed problems and explained individual perspectives (Howe et al. 1992; Tolmie and Howe 1993) as well as provided justification in their discussions (Tolmie et al. 2005) that were found to advance cognitively. Both Mercer's exploratory talk and Howe and Tolmie's problem/explanation/justification talk require that children are able to draw upon and develop high (cognitive) levels of talk within their interactions with others. But, as noted in Chap. 1, there are several shortcomings in classroom-based co-operative and collaborative learning studies (see Barron 2003; Reznitskaya et al. 2009) especially with regard to the finding that positive outcomes may not characterize all children in a class and that little consideration is given to relationships among peers. In this study of children in KS1 (aged 5–7 years) we re-emphasize that the children working in groups must feel comfortable and supported in their relationships with each other when undertaking classroom talk at a high cognitive level for learning.

4.2.3 Quality of Relationships Supporting Group Work

Our earlier review of experimental and naturalistic studies of group work in Chap. 2 identified the importance of supportive and communicative relationships if group work in classrooms is to be successful. It is rare to find these supportive relationships among children in classrooms unless some training is provided and modelled by the teacher (Gillies and Kahn 2009) and classroom organization is established for effective group working (Blatchford et al. 2003). As suggested in Chap. 1 one potentially helpful way of viewing effective group work is in terms of establishing a 'region of sensitivity' (Ellis and Rogoff 1982) among peers (as well as between pupils and their teacher) in the early years of the primary school. Development of this region has been positively associated with enhanced participation among all group members, according to Vygotsky (1978), and allows children's engagement or 'connectedness' (Damon and Phelps 1989). The experience of classroom group work within a safe environment is likely to help overcome many of the potential threats to effective group working and (Galton and Williamson 1992).

If we understand and plan for the development of a region of sensitivity (Ellis and Rogoff 1982) and high quality relationships (Cazden et al. 1979), we are more likely to develop quality relationships with and between young children in their classrooms. Yet the development of high quality relationships requires further consideration. In this chapter we provide information concerning whether supportive relationships should only be planned to precede group working at the start of a school year, or are better seen as a developmental process that unfolds throughout a school year. This consideration will, we trust, provide further insight into processes of communication within effective group work. A further assumption that we draw upon from previous research informs our interest in exploring classroom contexts where examples of communication may be associated with pupils' mutual and equally shared knowledge and skills (as posed by Damon and Phelps 1989) as opposed to tutoring one another (as experts/novices are described in the Zone of Proximal Development).

We will use our interactive analysis to assess whether shared mutuality or expert scaffolded conversation between children is the more effective group working context. While the expert/novice relationship has characterized many descriptions of social interaction and learning, mutuality may more appropriately characterize and be developed in regions of sensitivity between children within their classrooms. An effective programme of group work training should also encourage within–group support and limit overt pupil reliance on the teacher.

4.3 Particular Research Questions Considered in this Chapter

With few previous studies evident that consider the role of effective group work in the early years of primary school, is this chapter we:

1. Assess the effects of the SPRinG group work training over time with regard to classroom learning, children's behaviour and their motivation to work with one another.
2. In particular, we question whether children who participate in SPRinG-based, relational training will perform at higher levels academically/cognitively. We question whether group work training enhances connectedness and higher/elaborated cognitive levels of talk.
3. At a practical level, we wish to ascertain whether children with relational training for group work will spend more time on-task and be less distracted during in their group work settings (compared to children without such training). With regard to children in classes where group work and attainment has been effective, we are concerned to identify the type and quality of communication found between children—especially if the communication demonstrates symmetric/mutual or asymmetric/expert-novice dialogue.
4. And, and in consideration of a question posed by Howe et al. (2007), we consider whether the SRinG training programme should be seen simply as an antecedent to group work (whose effects are attributable to training at the beginning of the school year only) or as characterized in a developmental spiral with contributory aspects taking place throughout a school year.

4.4 Method

In Chap. 3 we explained that this study adopted a quasi-experimental design, within which we assessed how children changed over time and whether the SPRinG training was effective relative to a Control group. The sample consisted of 19 SPRinG classes (474 pupils in Years 1 and 2) and 18 Control classes (506 children in Years 1 and 2). Schools from which the SPRinG and Control classes were drawn were closely matched by proportion of free school meals and special educational

needs (see Table 3.1). In Chap. 3 we also described the research instruments used with early years children (Key Stage 1) and we summarize them here:

1. Attainment: PIPS tests for children aged 5 and 6 were administered in all SPRinG and Control classes at the start and end of the school year, allowing an assessment of school/cognitive achievement in mathematics and reading over time.
2. Systematic observation (OTS): Using an 'on the spot' systematic observation schedule, 6 target children per class were observed during the 'working' part of classroom lessons. Systematic observations were undertaken in all SPRinG and Control classes at three points in the school year: during the autumn, spring and summer terms. The three observation points allowed insight as to how changes in behaviour and communication took place over time and in relation to the SPRinG programme.
3. Communication: The same pairs of children in SPRinG and Control classes were asked to develop joint concept maps in each of the spring and summer terms. Only one pair of children was video/audio recorded per class for the two concept maps development sessions, and these recordings were analysed for demonstration of types of communication and interaction.
4. Motivation/Attitudes regarding classroom learning: The motivation questionnaire was administered to all SPRinG and Control classes at the start and end of the school year, allowing an assessment of change in children's attitudes and motivation to work with others in their classrooms. For children in Year 1 and 2 classes, we only focused on three of the scales: Personality, Attitudes to group learning and Peer/Self orientation to learning.
5. Classroom Rating Scale with regard to group working skills (S-TOP): The reflective rating scale was completed by researchers in the autumn and summer terms in the SPRinG classes and noted the extent to which teachers/classes took ownership of the SPRinG programme and the relationship between ownership and children's group working skills.

4.5 Results During and at the End of the Group Work Programme

4.5.1 Effects of SPRinG Training Over Time

4.5.1.1 Attainment in Mathematics and Reading/Literacy

To test whether pupils' attainment/learning in reading/literacy, and mathematics differed between the SPRinG and Control classes over the year, we draw on the PIPS results at the start and end of the school year. Children were tested in small groups of 3 or 4 children outside of their classrooms; ensuring that these young children were not distracted by general classroom activity and that all of the children's questions

Table 4.1 PIPS End-of-Year Test Scores by Year Group and SPRinG-Control (standard deviations in brackets)

	Reading Pre-test[a]	Post-test	Maths Pre-test[a]	Post-test
Year 1				
SPRinG	43.49 (36.42)	24.26 (14.10)	22.59 (9.196)	12.42 (5.63)
	$N = 170$	$N = 190$	$N = 170$	$N = 191$
Control	45.80 (33.42)	22.35 (13.39)	21.92 (8.54)	12.13 (5.49)
	$N = 214$	$N = 184$	$N = 214$	$N = 185$
Year 2				
SPRinG	21.27 (13.62)	51.82 (30.57)	9.31(6.28)	23.29 (8.170)
	$N = 203$	$N = 190$	$N = 203$	$N = 189$
Control	23.29 (11.97)	52.13 (27.18)	12.93 (5.51)	22.56 (7.490)
	$N = 243$	$N = 222$	$N = 243$	$N = 227$

[a] Year 1 pre-test results were based on the PIPS end of year Reception Class test (preceding the Year 1 test) and were marked on a different (higher scoring) scale from the PIPS Years 1 and 2 scale

and concerns could be addressed. The PIPS were administered by research assistants who were trained in the PIPS procedures and not informed whether they were testing children in SPRinG or Control classes. The analyses explored for differences between SPRinG and Control classes, while taking account of three factors: (1) children's performance may be affected by their year level in school (Year 1 or 2) and whether they were boys or girls; (2) assessment of end of year performance must account for initial (start of the year) performance—that is, analyses need to be made of the progress pupils make; and (3) children's performance is likely to be affected by the actual class that they are in (children tend to be more similar to others in the same class, as discussed by Paterson and Goldstein 1991). To account for these three points, a multilevel regression analysis was used to assess the effect of the SPRinG programme on attainment in reading/literacy and mathematics within the nested context of classrooms. The analyses accounted for classroom, attainment over the year with regard to initial attainment, year in school, SPRinG/Control group and gender.

Table 4.1 sets out differences between SPRinG and Control classes for reading/literacy and mathematics by Year in school. Results are presented as averages for the start and end of the school year for SPRinG and Control classes. As the table shows, scores for Year 1 SPRinG classes were lower than Control classes for reading and moderately higher for mathematics at the start of the school year. Initial simple statistical analysis showed that at the start of the school year there were limited attainment differences between children in SPRinG and Control classes (that tended to favour the Control classes). With regard to Year 2, at the start of the school year there was no statistical difference for reading between SPRinG and Control classes, and Control classes scored higher for mathematics (t (df = 444) = − 6.503, $p < 0.001$) than SPRinG classes. By the end of the school year, reading scores for the SPRinG classes improved more than Control classes (30.55– SPRinG versus 28.84– Control). Mathematics scores followed the same pattern (13.98– SPRinG versus 9.36– Control). These simple comparisons, though, do not account for the potentially confounding factors listed above, hence a multi-level regression was undertaken

Table 4.2 Multi-level analyses of attainment score: Significant main effect variables and interactions associated with reading/literacy and mathematics scores over the school year; Coefficients and levels of probability presented

Subject	Explanatory variable	Group/Term	Coefficient (SE)[a]	*P*-value
Reading/Literacy	Reading/Literacy (combining Years 1 & 2)	Linear Term	0.76 (0.06)	< 0.001
	Group	Control	0	
		SPRinG	0.23 (0.10)	< 0.02
	Sex	Females	0	
		Males	− 0.10 (0.05)	< 0.03
Mathematics	Mathematics	Linear	0.81 (0.06)	< 0.001
	Year 1	Control	0	
		SPRinG	(0.13)	< 0.99
	Year 2	Control	0	
		SPRinG	0.71 (0.13)	< 0.001

$N = 661$, representing all pupils in Years 1 and 2 with (both) pre-test and post-test scores in Reading/Literacy and Mathematics

[a]In this table the differences are expressed in standardised beta weights which show the difference between SPRinG and Control in terms of a standard deviation. The standard deviation (SD) is a measure of the variability of the data. To give the reader a sense of the magnitude of the difference (sometimes called the 'effect size'), a difference of 0.2 SD is the equivalent of a child performing at average level moving up 8 % in the distribution; and a difference of 0.7 SD would be the equivalent an average child moving to the top 24 % of the distribution

to test for levels of significance by year, gender, and reading and mathematics (Table 4.2).

The multi-level analyses of *reading* scores showed the following significant differences:

1. Increased attainment over the school year for all pupils;
2. SPRinG classes gained more than Control classes;
3. Girls achieved at slightly higher levels than boys; and
4. There was no effect for year in school.

Multi-level analyses of *mathematics* scores produced results that were a little different, and showed the following significant findings:

1. Increased attainment over time for all pupils;
2. SPRinG classes gained at significantly higher levels than Control classes in Year 2 (although there was no significant difference at Year 1); and
3. No effect for gender.

A final analysis considered whether children of different levels of initial attainment (as measured by the PIPS tests at the beginning of the school year) in SPRinG classes benefited differently from participation in group working when compared to Control classes. In these analyses, Year level was not differentiated and 'change' from pre- to post-test was averaged for reading and mathematics. Analyses divided initial levels of attainment into three groups—low, middle and high attainers. Results showed that

SPRinG and Control classes had different change profiles. The greatest improvement in the SPRinG classes was found in lowest attaining children, followed by mid- and high-attainers. In the Control classes, mid-attaining children improved the most, followed by low- and high-attainers. While the SPRinG attainment profile differed from the Control profile, within the SPRinG classes the attainment differences did not reach a level of significant difference for each Year level (for mathematics and reading); thus all children gained equally through participation in the SPRinG programme.

4.5.1.2 Systematic Observation of Behaviour

As described in Chap. 3, we used a systematic 'on the spot' observation schedule (OTS) to code behaviours and actions undertaken in classrooms in the autumn, spring and summer terms. The observations focused on 6 'target' children per class—in each of the SPRinG and Control classes and provide descriptions of changes in classrooms and interpersonal settings in which learning took place over the school year.

Initial analyses showed that the 'Learning Context' was different for SPRinG and Control classes in each of the three terms. In the autumn term, Learning Contexts were significantly different (X^2 (4, $N = 1744$) $= 294.033$, $p < 0.001$); with Control classes were more likely to engage in individual work, adult-led groups and pupil plenaries while SPRinG classes were more likely to engage in whole class work and pupil group work settings. Observations undertaken in the spring term, showed that all classes decreased in the proportion of individual setting and increased in group work, and there was a statistically significant difference between SPRinG and Control classes (X^2(4, $N = 1484$) $= 115.703$, $p < 0.001$); Control classes maintained high levels of individual work setting while SPRinG classes showed higher proportions of adult-led groups, pupil group work, and pupil plenaries. Observations in the summer term showed the most dramatic differences between SPRinG and Control classes. The SPRinG classes spent nearly 83 % of their observed time in some form of group work (either peer-based or adult-led) while the Control classes only spent 47 % of this time in group work. The difference in work setting in the summer term was significant (X^2 (4, $N = 1278$) $= 229.058$, $p < 0.001$); Control classes maintained a high proportion of individual work and whole class work while the SPRinG classes increased their proportion of pupil group work, maintained a high proportion of adult-led group work and increased in proportion of pupil plenaries. Table 4.3 indicates that the SPRinG classes began using the group work setting to undertake their learning tasks early in the school year and developed this practice with varying proportions of adult-led group work while decreasing in the whole class work setting. Control classes maintained high levels of individual and whole class setting through the year; these classes increased their proportion of pupil group work in the spring term and the amount of group work reached a plateau (and did not rise any higher) between spring and summer terms.

The importance of the development of group working over the school year is emphasized in the analysis of Subject being taught during the Learning Context observations. Before we present these results we remind the reader that the SPRinG

Table 4.3 Characteristic Work Settings of SPRinG and Control classes for each term: Number of observations (percentage of total observations in brackets)

Learning Context/ Condition	Individual	Pupil Group	Adult-led Group	Whole Class	Pupil Plenary	Total (count only)
Autumn term						
SPRinG	99 (11.5 %)	283 (32.8 %)	54 (6.3 %)	426 (49.3 %)	2 (0.2 %)	864
Control	368 (41.8 %)	162 (18.4 %)	125 (14.2 %)	213 (24.2 %)	12 (1.4 %)	880
Spring term						
SPRinG	16 (2.4 %)	311 (47.1 %)	175 (26.5 %)	150 (22.7 %)	8 (1.2 %)	660
Control	153 (18.6 %)	332 (40.6 %)	153 (16.5 %)	196 (23.8 %)	2 (0.2 %)	824
Summer term						
SPRinG	38 (7.2 %)	368 (70.1 %)	67 (12.8 %)	28 (5.3 %)	24 (0.5 %)	531
Control	235 (31.5 %)	328 (43.9 %)	22 (2.9 %)	154 (20.6 %)	8 (1.1 %)	747

Table 4.4 Amount of summer term subject activity by Learning Context and condition: Number of observations (percentage of total observations in brackets)

Subject/Learning Context	Condition	Reading	Mathematics
Individual	SPRinG	16 (10.5 %)	0 (0.0 %)
	Control	91 (26.6 %)	8 (6.7 %)
Pupil Group	SPRinG	46 (30.3 %)	229 (91.2 %)
	Control	192 (56.6 %)	66 (55.0 %)
Adult-led Group	SPRinG	43 (28.3 %)	17 (6.8 %)
	Control	9 (2.7 %)	13 (10.8 %)
Whole Class	SPRinG	23 (15.1 %)	5 (2.0 %)
	Control	47 (13.9 %)	33 (27.5 %)
Pupil Plenary	SPRinG	24 (15.8 %)	0 (0.0 %)
	Control	0 (0.0 %)	0 (0.0 %)

classes showed greater improvement in school attainment than Control classes in both reading and mathematics. Table 4.4 focuses solely on the summer term observations within mathematics and reading—the subjects that were 'tested' for by use of PIPS. The table shows that all classes undertook teaching and learning activities in individual, group and whole class learning contexts but there were differences in the setting used to approach reading and mathematics. SPRinG classes were more likely to undertake their learning activities in pupil and adult-led groupings for reading and mathematics while Control classes used pupil group, individual and whole class settings for reading and mathematics.

Looking now at summer term observations, Table 4.5 shows a number of differences between SPRinG and Control classes when target pupils worked as individuals or as members of a group. The observations showed that, generally, all pupils undertook the learning task assigned by the teacher, but SPRinG pupils were more involved in 'task preparation' while Control pupils were more likely to be 'off-task active'. There were few observed interactions between the target children and their teachers, so this analysis was not pursued. Within the group activity setting, there

Table 4.5 Target children's Individual and group activity by condition for the summer term: Number of observations (percentage of total observations in brackets)

Activity	Condition	Individual activity	Group Activity
On-task	SPRinG	35 (83.3 %)	314 (83.5 %)
	Control	173 (79.7 %)	261(73.9 %)
Task preparation	SPRinG	1 (2.4 %)	0 (0.0 %)
	Control	0 (0.0 %)	10 (2.8 %)
Procedure/routine	SPRinG	0 (0.0 %)	1 (0.3 %)
	Control	4 (1.8 %)	6 (1.7 %)
Social	SPRinG	0 (0.0 %)	6 (1.6 %)
	Control	0 (0.0 %)	27 (7.6 %)
Off-task active	SPRinG	1 (2.4 %)	36 (9.6 %)
	Control	20 (9.2 %)	25 (7.1 %)
Off-task passive	SPRinG	5 (11.9 %)	19 (5.1 %)
	Control	20 (9.2 %)	24 (6.8 %)
	Total Number	259	729
	SPRinG	42	376
	Control	217	353

were a number of differences between SPRinG and Control classes overall (X^2 (5, $N = 729) = 33.693$, $p < 0.001$). The differences are explained by: SPRinG children showed a higher proportion of 'on-task' working while Control children were likely to engage in 'social' (non-task) activity, 'task preparation' or working procedurally through the task.

With regard to changes in pupil-pupil interactions over the school year, initial analyses showed that in the autumn term the target pupils of the SPRinG and Control classes had similar levels of interaction within their own groups and with children in other groups in their classrooms. By the summer term observations, pupils of the SPRinG classes were more likely to interact within their own group than pupils from the Control classes ($\chi^2(1, N = 594) = 8.62$, $p = 0.003$); with SPRinG pupils maintaining their high level of own group interaction (89 %) while Control pupils decreased in own group interaction from 90 to 80 %. Observations of cognitively engaged talk showed that this type of talk was most likely to take place between pupils in SPRinG classes; 87 % of this talk was found in SPRinG classes with 13 % in Control classes, allowing us to speculate that the SPRinG group context provided a substantive basis for collaboration associated with children's knowledge development. Overall, these comparisons over the school year, showed that children in the SPRinG classes were much more likely to work productively in a group setting, were more likely to stay on-task within their groups and to demonstrate higher levels of cognitive activity.

4.5.1.3 Communication within Pairs Undertaking Joint Concept Maps

The concept map analysis provided further insight into the effects of SPRinG on the quality of collaborative communication and co-operative support activity that children displayed when working together. The data reported here is from children's paired work on concept maps in the spring and summer terms (explained in Chap. 3).

Table 4.6 Coding of Fogel contextual/framing activities in spring and summer term by condition (percent by term by condition for each row)

Condition	Activity											
	On-task*		Off-task**		Child intervention		Teacher Intervention		Teacher to whole class		Non-codable	
	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.
SPRinG	82.3	90.5	3.9	1.7	1.1	0.4	6.8	2.6	3.9	3.8	1.8	0.6
Control	84.4	80.2	4.6	12.3	0.2	0.9	0.9	0.6	10.0	5.8	0.3	0.2

* ANCOVA: F (1, 21) = 5.51, $p = 0.03$
** ANCOVA: F (1, 21) = 5.97, $p = 0.025$

Table 4.7 Coding of Fogel communicative activities in spring and summer term by condition (percent by term by condition for each row)

Condition	Communicative activity									
	Symmetrical+		Asymmetrical+*		Unilateral		Unengaged**		Disruptive	
	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.	Spr.	Sum.
SPRinG	42.2	53.1	18.4	16.1	10.8	7.7	24.9	19.8	0.9	0.3
Control	31.9	32.9	8.6	3.8	8.5	9.8	50.8	52.9	0.7	0.5

+ Combined co-regulation ANCOVA: F (1, 21) = 3.70, $p < 0.05$
* ANCOVA: F (1, 21) = 14.204, $p = 0.001$
** ANCOVA: F (1, 21) = 9.131, $p = 0.007$

We obtained observations from 23 pairs of pupils. Twelve pairs were recorded in SPRinG classes and eleven pairs were recorded in Control classes. Each of the pairs was randomly selected for recording in the spring term, and pairings were structured by class teachers such that the partners in each pair were able to work with each other.

Videotapes of the paired interactions were analysed for proportions of time attributed to each of Fogel's (1993 adapted for child-peer talk) communicative interaction categories—framing and communication. With regard to the frame in which the concept map activity took place, there were noticeable differences between SPRinG and Control children (see Table 4.6). The main differences between SPRinG and Control pairs over the two terms were: (1) SPRinG pairs increased in their on-task, and decreased in off-task, child (non-partner) intervention and teacher intervention; and (2) Control pairs decreased in on-task and teacher to whole class, and increased in off-task and child (non-partner) intervention. Analyses of covariance (ANCOVAs) were undertaken for the frame activities to test for changes in the general classroom setting within which peers co-constructed their concept maps. The summer term percentage was drawn upon as the dependent factor and the spring term percentage entered as a covariate. Statistically significant differences showed SPRinG pairs as opposed to Control pairs) were more likely to stay on-task and less likely to stray off-task.

With regard to communicative interaction, further differences were found between the SPRinG and Control pairs over the two terms (see Table 4.7) for proportions of coded behaviours and statistical results. Before explaining these analyses, it should

be recalled that the first videotaping of the pairs took place in the spring term, hence the SPRinG pairs had already received a full term of the intervention. Analyses of covariance were undertaken to test for communicative changes between the spring and summer. The increase in symmetrical or mutual communication between partners appeared large for the SPRinG pairs, but not significant. With regard to asymmetrical or expert/novice communication, the difference between SPRinG and Control pairs was statistically significant with Control pairs decreasing more than SPRinG. An ANCOVA for a combined (symmetric with asymmetric) co-regulation ANCOVA was run and showed a significant difference with SPRinG pairs displaying higher levels of co-regulated communication than Control pairs. The ANCOVA for unilateral communication showed a decrease for SPRinG pairs and an increase for Control pairs, but the difference between conditions was not statistically significant. With regard to unengaged activity over the two terms, there was a similar decrease in SPRinG pairs and an increase in Control pairs. Overall, and with regard to our previously stated concern as to what types of communication were most strongly associated with cognitive/attainment gain, these analyses showed that the SPRinG pairs started the spring term with higher levels of symmetrical and asymmetrical co-regulation than Control pairs. Within these analyses, mutuality within symmetrical communicative activity increased while the expert/novice orientation of asymmetric communication informed information sharing remained constant. Pairs from the Control classes did not develop in their symmetrical communication, decreased in their asymmetrical communication and showed a small increase in unilateral communication. During these two terms, SPRinG pairs were consistently more engaged with their task than Control pairs. The children in SPRinG classes appeared to be working in a classroom environment that was more conducive to mutual sharing of information and less threatening for its pupils.

4.5.1.4 Motivation and Attitudes Regarding Classroom Learning

Analyses were undertaken separately for Years 1 and 2 as we felt that, like mathematics, there may be a difference between year levels that may be related to amount of children's school experience. Peer/Self Orientation to learning proved to be the most reliable scale for comparison, and our analyses will focus on this main dimension, while mentioning a few other responses where results are of interest. With regard to the Peer/Self Learning Orientation scale, there was no significant difference between SPRinG and Control classes in the autumn pre-test. At the post-test, SPRinG classes showed significantly higher scores than the Control classes—indicating that SPRinG children preferred group and paired work to support their learning rather than working as individuals, $F(1,249) = 5.39$, $p < 0.02$ $d = 0.30$). An ANCOVA for individual items of the Peer/Self Learning Orientation scale showed that the pupils of the SPRinG classes gave higher scores than pupils of the Control classes on the items "I work well", $F(1, 250) = 5.676$, $p < 0.02$, "I learn most", $F(1, 250) = 5.674$, $p < 0.02$, and "I think best", $F(1, 249) = 7.15$, $p < 0.001$; these higher scores indicate that children in the SPRinG classes increased their preference for working in

Table 4.8 Comparison of SPRinG and Control class rating scales for spring and summer terms: Average scores on 4 pt scale (standard deviations in brackets)

Rating item	Spring term SPRinG	Control	Difference	Summer term SPRinG	Control	Difference	ANCOVA
Classroom conducive to group work	3.50 (1.19)	4.00 (1.33)	NS	3.70 (1.30)	4.13 (0.99)	NS	F 2,24 = 16.161 $p < 0.001$
Group size conducive to group work	3.45 1.05)	3.70 (1.42)	NS	3.90 (1.07)	3.25 (1.70)	NS	F 2,24 = 20.838 $p < 0.001$
Tasks conducive to group work	3.45 (0.99)	2.60 (1.27)	F 1,28 = 4.044, $p < 0.05$	4.00 (1.08)	2.25 (1.04)	F 1,26 = 15.420, $p <$ 0.001	F 2,24 = 18.295 $p < 0.001$
Teacher encourages group work	3.25 (1.64)	2.70 (1.52)	NS	3.85 (1.27)	2.25 (1.28)	F 1,26 = 9.045, $p < 0.006$	F 2,24 = 12.543 $p < 0.001$
Pupils engage in group work	3.15 (1.09)	2.30 (1.06)	F 1,28 = 4.131, $p < 0.05$	3.65 (1.31)	2.25 (1.58)	F 1,26 = 5.820, $p <$ 0.023	F 2,24 = 11.174 $p < 0.001$
Pupils encourage group work	3.15 (1.09)	2.80 (1.32)	NS	3.70 (1.30)	2.38 (1.19)	F 1,26 = 6.190, $p < 0.02$	F 2,24 = 11.630 $p < 0.001$

small groups or pairs and decreased in their preference for working individually with regard to working hardest, learning most and thinking best. Control classes maintained their preference for working individually. With regard to Year 2, the Peer/Self Learning Orientation scale showed no significant SPRinG/Control differences on the pre-test scores—but there was a significant difference between pre- and post-test, $F(1, 370) = 11.38$, $p < 0.001$, indicating that children in the SPRinG classes had a greater preference for learning in small groups and pairs than children in the Control classes.

4.5.1.5 Classroom Rating Scale

As explained in Chap. 3, the Classroom Rating Scale (S-TOP) was a reflective instrument used to assess how the use of pupil groups was coordinated into the everyday classroom. The Rating Scale was only used in the spring and summer terms and results are presented in Table 4.8. The table shows that there were few differences between the SPRinG and Control classrooms with regard to their layout and the size of groupings that pupils were asked to work in during each of the spring and summer terms. By the start of the spring term, teachers in the SPRinG classes were already setting more learning tasks that encouraged group work than teachers in the Control classes—and this was even more pronounced in the summer term. SPRinG teachers, themselves, encouraged group working among the children to a slightly

(not significantly) greater extent in the spring term and significantly more in the summer term—when compared to the Control teachers. And, amongst the children, SPRinG children were more likely to engage in group working during both terms, but only showed significant/active encouragement of their peers in the summer term. The final column of analyses of covariance displays a stronger set of results. With regard to Classrooms being conducive to group work, Control classes consistently scored higher than SPRinG classes—although there was greater movement towards a better classroom environment in the SPRinG classes over the two terms. Significant results regarding group size for group work showed that SPRinG classes improved over the year while Control classes decreased on this scale. Structuring (learning) tasks for and teacher encouragement of group working appeared to be problematic for both SPRinG and Control classes, although there were less negative effects over time in SPRinG than Control classes. And with regard to pupil engagement in group work, children in the SPRinG classes appeared to benefit more than children in the Control classes. Overall, results from the rating scales show that all classrooms were set-up for group working and used pairs or small groups to undertake learning tasks. Differences between the SPRinG and Control classes appeared in the spring and summer terms—with regard to tasks being organized for group working as well as teachers and children encouraging group working within their classes and small groups.

Knowing that there were differences between SPRinG and Control classes in the ways in which the teachers set-up their classrooms, encouraged children to participate and children's actual participation, further analyses explored for similarities and differences within the SPRinG classes only. For clarity, and in order to ascertain the effect of participation of the group work intervention, these analyses focused on the 12 SPRinG classrooms that contributed to the communication/concept map aspect of the study; this allows a comparison of effectiveness of context set-up for group working skills by the teacher with application to the children's communication skills. Analyses drew upon the six Classroom Rating Scale items referred to in Table 4.8, and added two further items that describe how well the teachers implemented aspects of the intervention programme and whether the teachers were able to describe and discuss the fundamental features of their intervention programme. The means for each of the Classroom Rating Scales between spring and summer terms (Table 4.9) show a general improvement over time for the 12 teachers. The range of scores in the summer term, though, indicates that not all of the teachers improved equally.

Table 4.10 focuses on the relationship between the rating scale scores and actual communicative/group work skills of the children. The table was constructed to show how the variation in end of intervention summer-term scores correlated between rating scale items and aspects of communication and group work activity. The table shows that: (1) where there was a significant and high positive correlation, teachers/classes that scored high on the rating scales also scored high in the communication items; and (2) teachers/classes that scored low on the rating scales also scored low in the communication items. The table shows that there was a consistently high positive (0.80 average) correlation between 'symmetric' co-regulation or mutual sharing when undertaking the paired concept mapping task, and all Classroom Rating Scales.

Table 4.9 Scores on reflective rating scales during spring and summer terms for SPRinG classes only

Reflective category/term	Term	Mean	Standard deviation	Range (min-max)	Number
Classroom environment: conducive to group work	Spring	3.58	1.165	1–5	12
	Summer	4.00	1.279	1–5	12
Size/composition of groups conducive to group work	Spring	3.50	1.168	1–5	12
	Summer	4.08	1.165	1–5	12
Tasks/resources conducive to group work	Spring	3.67	0.985	2–5	12
	Summer	4.17	1.115	2–5	12
Adults encourage high quality group work	Spring	3.25	1.215	1–5	12
	Summer	4.17	1.115	2–5	12
Pupils engaged in high quality group work	Spring	3.25	1.055	2–5	12
	Summer	3.92	1.165	1–5	12
Pupils showing support for others in group work	Spring	3.25	1.055	2–5	12
	Summer	4.00	1.128	1–5	12
Implementation of SPRinG training	Spring	3.92	1.084	2–5	12
	Summer	4.42	1.240	1–5	12
Teachers describe and discuss Spring ideas	Spring	3.58	1.311	1–5	12
	Summer	4.42	1.379	1–5	12
Average of reflective scores	Spring	3.46	1.062		
	Summer	4.15	1.123		

Table 4.10 Correlations between communication actions and Reflective Rating Scale items for SPRinG summer term classes only

Reflective category/term	Symmetric Co-regulation	Asymmetric Co-regulation	Unilateral	Unengaged	Disruptive
Classroom environment: conducive to group work	0.827***	– 0.408 NS	– 0.827***	– 0.692**	0.311 NS
Size/composition of groups conducive to group work	0.759**	– 0.525 NS	– 0.699**	– 0.586*	0.288 NS
Tasks/resources conducive to group work	0.792**	– 0.195 NS	– 0.875***	– 0.743**	0.525 NS
Adults encourage high quality group work	0.792**	– 0.194 NS	– 0.875***	– 0.743**	0.525 NS
Pupils engaged in high quality group work	0.809***	– 0.137 NS	– 0.815***	– 0.793**	0.331 NS
Pupils actively involved in group work	0.812***	– 0.104 NS	– 0.910***	– 0.778**	0.288 NS
Implementation of SPRinG training	0.806***	– 0.003 NS	– 0.967***	– 0.824***	0.347 NS
Teachers take-on Spring ideas	0.801***	– 0.076 NS	– 0.955***	– 0.767**	0.311 NS

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Interestingly, there was a consistent negative correlation between 'asymmetric' co-regulation and all Classroom Rating Scales. There were also negative correlations between 'unilateral' and 'unengaged' categories and all reflective scale items. Thus, while the literature in Chaps. 1 and 2 may have predicted the findings with regard to symmetric co-regulation, unilateral and unengaged relationships, it is surprising that asymmetric was negative. And, children in classes with lower levels of SPRinG programme take-up were less likely to participate in mutual discussion and more likely to assert unilateral forms of communication and be non-engaged in their tasks.

4.6 Discussion

This chapter focused on the implementation and effects of the SPRinG group work programme over a full school with young children (at Key Stage 1, aged between 5 and 7 years old). This intervention drew upon the literature discussed in Chaps. 1 and 2, and in particular the social pedagogic principles of relational training, classroom context and role of the teacher discussed in Chap. 3. The research was undertaken in authentic classroom contexts, and compared SPRinG and Control classes on attainment in reading and mathematics, classroom behaviour, communicative activity and group aspects of motivation over the school year, using a quasi-experimental design. The results, especially with regard to attainment, are robust and provide a large scale evaluation of the positive outcomes and process (leading to those outcomes) that can be obtained from effective group work in classrooms.

A brief summary of our results shows that children in the year long SPRinG programme improved in their reading and mathematics scores more than expected over a normal school year as evidenced by comparison with Control children. Moreover, the behavioural, communicative and motivational evaluations provide a range of explanations as to why the SPRinG academic/cognitive attainment may have taken place. As teachers and children in SPRinG classes passed through initial aspects of relational training, the teachers significantly increased the use of groups for learning. As teachers and children became more confident in group working situations, we note that effectiveness could not be simply described as being 'seated in a group' to undertake learning activities. Behaviourally, SPRinG children spent significantly greater proportions of time-on-task and were less distracted than Control children. Communication among SPRinG children was more likely to be undertaken collaboratively, at a high cognitive level and mutually reciprocated. These actions within the groups characterized all children in SPRinG classes and engendered higher levels of support for learning. The study also shows that SPRinG children, while becoming more effective group workers, draw upon this experience in their growing preference for working with their classmates as opposed to working as individuals or in an amorphous whole-class situation. We now consider the results of this research with regard to the key social pedagogic principles identified in Chap. 2.

4.6.1 Relational Training

The study reported here (and further studies in Chaps. 5 and 6) began with the assumption that within class/interpersonal relationships need to be positive if they are likely to support attainment and development. The stance that places relational development and training as a precursor to attainment and development in the classroom contrasts with previous group work, collaborative and co-operative learning studies. These other studies did not 'problematize' relationships as a necessary initial stance in their programmes; rather they tended to see the development of positive relationships result from successful collaboration or co-operation. We are now in a position to assess whether effects of implementing the programme are associated with initial or post-study effects, a point raised by Tolmie et al. (2010). Our results indicate that a cyclic (possibly envisioned as a spiral) process provides the most appropriate description of the effect of relational training. Evidence for the cyclic process can be found especially with regard to the analysis of communication and to a lesser extent the analyses of classroom activity. Our consideration takes place against a background of higher gains in attainment in reading and mathematics over the school year (especially among initially low attaining children) and a developing motivational preference for learning to be undertaken in pairs and small groups in SPRinG than Control classes. Communication activity results in the SPRinG classes showed comparatively higher levels of co-regulated interaction (especially of symmetrical communication), task engagement and on-task focus by the spring term than the Control classes. And, by the summer term these communicative activities were even further developed in the SPRinG than Control classrooms. Thus, we can characterize the benefits of participation in this group work programme to be associated with initial classroom changes such as greater amounts of group working opportunities. At the same time, these group working opportunities take place with tasks that encourage group working, teacher encouragement of group working and children's co-support for group engagement. The initial impact of the intervention was higher levels of mutual and supportive engagement in SPRinG children's communication—especially symmetric co-regulation. These classroom actions laid the basis for longer-term development of collaborative communicative skills, higher levels of attainment and co-operative group-oriented motivation.

4.6.2 The Classroom as Conducive to Group Working

As identified above, there were a number of examples where group work was supported in the SPRinG classes. Through the year, examples of types of activity conducive to group work were displayed in both SPRinG and Control classes, although the SPRinG classes undertook these activities in a classroom context with an atmosphere where children were more likely to benefit from these group activities. Both the reflective rating scale and observations showed differences between SPRinG and Control classes in the spring and summer terms, such that times when

children were asked to work together, they were set tasks that were collaborative or co-operative and teachers modelled and supported children's working together. These observations show that the SPRinG classes participated in actions that can be said to be supportive of 'engagement' and 'connectedness' (Damon and Phelps 1989), 'participation' (Wertsch 1978) and developed a 'region of sensitivity' (Ellis and Rogoff 1982) within which cognitive and school development is enhanced. This 'region of sensitivity' is characterized by: high levels of mutual/symmetric communication and engagement; low levels of discursive and unilateral communication; and moderate levels of asymmetrical/expert-novice communication. The 'region of sensitivity' is further supported by a context of: high levels of 'on-task'; low levels of 'off-task'; and periodic supportive interventions by the teacher. It should also be noted that the 'region of sensitivity' and general social pedagogic progress that characterized the SPRinG classrooms were undertaken with children aged 5–6 years—showing that the introduction of group work training can be effective with young children. And, unlike previous studies that have shown children of this age can co-operatively learn specific knowledge in a curriculum-based programme (literacy: Mathes and Babyaks 2001; mathematics: Fuchs et al. 1997), this study showed that effective relational training does not need to be 'tied' to a specific curriculum subject but can be seen as a general relational skill used by all children in the classroom.

4.6.3 Role of the Teacher

It is worth recalling that the implementation of the SPRinG group work programme in authentic classrooms would not have been possible without the co-work and support of the SPRinG teachers. These teachers co-developed particular activities within the frame for implementation designed by the research team (Baines et al. 2009). The teachers also set up the conditions and supported group work within their classrooms by focusing on appropriate tasks, modelling and encouraging pupil development and allowing the time and space for effective group work activities. Teachers in the most effective SPRinG classrooms adapted their classroom environments to be conducive to group work—including arranging the physical layout of the classroom, providing greater opportunities for children to engage in group work, supporting relational activities in their everyday classroom activities and allowing groups to 'get on' without too much teacher direction and intervention. Provision of a programme like SPRinG and its classroom implementation, though, does not necessarily mean that all teachers will be as effective in their social pedagogic role. As identified in Table 4.10 (and similarly described as 'SPRinGLite' in Chap. 7), there will be teachers in any programme who do not take the programme's principles fully to heart—these teachers and their pupils will not gain as much intellectual, behavioural or motivational benefit as the teacher fully committed to SPRinG.

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Chapter 5
Improving the Effectiveness of Collaborative Group Work at KS2: Effects on Pupil Attainment, Classroom Behaviour and Attitudes

5.1 Introduction

The previous chapter dealt with results from the youngest pupils involved in the SPRinG study—pupils aged 5–7 years (Key Stage 1). In this chapter we look at the effect of SPRinG on older primary aged pupils—aged 7–11 years (Key Stage 2). At KS2, similar to KS1, we embarked on an ambitious and extensive project which sought to develop a programme of group work that could be successfully integrated into class and school life. As described in Chap. 3, the SPRinG programme was founded on several key principles: a 'relational' approach, the nature of teacher involvement, ways of structuring the classroom environment and curriculum and group work activities. And, following Galton and Williamson (1992), teachers were heavily involved in the design of the programme and the joint development of strategies likely to lead to high quality group-work.

Our overall aim was to evaluate the effectiveness of the SPRinG programme in terms of three main outcomes: pupil attainment; classroom interaction and pupil classroom engagement; and pupil attitudes and motivation to group work and learning. At the same time, there were a number of design features that were particular to KS2 and there were some differences and extensions in the specific research questions addressed. We now explain the background to these, for each of the three 'outcomes' in turn.

5.1.1 Attainment in the Classroom

5.1.1.1 Why Science was Chosen at KS2

The first way we evaluated the SPRinG programme was in terms of its effect on pupil attainment over the course of the intervention year. The decision to assess group work under normal classroom conditions over a full school year resulted in difficult decisions about research design and data collection. As we explained in Chap. 3, given the breadth of the programme there was no possibility of controlling

P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,*
Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_5,

all aspects of how teachers implemented group work into the curriculum. Part of the rationale of the programme was to encourage teachers to make informed decisions about how to use group work in their classrooms. But, as we explained in Chap. 3, to conduct a valid evaluation of the SPRinG programme at KS2 we imposed some commonality by first ensuring that all teachers conducted the initial non-curriculum specific activities followed by ensuring teachers used group work on a regular basis in science as well as in their preferred curriculum areas. Science was chosen because of the coverage in the curriculum of separate and clearly defined topics, the relatively easy way in which group work can be introduced, and the acknowledged role of social interaction in science understanding (Adey and Shayer 1994). Also, as explained in Chap. 3, science was selected for the practical reason that, in many primary schools in England, older pupils are allocated to 'sets' (i.e., classes formed of pupils of similar ability) usually for the teaching of the core subjects of maths and English. Setting complicated matters because it would mean that pupils might be taught by a teacher not involved in the SPRinG project. In contrast, pupils were not set for science and it would therefore be easier for teachers involved in SPRinG to carry out group work activities in that subject.

Finally, as described in Chap. 3, in order to evaluate the effect of the programme we measured pupil progress over the year by use of general 'macro' science assessments at the start and end of the year, and also, in order to provide a more specific assessment of SPRinG vs. Control pupils' progress in science, we developed 'micro' lesson outlines involving group work on two science topics, along with accompanying 'micro' assessments. In addition to the description in Chap. 3, there were two additional features of the evaluation of attainment at KS2.

5.1.1.2 Types of Pupil Knowledge and Delayed Effects

There is some uncertainty in the research literature about the types of knowledge most affected by group work—especially at the upper years of primary schooling. Most studies that involve classroom groups use co-operative methods to help children master fairly well defined skills or information (Slavin et al. 2003). However, Damon and Phelps (1989) argue that group work is best suited to learning processes which transcend current levels of understanding to reach a new cognitive perspective, rather than learning processes which involve the acquisition of new skills or procedures (which may be best furthered in contexts involving more skilful partners; see Howe et al. 2000) or the practicing of skills. It has also been argued that the act of engaging in collaborative interaction is good for developing critical thinking skills (Davidson and Worsham 1992) and higher order thinking strategies such as the analysis, synthesis and evaluation of knowledge (Bloom et al. 1956). Research on group work in the science curriculum also indicates that group work is effective for progress in conceptual understanding (Howe et al. 2000). This research by Howe et al. further reports delayed effects whereby students that have experienced group work continue to improve in their understanding after immediate testing without further coverage of the topic. In one study, delayed effects were evident 11 weeks

after the initial experience (Tolmie et al. 1993), suggesting carry-over benefits for cognitive processing following the experience of group work. In line with this research, the evaluation of SPRinG at KS2 addressed whether the SPRinG group work experience had stronger effects on particular types of knowledge, and also whether there was support for the idea of a delayed effect after the intervention. More details can be found in Baines et al. (2007).

5.1.2 Pupil-Pupil and Teacher-Pupil Interactions

The SPRinG programme was designed to raise levels of conceptual understanding and school attainment, but it was also designed to affect classroom interactions. There was a particular interest at KS2 in examining the ways in which involvement in SPRinG affected the interactions between pupils in the class, both in the group work context and more generally over the school year, and in the interactions between teachers and pupils. This interest was informed by what we saw as a main limitation of much previous research on group work. There has been extensive debate about cognitive processes likely to account for any cognitive advances resulting from group work (see O'Donnell and King 1999), but there is also a need to understand the classroom interactions that are likely to underpin and affect the impact of group work (Gillies and Kahn 2009; Webb et al. 2009). Although early social psychological research was interested in communication, interactions and engagement in the group, there is a need to know more from close scrutiny about the processes in group work which mediate and reflect learning in groups (see Webb and Palincsar 1996). In line with what was said in Chap. 2, there is also a need for more studies of group working processes in naturalistic settings, rather than in short term experimental manipulations.

Specifically, the KS2 study aimed to increase the likelihood of peer collaborative dialogue involving all group members in high (cognitive) level task related and sustained talk which included explanations, justifications and reasoning (see critiques from Barron 2003 and others). It also encouraged teachers to shift from direct teaching, involving statements and questioning, toward monitoring and scaffolding group interactions. Indeed, we felt that these were important educational goals in their own right and important in encouraging engagement in classroom and school life and democratic processes. In this sense the SPRinG project was designed to affect pupil-pupil discussion not only as a possible mediator affecting pupil learning but also as an educational outcome in its own right.

5.1.2.1 Pupil-Pupil Interaction/Dialogue

The first key principle of SPRinG was to develop in pupils relational skills that underpin successful group work. This led to several specific predictions concerning pupil-pupil interaction in groups.

Task Related Pupil-Pupil Interactions

A main purpose of the SPRinG project was to help pupils increase the amount of time spent in active and productive task related interactions with each other. Previous research supports the view that working together and task vocalization can be increased by group work training (Cohen and De Avila 1983; Slavin et al. 2003). Accordingly, it was predicted that as a result of involvement in the SPRinG project at KS2 there would be more interactions between pupils that were task related, i.e., concerned with the substantive nature of the work to be done, and less of the interactions would be 'off-task', either actively, e.g., in terms of fooling around or, passively, in terms of being distracted.

Group Participation and Ethos

The SPRinG programme's relational approach was designed to create 'connectedness' (Damon and Phelps 1989) between group members in terms of: a) increasing the degree of participation of all group members; and b) sustaining a positive and inclusive group ethos. In terms of group participation, many approaches to group work seek to overcome the problem that some members do not contribute equally to the group, e.g., by 'free riding' or 'social loafing' (Latane et al. 1979; Slavin et al. 2003). In the SPRinG project, strategies aimed to help pupils encourage each other to be involved in the group, help pupils themselves to deal with 'free riders', and work through difficulties caused by some children dominating, being isolated or withdrawn. Consistent with the aims of the SPRinG programme, we expected to find that the degree of involvement of all the group members would be higher than for children in the Control classes.

We also expected to find more proactive efforts to sustain a positive socio-emotional ethos within the group through group 'maintaining' as opposed to 'blocking' actions. The former describes contributions that facilitate interactions, for example by encouraging others, through comments like 'that's a good suggestion', by making sure everyone gets a chance to participate, defusing potential flashpoints, or helping group members. These proactive efforts can be contrasted with behaviour in groups which serves to block progress, e.g., by pupils refusing to participate or co-operate, and interrupting or ridiculing other group members. Such negative behaviour is a major reason why teachers can feel that group work can be unproductive. The SPRinG project through its relational approach deliberately aimed to reduce group 'blocking' and increase group 'maintenance', and so we expected to find more of the latter and less of the former in SPRinG classes.

Conversation Length: Substantial and Sustained Interactions

Researchers have been concerned about the fleeting nature of discourse topics during group interactions (Baines 1996; Dorval and Eckerman 1984; Galton and Williamson 1992). Slavin et al. (2003) review studies that identify elaborated contributions from

students as one component of good quality group work. In a similar way, Damon and Phelps (1989) have stressed how mutuality of peer interaction involved in collaborative learning can lead to discourse that is extensive and connected. Accordingly, as a result of involvement in SPRinG it was expected that discourse topics would be sustained for longer and would be less likely to be changed by group members initiating a new topic or talking off-task.

Type and Level of Dialogue: 'Inferential' and 'Text Based' Talk

A main prediction, in line with the aims of SPRinG, as well as previous research (e.g., Damon and Phelps 1989), was that SPRinG pupils would engage in more pupil-pupil collaborative discussion involving talk that aims to make reasoning explicit to others, e.g., through explanations, counter arguments, conditionals, and requests for justification and clarification. In other words, we expected more 'higher level' talk of the sort termed 'exploratory' talk by Wegerif et al. (1999) as well as 'justifications' by Tolmie et al. (2005) and 'argumentation' by Osborne et al. (2001). However, it became apparent from close observation of video tapes of groups working that there were two types of 'high level' talk involving joint reasoning. The first type of talk we call 'inferential talk' because it involved reasoning that drew on evidence or ideas that went beyond the text given to the pupils. The second, and lower, level form of reasoning we call 'text based talk' because pupils would often just refer to information provided by the text or worksheet to justify their views. We expected that pupils who participated in the SPRinG project would be more likely to engage in 'inferential talk'. A third, and still lower form of talk, observed on video tapes of groups, involved simply sharing information; this involved little effort to reason, explore the ideas further or to investigate the evidence, in a collaborative way, and we therefore expected less of this kind of talk in SPRinG classroom.

It might also be predicted that there would be more talk in SPRinG classes, not about its substantive content, but about planning and organizing the group (e.g., talk about who should take on what role, how the group is getting on). This prediction would follow from the activities and principles of SPRinG, and is what Webb and Palincsar (1996) mean by 'discussion of group functioning' and which we refer to as 'meta-group' talk. This kind of talk is in a sense developmentally prior to on-task talk, in that once groups resolve difficulties in working together they should be able to focus on the task at hand. Yager et al. (1986) found that engaging in group processing (analyzing positive and negative behaviours of group members) led to improved achievement. And, such talk can be distinguished from talk about organizing the task (rather than the group members), that is, talk about planning and preparation of materials connected to the task. We expected to find more of this procedural talk in Control classes because these children would be less skilled in getting on with group work and might well spend more time having to get the task and materials organized.

Disputes and Arguments Between Pupils

It is important to distinguish different kinds of arguments between pupils. Central to Piagetian accounts of the role of peers in cognitive development is the role of argumentation and cognitive conflict arising out of accommodating to another's point of view (Perret-Clermont 1980). However, there is a distinction between arguments and explanations to the group, involving an attempt at explanation or justification, in comparison to unsubstantiated disagreement. The latter is considered to be a developmental pre-requisite to argumentation (Howe and McWilliam 2001). We predicted that 'disputational' talk (Mercer and Littleton 2007), where the speaker defended an idea without explanation or compromise, would be less likely in SPRinG classrooms.

Differences Between Types of Pupils

As with effects on academic outcomes, we also examined whether all types of pupils benefited equally from SPRinG in regard to classroom interactions. We predicted that the relational approach involved in the SPRinG programme would, by its nature, serve to improve working relationships between all pupils, and would therefore minimize any differences between pupils in effects. We do not focus here on group differences in their own right but rather on whether any effects of SPRinG on classroom behaviour were influenced by two categories of pupil characteristics: prior attainment and gender.

5.1.2.2 Teacher-Pupil Interaction

The role of the teacher in the long term success of group work is crucial, but teacher involvement has varied in group work training programmes. Cohen and De Avila's (1983) results suggest that teacher involvement in groups can serve to lower pupil task involvement. On the other hand, in some group work programmes teachers are asked to set up the group and offer training to pupils, but then allow pupils to get on with the assigned work in their various seating groups. The SPRinG strategy was to strike a balance so that it helped teachers to set up and structure lessons involving group work, with particular stress on briefing and debriefing (Blatchford et al. 2005), and also to interact minimally but strategically with groups within lessons. The general aim of the SPRinG strategy was to lower the risk for pupils, while ensuring the challenge of tasks remained high, through a process of 'scaffolding', i.e., adapting and structuring the group work context and the task (see Palincsar and Herrenkohl 1999; Tolmie et al. 2005). The SPRinG programme stressed that it is important for the teacher to find time for the observation of pupils, and to spend time monitoring their behaviour. It was predicted that as a result of involvement in SPRinG, teachers would change their classroom behaviour, such that they would shift from direct teaching in favour of handing control of learning to pupils. We expected this to be most clearly seen in terms of higher levels of monitoring of pupils' work.

5.1.3 SPRinG and Pupil Attitudes/Motivation

A major test of the success of the SPRinG project was in terms of increases in attainment, and also positive changes in classroom behaviour and interactions, but as at KS1 we also investigated whether the SPRinG programme would have positive effects in terms of pupils' attitudes to group working and their liking of school subjects. We were also interested in whether the experience of group work affected perceptions of their own competency, interest and self-perceptions with regard to working in groups and learning within classrooms. In addition, aspects of self-esteem and self-efficacy were addressed. The specific measures of these areas developed in the project were common across the two primary sites (i.e., KS 1 and 2) and also the secondary school study (not reported in this book). We developed a common framework for addressing each area, following a careful review of the literature. The individual items were developed as reported in Pell et al. (2007) and summarized in Chap. 3. The main research question was whether the group work programme led to more 'favourable' motivational patterns and attitudes to learning

5.1.4 Particular Research Questions Considered in this Chapter

By way of summary of the work at KS2, we compared the SPRinG and Control classes in order to address whether the following predictions were confirmed:

5.1.4.1 Pupil Attainment

Involvement in the SPRinG group work programme would lead to increases in learning/attainment in science at both the micro and macro levels over the school year and in comparison to a control group

We were also interested in whether SPRinG involvement affected different forms of knowledge and understanding and also whether there were delayed effects after specific group work experiences. Further, we wanted to see whether the SPRinG programme differentially affected boys or girls and children of different prior attainment.

5.1.4.2 Classroom Interactions

We predicted that pupil-pupil interaction would be positively affected in SPRinG classrooms in terms of:

- more interactions between pupils being task related, i.e., concerned with the substantive nature of the work to be done, and less 'off-task' interactions, either actively or passively
- more involvement of all the group members in the group work

- more group 'maintenance' (contributions that facilitate interactions) and less group 'blocking' (refusing to participate or co-operate, interrupting or ridiculing other group members)
- more substantial talk and less talk that was fleeting and intermittent
- longer and more sustained talk and more connected to the task in hand
- fewer times when the group members started talking about something unrelated to the task topic
- more signs of collaborative discussion and explicit verbal reasoning especially 'inferential talk', rather than 'text based task, and less sharing information, with little effort to reason or explore the ideas further
- more talk about planning and organizing the group and less procedural talk about organizing the task
- less disputational talk, where the speaker defended their idea without explanation or compromise.

In addition, it was predicted that SPRinG teachers would:

- change their classroom behaviour, so that they would shift from more direct teaching to more monitoring of groups and work.

We also asked whether any effects of SPRinG on classroom behaviour were influenced by two categories of pupil characteristics: prior attainment and gender.

5.1.4.3 Pupil Attitudes and Motivation

It was predicted that attitudes to learning and group work would improve over the course of the school year as a result of involvement in SPRinG.

More information on the background and methods used in the study at KS2 can be found in Blatchford et al. (2006) and Baines et al. (2007).

5.2 Method

5.2.1 Sample

General details of the samples were given in Chap. 3. The overall experimental intervention at KS2 involved 265 Year 4 (8/9 years) pupils and 295 Year 5 (9/10 years) pupils from 21 classes in 12 London schools. The overall Control group sample came from a different area of London and involved 40 classes from 19 schools providing data on 486 Year 4 pupils (8/9 years) and 541 Year 5 pupils (10/11 years). The observation sample characteristics are given in Chap. 3 and Table 5.1.

Table 5.1 Details of SPRinG and Control samples

Methodology	Schools	Classes			Pupils			Number of observations			Groups within classes		
		Year 4	Year 5	Total	Year 4	Year 5	Total	Year 4	Year 5	Total	Year 4	Year 5	Total
SPRinG group													
On-the-spot observation	12	9	13	21[a]	60	75	135	3364	3659	7023	–	–	–
Video observation	7	6	3	9	54	42	96	1073	592	1665	18	13	31
Control group													
On-the-spot observation	15	17	17	32[a]	86	93	179	2781	3157	5938	–	–	–
Video observation	7	5	8	13	37	76	113	508	1163	1671	9	20	29

[a] Total is lower than sum of Year 4 and Year 5 because of mixed age classes (SPRinG = 1; Control = 2)

5.2.2 Attainment

5.2.2.1 Macro Attainment Measures

As described in Chap. 3, 'Macro' attainment measures were collected at the start and end of each school year. In order to understand the results we now provide a little more detail on the methods used. Government administered science tests did not exist for the year groups covered and so three specially designed tests were constructed. These were based on items drawn from Government designed 'Standard Assessment Tasks' for Year 6 that overlapped with the work covered by pupils in the previous and forthcoming year and were of varying difficulty. Items were simplified for younger children in a number of ways, for instance, by converting questions to a multiple choice format, reducing the number of options and so on. Items related to the themes of 'physical processes' and 'materials and their properties'. Three tests in total were developed. Test 1 was given to Year 4 pupils to be undertaken at the start of the year. Test 2 was undertaken by Year 5 pupils at the start of the year and by Year 4 pupils at the end of the year. Test 3 was undertaken by Year 5 pupils at the end of the year. Tests were designed to require interpretation of diagrams, tables and graphs and contained a mixture of forced choice questions and open ended questions. There were a total of 34 questions on each test. Items were included in each test on the two areas covered in the 'micro' activities (see below) of evaporation/condensation and forces. On the topic of evaporation/condensation there were 4 questions on the start of Year 4 assessment, 4 questions on the end of Year 4/start of Year 5 assessment, and 7 questions on the end of Year 5 assessment. On the subject of forces there were 4 questions in the start of Year 4 assessment, and 10 questions in the end of Year 4/start of Year 5 assessment and the end of Year 5 assessment. Tests were teacher administered and blind marked by independent raters and answers to open ended questions were judged for accuracy using Government agency (DfEE 1999 and associated Qualifications and Curriculum Authority Schemes of Work–Science) guidelines.

5.2.2.2 Micro Measures

As described in Chap. 3, 'micro' level tests were also developed. Activities and teachers' notes were specially constructed for the coverage of science topics of evaporation/condensation and forces. These were based on Government curriculum guidance and consistent with expected coverage of these topics, but we gave a central place to group work activities. The two sets of group work activities extended over at least two and a half hours each and could be covered in at least two lessons. The activities covered higher order problem solving skill (e.g., that involved thinking about and discussing particular scientific concepts, planning controlled science experiments). The evaporation/condensation unit was implemented during the spring term and the forces unit during the summer term. These science lessons were

accompanied by pre- and post-tests to measure change in learning/conceptual understanding and were completed in the spring and summer terms. Pre-tests were built into the start of the lessons and we asked for post-tests to be conducted two weeks after the activities were completed. The lessons and assessments were based on previous work (Howe et al. 2000; Millar et al. 2000; Russell and Osborne 1993). The lessons and tests were piloted in a separate sample of schools. Teachers reported that they found the lesson plans useful and that pupils had found them enjoyable. The tests consisted of items that predominantly focused on conceptual but also some procedural understanding. Questions focused on all of Bloom et al.'s (1956) categories of thinking but predominantly on application, analysis, synthesis and evaluation. Tests consisted of forced choice and open-ended items. The tests for the evaporation module consisted of 13 and 21 items for the pre-test and post-test respectively. Both the pre- and post-tests for the forces module consisted of 29 questions.

As explained in Chap. 3, teachers in Control classes covered similar science topics to those in the SPRinG group, including evaporation and forces (because they followed Government agency schemes of work widely available at the time), but the main difference was that the same topics were taught in a different way to that used in SPRinG classrooms, and the pupils had not experienced relational skills training. As with the SPRinG sample, Control pupils also completed the pre-test immediately prior to coverage of the topic, and post-tests were completed 2 weeks after topic coverage was complete.

5.2.2.3 Treatment of Data and Statistical Analyses

Multilevel statistical methods were used which allowed for the lack of independence in the results from different pupils with the same class teacher (Goldstein 1995). Two-level models with pupils contained within classes were used. All analyses factored in the pupil baseline attainment scores as a covariate. Results thus reflect the progress made by pupils during the school year. The comparison of SPRinG vs. Control pupils was included in all analyses, as this was the key variable of interest. The effect of prior attainment was also analyzed by categorizing pupils into three equal sized groups on the macro science pre-tests and then examining for statistical interaction effects with SPRinG vs. Control. The main effect of several other factors was examined: gender, percent of pupils in the school eligible for Free School Meals (% FSM), percent of pupils in the school that had Special Educational Needs (% SEN), percent of pupils in the school where English was not their main language (% EAL), but there were few significant results and these are not presented here. Of most interest, given the focus on SPRinG vs. Control, was statistical interaction effects, i.e., whether the effect of SPRinG vs. Control varied in relation to pupil attainment, gender and year group, to identify, for example, whether greater progress was made by one attainment group more than others. However, no interactions were found and results did not vary by sex, pupil ability or year group and thus will not be discussed further.

5.2.3 *Observation Measures of Pupil-Pupil and Teacher-Pupil Interactions*

The methodological tools for the analysis of the behaviour of pupils and teachers were described in Chap. 3. At KS2 the study involved two forms of observation: 1) On-the-spot (OTS) naturalistic observations of general categories of pupil behaviour across a normal school day and over the school year; and 2) detailed analysis of pupil talk and involvement in group-work from video tapes of researcher-designed group work activities. The OTS method recorded behaviour during normal classroom activities, so tested whether involvement in group work transferred to 'normal' classroom activities. The video analysis tested whether SPRinG and Control pupils differed in predicted ways when involved in the same selected group work task. The OTS analysis provided a quantitative template of classroom behaviour in SPRinG and Control classes, while the video analysis allowed a more fine-grained description of classroom talk and group working, and addressed research predictions. The two observation systems covered the research predictions relating to pupil and teacher behaviour listed above. The precise number of observations for both methods can be found in Table 5.1.

A feature of the analysis of the On-the-spot observation data used was the use of 10-second observation intervals as the unit of analysis. Observation points were therefore nested within individual pupils. This feature allows for greater accuracy and flexibility than cruder, but more commonly used, frequencies or proportions of behaviours for each pupil and also recognizes that observations from pupils in the same class will be more similar than observations from pupils in different classes; hence, multilevel statistical methods (Goldstein 1995) were used to allow for the non-independence of the data. We were also able to create variables formed by the co-occurrence of two behaviours in time, across different mutually exclusive sets. This was necessary when forming separate variables denoting times when a given instance of pupil-pupil interaction, in particular behaviours that were coded 'substantial', 'sustained' and 'high level', were also coded either on- or off-task. The creation of co-occurrence variables therefore allowed the formation of helpful combined variables (e.g., high level on-task interactions).

The video analysis recorded groups of pupils rather than individual pupils. Table 5.1 shows that the sample consisted of 31 SPRinG groups and 29 Control groups. There were on average 53.7 observations (one observation every 20 seconds) for each SPRinG group and 57.6 for each Control group. Videos were coded by an experienced researcher, trained in the application of the coding scheme, but not aware of whether groups were SPRinG or Control. A second observer coded 15 % of the group interactions. Agreement was high, reaching 89 % overall and for each mutually exclusive set was: 83 % for group participation and engagement, 86 % for socio-emotional maintenance, and 67 % for socio-emotional blocking, 88 % for discourse topic, and 87 % for type of pupil-pupil dialogue.

As interest in this part of the study was in differences in group interactions and dialogue the unit of analysis was the group rather than individual child. Total measures

were calculated for each group in terms of the above categories and differences between SPRinG and Control groups were calculated by analysis of variance (ANOVA). (As the data were at the group level, and there were insufficient numbers of classes, multi-level analyses were not used).

5.2.4 Motivational/Attitudinal Measures

At each KS these measures came from pupil self completed questionnaires involving rated items which, when added, formed a number of scales. The measures and methods were described in Chap. 3. Results were analyzed by analyses of co-variance (ANCOVA), with time 2 (summer-term) scores on the scales used as the outcome variables and time 1 (autumn-term) scores as co-variates. This analysis, like the analyses used on the attainment scores, examined whether the relative change in SPRinG pupils scores improved or declined at a different rate to the Control pupils.

5.3 Results

5.3.1 Attainment

Results from the analyses of macro and micro tests are presented in Table 5.2. These analyses are presented in terms of regression coefficients expressing the difference in SPRinG pupils relative to Control pupils, controlling for key variables including scores at the beginning of the year. It is likely that all pupils will make progress over the year and so another way of looking at the regression analysis is to say that it examines change over the year in SPRinG pupils relative to Control pupils.

5.3.1.1 Macro Tests

Results showed a significant difference between SPRinG and Control pupils on the end of year macro science tests, controlling for prior attainment and all other pupil background factors listed previously. Pupils in the SPRinG group obtained scores that were 0.2 standard deviations higher than those in the Control group (see Table 5.2). No other main or interaction effects were found with regard to sex or initial attainment level.

Comparisons of differences between SPRinG and Control pupils were also made on evaporation and forces items drawn from the macro science tests (see Table 5.2). Findings showed significant gains by SPRinG pupils over Controls on evaporation macro items with the average difference between groups being more than 0.4 standard deviations.

Table 5.2 The effect of SPRinG vs. Control and other explanatory variables on scores on the macro science, evaporation and forces macro test items and micro evaporation tests

Outcome variable	Coefficient (SE)[a]	*P*-value
MACRO TESTS		
Macro Science test		
Group (SPRinG vs. Control)	0.208 (0.083)	0.01
Evaporation items on Science Macro test		
Group (SPRinG vs. Control)	0.429 (0.081)	< 0.001
Forces items on Science Macro test		
Group (SPRinG vs. Control)	0.294 (0.077)	< 0.001
MICRO TESTS		
Evaporation Micro test		
Group (SPRinG vs. Control)	0.576 (0.220)	0.009
DELAYED TESTS		
Evaporation items on Science Macro test (micro post test as covariate)		
Evaporation micro post score	0.214 (0.046)	< 0.001
Group (SPRinG vs. Control)	0.234 (0.111)	0.03

[a] In this table the differences are expressed in standardised beta weights which show the difference between SPRinG and Control in terms of a standard deviation. The standard deviation (SD) is a measure of the variability of the data. To give the reader a sense of the magnitude of the difference (sometimes called the 'effect size') a difference of 0.2 SD is the equivalent of a child performing at average level moving up 8 % in the distribution; a difference of .3 SD would mean an average child moving up to the top 38 % of the distribution; and a difference of 0.6 SD would be the equivalent an average child moving to the top 28 % of the distribution

5.3.1.2 Micro Tests

Results for evaporation micro tests are also shown in Table 5.2. The results indicated that SPRinG had a very significant effect on the evaporation micro score. Pupils in the SPRinG group had scores that were over 0.5 standard deviations greater than pupils in the Control group.

While all SPRinG and Control classes covered the unit on forces, unfortunately insufficient numbers of Control classes returned both pre- and post-test data on this unit and thus micro test comparisons between conditions were not possible. However data for SPRinG pupils showed progress between pre- and post-test (pre-test mean = 46.6 %, post-test mean = 56.0 %, mean gain = 9.4 %) and, as already reported, end of year forces items on the macro test were in favour of SPRinG pupils.

5.3.1.3 Delayed Effects

It is also possible to examine whether effects of the micro evaporation lessons extended beyond the two week gap after the lessons and thus whether there is further progress (and therefore a delayed effect) by the end of the year. This was examined by using the micro post-test data as the baseline measurement and the evaporation macro test items as the outcome measure (see Table 5.2). Pupils in the SPRinG group

again had significantly higher attainment progress than the Control group (0.23 standard deviations). This change suggests that some of the benefit of group work lessons on evaporation came after the lessons were completed.

5.3.2 Pupil-Pupil and Teacher-Pupil Interaction

5.3.2.1 On-The-Spot Systematic Observations

In this section we examine the effect of SPRinG vs. Control on selected observation categories. Logistic regression analyses (see Blatchford et al. 2006) were conducted which examined the effect of SPRinG relative to Control classes, controlling for prior attainment and gender. Results focused on observations measures, controlling for the same observation measures collected at the beginning of the year –this analysis is therefore similar to the regression analyses of academic results and addresses the change over the year in SPRinG pupils' scores relative to Control pupils. Results are complex and the log linear statistics are not easily accessible. In the interests of brevity we summarize the significant results in the text below—all results cited are statistically significant unless mentioned. A full account of all analyses and results can be found in Blatchford et al. (2006).

Pupil-Pupil Interaction/Dialogue

Differences were examined between SPRinG and Control samples in the overall amount of time spent in the three main work mode categories, that is, individual/not interacting, teacher-pupil, and pupil-pupil. There was more working alone in Control classes, but there was more pupil-pupil interaction overall in SPRinG classes. There was more overall teacher-pupil contact in SPRinG classes by the end of the year.

Differences between SPRinG and Control samples for pupil-pupil on- and off-task interactions were also calculated. Pupils in the SPRinG condition engaged in more pupil-pupil on-task, and less pupil-pupil off-task behaviour, compared to pupils in the Control condition (task related talk in this analysis includes task preparation). Even having taken account of differences between SPRinG and Control pupils, there was a significant difference between sexes for both outcomes, with boys engaging in fewer on-task interactions and more off-task interactions than girls. Time in the year was also found to influence both outcomes, with observations at the end of the year showing more on-task, and less off-task than those recorded in the middle of the year. Pupil attainment was related to pupil-pupil on-task interaction, with both middle and high attainment pupils engaging in more on-task interactions than low attainment pupils.

Simple cross tabulation of pupil-pupil interaction categories with whether interactions were substantial or intermittent showed that in SPRinG classes more of their substantial interactions tended to be on-task (87 % vs. 69 %) and less were

off-task (23 % vs. 11 %) compared to Control classes. A similar cross tabulation involving sustained interactions and pupil-pupil interaction categories showed that for SPRinG pupils more of their sustained interactions were on-task (91 % vs. 69 %) and less were off-task (25 % vs. 8 %) compared to Control pupils. All results were statistically significant.

In order to be assessed in the analyses, substantial, sustained and high level talk were separated into whether they were on- or off-task (based on co-occurrences with on- and off-task behaviour–as described above). There were significant differences between SPRinG and Control pupils for high level on-task interactions; these interactions were much more likely in SPRinG groups than the Control groups. For substantial on-task interactions, the difference between conditions was found to vary by sex. There was no significant difference between conditions for girls, whilst for boys the outcome was more likely in the SPRinG condition than in the Control.

Results for pupil-pupil on-task intermittent, active and sustained interactions, indicated a significant interaction with time. For all three variables differences were significantly larger at the end of the year than in the middle of the year. Differences between SPRinG and Control pupils were particularly marked for sustained interactions. By the end of year SPRinG pupils were far more likely to engage in sustained on-task conversations. Interestingly, although SPRinG pupils engaged in less intermittent interactions than Control pupils, as we saw above, more of their interactions classified as intermittent were on-task.

A similar set of categories were created for the co-occurrence of substantial, intermittent, active, and sustained and whether off-task (co-occurrences of high level and off-task were too rare to be used to create a variable). There were no significant interactions between condition and any of the other variables. SPRinG pupils were less likely, and Control pupils were more likely, to engage in off-task substantial, intermittent contributions, and Control pupils were thus more active during off-task interactions. There was no difference between conditions for off-task and group work conversation combined.

Teacher-Pupil Interaction

SPRinG teachers were significantly less likely to interact with the observed pupils when they were the main focus of their attention at both the middle and end of the year. This means there was less teacher-pupil individualized interaction in SPRinG classrooms. The difference between conditions was greater at the end of the year. Teacher-pupil task related interactions (on-task plus task preparation) were also less likely in the SPRinG condition. On the other hand, adult monitoring of pupils was significantly higher in the SPRinG condition, and was significantly more likely at the end of the year. There was a suggestion that SPRinG teachers engaged in more talk with their pupils about procedural matters but this did not reach statistical significance.

Table 5.3 Mean % of observations for participation and engagement, socio-emotional ethos, discourse topic and type of dialogue by condition: video observations

Outcome variable	SPRinG $N = 31$		Control $N = 29$	
	Mean	SD	Mean	SD
Participation and engagement				
All actively involved	65.20**	24.83	35.85	22.04
All involved, some passive	5.26	8.42	8.31	11.45
All involved split	0.12	0.47	1.15*	2.56
Some uninvolved—off-task passive	9.03	8.82	9.90	10.76
Some uninvolved—off-task active	15.62	16.20	30.89**	19.86
All off-task	4.37	7.21	9.25	12.91
Socio-emotional ethos				
Group maintenance	10.94	6.76	12.13	9.71
Group blocking	3.53	6.13	13.35**	14.78
Discourse topic				
Sustained topic focus	22.91**	13.10	14.33	12.11
Changeable topic	30.58	12.59	44.70**	21.18
Other/no talk	44.94**	18.34	36.05	17.97
Type of dialogue				
Higher order—inferential	25.19**	16.42	9.20	8.57
Higher order—text based	12.00	7.11	12.62	8.85
Meta-group talk	11.24	8.50	11.31	10.01
Sharing information	17.4	9.11	25.26*	14.58
Disputational talk	0.16	0.88	1.06*	1.89
Reading out task	11.38**	6.64	1.94	3.52
Procedural talk	7.66	5.42	12.74**	8.51
Off-task talk	5.60	9.00	17.40**	16.21
Other/No talk	8.85*	8.74	4.05	4.50
Total observations	53.72	14.24	57.62	14.80

* $p < 0.05$; ** $p < 0.01$

5.3.2.2 Video Observations

Results from the analysis of video tapes of groups working on the pre-set tasks are shown in Table 5.3. The results showed a number of differences between SPRinG and Control groups. SPRinG groups were more likely to be actively involved in the group, less likely to be involved but split into subgroups, and less likely to have some uninvolved and off-task active. Control groups were more likely to have all group members off-task, though this just avoided statistical significance. There was much more group blocking in Control classes, but no significant differences between SPRinG and Control in group maintenance. Results on the changeability of the topic showed that the Control groups changed the topic more frequently than SPRinG groups, while SPRinG groups were more likely to sustain the topic focus.

In line with expectations and the OTS analysis, the video analysis showed that there was much more off-task talk in the Control groups. There was also more procedural talk in Control groups, and also more sharing information. Although

disputational talk was not common, it occurred more frequently in Control groups. In contrast, there was much more collaborative inferential talk in SPRinG groups, and also more reading out of the task. There were no differences between SPRinG and Control in collaborative text based talk and meta group talk.

5.3.3 Attitudes and Motivation

Findings indicated few effects of SPRinG over Control pupils on the attitude/ motivational measures. ANCOVAs with scores at time 1 (autumn-term) entered as a covariate showed no differences on the following attitudinal dimensions: The value of group work; Liking group work; Working well as a group Peer relations 'activator' and 'truculent'; Liking of school subjects English; Mastery Orientation; Performance Orientation. The only differences were on Liking of mathematics (F(1,782) 6.88, $p < 0.01$) and Liking of science (F(1,756)15.99, $p < 0.001$). Both of these results were explained by a deterioration in liking scores for the Control group, while the SPRinG pupils had similar scores at both time points.

5.4 Discussion

5.4.1 Attainment

With regard to attainment, the results at KS2 can be summarized as follows. The pupils who took part in the SPRinG programme made:

- more progress over the school year than the Control group on the overall 'macro' science tests;
- more progress than the Control group on the two 'macro' sub tests covering the areas of evaporation/condensation and forces;
- more progress than the Control group between pre- and post-test over specific lessons covering evaporation/condensation; and
- additional progress after the micro science lessons on evaporation to the end of year macro test.

Overall, the results show that involvement in the group work programme did not, as some teachers feared, impede progress in a mainstream curriculum area. Indeed, the SPRinG programme had a positive effect in terms of pupils' measured progress in science. The effect sizes associated with the difference between the SPRinG and Control groups and reported in Table 5.2 are equivalent to an average pupil moving up into the top third of the class. These results are impressive and consistent with those from another study of collaborative problem solving in science (Palincsar and Herrenkohl 1999). Evidence of greater progress on the micro evaporation tests made by SPRinG, as opposed to Control, pupils also reinforces the beneficial effects of using group work in science lessons. We believe these results are significant. The

results indicate that group work and progress in the basic areas are not mutually exclusive: the experience of high quality group work led to better progress in science understanding and knowledge, as measured in the tests we used. As we describe more fully in Chap. 3 and 8, we believe the design of the SPRinG project evaluation is strong enough to argue that these results are robust and deserve attention.

5.4.1.1 Type of Knowledge and Delayed Effect

Slavin et al. (2003) argue that much research on co-operative learning has addressed fairly well defined skills or information. In this study we deliberately assessed skills and understanding across various types of knowledge in science, ranging from descriptive and procedural knowledge to evaluative and analytical understanding. The assessments we used, particularly in the micro evaluation tests, tended to be weighted more toward higher order conceptual understanding than procedural knowledge. The results reported above showed that SPRinG pupils outperformed Control pupils on the micro tests and macro tests and it therefore seems that the SPRinG group work programme was effective at encouraging all types of knowledge.

It should also be noted that the effect of the micro science group work lessons continued after the lessons were complete, since further progress was evident between the micro post-test and the end of year evaporation macro test items. Though difficult to be sure, this suggests that knowledge and ideas resulting from a group work intervention, rather than fading from memory, may actually strengthen. We are unable to comment on whether this is due to further reinforcement of the area of science through additional work, or through some form of internal cognitive process of 'incubation' arising from peer collaboration, as suggested by Howe et al. (2005). Either way, these delayed effects are remarkable as they may be part of a more general learning process where partially learned ideas and principles become more stable or explicit over time, or could be part of an internalization of ideas developed through interactions with others, as outlined by Vygotskian and socio-cultural approaches (Rogoff 1998).

5.4.1.2 Pupil Differences

We also examined whether pupils differed in how much they benefited from the SPRinG programme. As was said earlier in this chapter, teachers were worried that only pupils who were already academically confident would benefit from group work, but we found that low attainers as well as middle and high attainers originally identified at pre-test made equal progress over the year. There were also no differences between boys and girls in the progress made over the year. Furthermore, there were no statistical interaction effects with the SPRinG vs. Control condition; in other words the effect of background factors like the proportion of pupils receiving free school meals and English as an additional language was the same in the SPRinG and Control schools. These results therefore suggest that all types of pupils benefited to a similar degree from the SPRinG programme.

5.4.2 SPRinG and Pupil-Pupil and Teacher-Pupil Interaction

The study at KS2 examined whether pupils and teachers in SPRinG classrooms changed their behaviour in predicted ways more than pupils in Control classrooms. At a general level, of the three main contexts for learning—that is, teacher-pupil interaction, pupil-pupil interaction and working alone—we found that involvement in SPRinG increased the amount of time pupils spent interacting with other pupils, but reduced the amount of time pupils spent working on individual activities. Moreover, results on pupil-pupil interactions in terms of whether they were on- or off-task, showed clear results favouring SPRinG involvement. Interactions between pupils were more actively task-related in SPRinG classrooms. In contrast, we found that Control pupils spent more time than SPRinG classes in active off-task interactions with each other, and this was found in both OTS and video observation analyses.

These results indicate that the SPRinG programme was successful in encouraging more interactions between pupils, at the expense of time spent working alone, and that these interactions were more work related and productive. These results are important in the context of the generally passive learning role that pupils tend to have in primary schools in England (Galton et al. 1999). What is encouraging is that involvement in SPRinG seems able to help fulfill the potential of group work to increase active engagement on tasks.

There were also clear results concerning the degree to which all group members participated. We found that within SPRinG groups all members were more likely to be involved in the activity. Control groups, on the other hand, had some pupils uninvolved, some actively off-task and some split into subgroups. We think these results are educationally important. As described above, one of the main concerns of teachers, supported by early observations in the SPRinG project, was the way in which some pupils failed to contribute to the group and this was a main factor inhibiting the development of good group work. We were seeking to empower pupils themselves to develop strategies to deal with 'free riders' in the group. A main aim of the SPRinG project was therefore to try to create the conditions within which group members were encouraged to get all to contribute, and in this regard it seems to have been successful.

Results on group 'maintenance' and 'blocking' were interesting and only partially in support of expectations. There was more group 'blocking' in Control groups, e.g., by refusing to participate or co-operate, interrupting or ridiculing other group members. This indicates that SPRinG had been more successful as predicted in reducing the amount of everyday negative behaviours between pupils in groups. Yet against expectations, we were surprised to find that there was little difference in the amount of group maintenance e.g., encouraging others to speak and participate. The observers' notes at the time of the observation provide a likely explanation. They perceived that, as a result of the SPRinG training and practice with group work, facilitation of others was now such an integral part of pupils' interactions and that there was little need to make encouraging verbal gestures to others. Other results also showed that SPRinG pupil-pupil interactions in groups were more productive and so there would be less need to help others.

We also found that SPRinG pupils in the OTS observations were more likely to engage in sustained interactions and there was more sustained talk in SPRinG classrooms at the end of the year. Furthermore, in SPRinG classes more of their substantial contributions tended to be on-task and less were off-task and more of their sustained interactions were on-task and less were off-task compared to Control pupils. These results support the view that involvement in SPRinG has again helped pupil-pupil dialogue in an educationally beneficial way. These results concerning pupil dialogue are complemented by results on group working, where we found evidence that SPRinG groups were more likely to sustain topics under discussion, while in Control groups pupils were more likely to change topics and thus not sustain them over time. As Slavin et al. (2003) argue, elaborated contributions from students are one component of good quality group work, and the presence of sustained peer interactions can be seen as one indicator of effective group work. When taken with results concerning on-task related interactions described above, there is support for the view that involvement in SPRinG resulted in extended and active engagement in tasks.

We then looked more closely at the type of interactions between pupils. A main prediction that pupil-pupil talk would show more signs of explicit verbal reasoning was confirmed by the OTS analysis. The video analysis extended these results. We found noticeably more 'collaborative inferential talk' involving reasoning that went beyond the information provided for the task. There was, however, little sign of a difference between SPRinG and Control groups in the lower level 'text based talk', which involved reasoning based on the text in front of pupils. A still lower form of talk, observed more often in Control groups, involved simply sharing information with little effort to reason, explore ideas further or investigate evidence. Taken together, these results suggest that involvement in SPRinG encouraged pupils to engage in more high order inferential forms of reasoning.

Against expectation, there were no differences in the video analysis in 'meta group' talk concerning planning and organizing the group, e.g., talk about who should take on what role, how the group is getting on, and what the group needs to do to meet aims of the task. Again the observers' notes were helpful: it was their impression that we had not fully anticipated how much the SPRinG pupils—during the videotaped sessions at least—seemed keen to just get on with the task and they did not seem inclined to reflect on how they were doing the task. It is probable that with such a straightforward and relatively short task, meta-group talk would not be warranted in the way it would be, for example, with a more complex group project.

We had also expected that there would be less pupil-pupil procedural talk in the SPRinG classes and this was confirmed by the video results. This indicates that Control group members felt more need to talk about procedures and materials, probably because they were less experienced and skilled at group work tasks. Overall, however, there was not a lot of this kind of talk in either SPRinG or Control groups in the OTS analysis—which is the best guide to its overall frequency in classroom life.

The SPRinG project was set up to encourage debate between pupils but with the use of reasoning and justifications, and so we expected the overall amount of pupil-pupil disputational talk to be lower. In the event we actually found very few disputes

in the videos, but there was a tendency for these to be more common in Control groups. The low frequency of debate overall seemed to reflect the fact that the pupils were fairly business-like and wanted to get-on with the task. We certainly found disagreements, but these tended to be more like counter arguments that occurred in the context of decision making.

These results from the observation analyses therefore provide a strong argument in favour of the beneficial role of SPRinG training on the quality of classroom-based group work. It seems that the relational approach adopted in training for group work has been helpful in terms of its positive and productive effect on the quality of relationships between pupils when working together. Effects of the relational approach were seen in results on the amount of interaction with peers, the amount of active, sustained, task related and higher order interactions with each other, and the degree to which pupils were all involved in the group work. SPRinG pupils' group work in these sessions tended to be more task than person focused. Overall, and in line with comments in earlier chapters, there is support here for the view that collaborative group work can, with the appropriate support provided by a programme like SPRinG, encourage more 'connectedness' between pupils (Damon and Phelps 1989), as seen in the increased joint involvement and reduced negative tone and probably provides a good example of learning within a 'region of sensitivity' (Ellis and Rogoff (1982)).

5.4.2.1 Differences Between Types of Pupils

Results showed few differences in classroom interaction and behaviour between pupils in terms of gender and prior attainment. Boys engaged in more pupil-pupil off-task and less on-task talk, and middle and high attaining pupils engaged in more on-task interactions than low attaining pupils. There were few signs that SPRinG worked in a positive way to reduce differences between boys and girls that might have been expected in general and therefore evident in the Control condition. Results were therefore in line with general expectations on differences between boys and girls and were far less significant than overall effects attributable to involvement in SPRinG.

5.4.2.2 Teacher-Pupil Interaction

In the SPRinG programme the teacher was encouraged to support group work through scaffolding contexts for group work and related activities and talk. As predicted, SPRinG teachers engaged in more monitoring of pupils than Control teachers, while teachers in Control schools engaged in more direct teaching, e.g., explaining and questioning, as well as preparing tasks for pupils. This is in line with other studies which report decreases in direct supervision after training in co-operative norms (Cohen and De Avila 1983). We also found that in Control classes pupils were more likely to be the individual focus of their teacher's attention.

It therefore seems that involvement in the project if anything led to more contact between pupils and the teacher, but that it led to changes in the balance of different kinds of teacher-pupil interactions in class, with a movement from direct teaching to monitoring and assessing pupil contributions. Given the findings just reported on the quality of group work in the SPRinG classrooms, this suggests that less teacher involvement in groups and a more strategic monitoring role—as we suggest in the SPRinG approach (see Chap. 3; and Baines et al. 2009)—can serve to increase pupil autonomy and task involvement. There has been much attention given, theoretically, to the scaffolding role of adults in relation to children's learning, and research has examined specific versions of scaffolding, e.g., reciprocal teaching (Palincsar and Brown 1984). We take this up more fully in the last Chapter of the book, but here we note that scaffolding can be considered in a more general way than just classroom talk. Implied in the SPRinG approach is the point that the scaffolding role of adults can be seen in linguistic terms but also in terms of classroom organization. We also suggest that the success of group work should not be seen as reliant exclusively on the extent of adult support. Though there is certainly a role for teachers in relation to group work, involvement in the overall SPRinG programme (as exemplified more fully in Chap. 4), with adherence to the SPRinG principles and developmental approach, can do much to create the conditions for effective group work, relatively independent of adult support. We extend this point in the last chapter.

5.4.3 SPRinG and Pupil Attitudes/Motivation

Results on the effect of SPRinG involvement on motivation/attitudinal dimensions were less clear cut than those on attainment and behaviour. We did find, however, that KS2 involvement in SPRinG arrested deteriorating attitudes to mathematics and science, found in the Control group. Over the year attitudes to subject areas in the Control group showed the typical fall-off found in other research (see Galton et al. 2003). Experience of the SPRinG programme seemed therefore to have arrested a decline in positive attitudes to subjects typical of pupils as they get older.

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Chapter 6
ScotSPRinG: The Effects of Group Work in Scottish Primary Schools on Attainment, Interaction and Classroom Relationships

Andrew Tolmie

6.1 Introduction

Research over the past 25 years has established beyond dispute that interaction between learners is a powerful and natural mechanism for promoting enhanced clarity of conception and articulation, but group work within schools has typically failed to make best use of this mechanism. As described in the preceding chapters, the SPRinG programme was a large scale investigation based in the South-East of England designed to develop, support and evaluate the impact of effective group work in primary schools at both Key Stages 1 and 2 (KS1 and KS2) of the English National Curriculum. This work was intended to generate an evidence-based, generalizable social pedagogy specifying: (1) the forms of productive group activity, (2) the conditions that facilitate these, and (3) how these conditions may be harnessed.

Among other key points, SPRinG established that even pupils as young as those in Year 1 are able to work effectively in groups, but that it is necessary to build up a relational basis for such competence via trust and communication exercises for it to lead naturally to productive forms of communication (e.g., the exploratory talk identified by Mercer 1995; or the disagreement-explication cycle defined by Howe and Tolmie 1998). One of the principal outputs of SPRinG was a set of resources designed to support teachers in the use of group work, including a manual of training exercises for use with their pupils (as presented in Baines et al. 2009).

The existence in Scotland of distinctive forms of organization of primary education offered an opportunity to assess the generalizability of SPRinG's resources and core social pedagogy. At the time of the research, curricular differences between Scotland and England were not large. Whilst the curriculum in Scotland did not have the same legal force as the National Curriculum in England, the 5–14 programme in use then had effectively the same stature because of its wholesale adoption by local authorities and the fact that local authority schools dominate provision in Scotland to a much

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P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,* Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_6,

greater extent than is the case in England. It also covered very similar curricular and teaching grounds. Even where there was a pertinent difference, namely the inclusion in 5–14 English Language of what amounted to training in the communicative aspects of group work, this did not correspond to the relational support identified as central by SPRinG. The use of group work in schools also has much the same tradition in Scotland as in England, i.e. an increased incidence during the 1960s, reflecting policy shifts towards child-centred teaching and the view that group work allowed appropriate differentiation of ability levels in classroom activities; followed by its espousal as essentially an organizational device rather than as a teaching strategy. Thus in Scotland, too, the principal issue motivating the SPRinG research held and continues to hold true: group work exists, but it is frequently not *effectively planned or drawn upon* (Darling 1999).

It was exactly this broad curricular and historical comparability that allowed research to be undertaken in Scotland that addressed the generalizability of the SPRinG resources from a social pedagogical perspective without the confounding effects of other key differences. Where Scotland does differ markedly from England (particularly the South-East) is in its inherently greater variation in primary school size, and in class and group characteristics. The variation in school size is a result of the much wider range of urban and rural communities to be found in Scotland, with small village primary schools remaining common in many areas. Where schools are linked to small communities in this way, one consequence is that pupils typically possess much greater familiarity with each other and with each other's families. Thus in terms of the framework of influences on effective group work identified by SPRinG, children in such schools might be expected to have stronger pre-existing relational bases for joint activity, and to fall more naturally and competently into group work as a result (cf. early research by Shapira and Madsen 1969, on the greater co-operative tendencies within school of children from more collective communities).

However, community schools of this kind also commonly make use of composite classes (i.e., those with a mixture of ages) because the small number of pupils in these schools makes strict age banding impractical, and children have more individualized learning programmes to redress the resulting within-class diversity. Joint activity in such classes may therefore be less common. Where it does occur, it is likely to entail interaction between children of different ages and differing levels of expertise, potentially altering the dynamic from one of collaboration between peers to one of tutoring of the junior partner by the senior (cf. Piaget 1932; Rogoff 1990; Howe et al. 2000).

Given the positive outcomes reported in the literature on peer tutoring (e.g., Topping and Ehly 1998), this does not entail that group work is necessarily less effective under mixed-age conditions. However, it may well alter the operation of factors such as the relational ease that stems from greater familiarity, which in collaborative work serves to facilitate expression of individual thoughts and feelings (cf. Azmitia and Montgomery 1993). For instance, although better understanding on the part of the tutor of the knowledge held by the tutee contributes to effective tutoring (Foot et al. 1990), greater relational distance in terms of familiarity might plausibly be needed for the tutee to be prepared to be guided by the tutor. Moreover, a substantial literature

attests to the fact that peer collaboration and peer tutoring have different natural ambits of applicability, with the former lending itself more to conceptual discussion, and the latter to procedural understanding and skill acquisition (see Howe et al. 2000). The implication is, then, that teachers might need to make use of group work in different ways in small school settings, thus undermining the generalizability of the SPRinG resources, and indicating the need for more differentiated, context-specific social pedagogical models in order to ensure its effectiveness.

Investigation of these issues via any simple comparison between small rural schools with composite classes and larger urban ones without them is unworkable, due to the inherent confound between cross-age group work and greater personal familiarity. If results suggested there were problems in extending use of the SPRinG model to rural schools, it would be unclear whether this was attributable to a lack of relational distance, or a mismatch between the focus and design of the SPRinG support resources and classes with cross-age groups. The distinction is important, since the former would imply that the situation might be rectified to some extent simply by choosing pupil groups more carefully, whereas the latter might indicate the need to develop separate support regimes for teachers working in these contexts.

Fortunately, however, the Scottish primary system provides a means of disentangling the possible influences. Compositing is not restricted to rural schools; it is also present in many urban primary schools where it is used to keep individual class sizes roughly constant despite variation in the scale of annual intake. Thus some cross-age group work occurs in contexts where out-of-school familiarity is lower. Conversely, it is possible to find rural schools with single-age classes where size of intake permits more typical forms of age-banding. Compositing and relative familiarity are therefore separable factors for practical purposes, allowing the impact of each to be assessed independently whilst controlling variation in the other.

Application of the SPRinG resources to selected types of school in Scotland therefore allowed a form of natural experiment to be conducted, comparing the effects of using these to support group work under four conditions: (1) rural schools where out of school familiarity was higher, but compositing was used and group work was therefore cross-age; (2) rural schools without composite classes and thus group work between same-age children; (3) urban schools where out of school familiarity was lower, but compositing was used; and (4) urban schools without compositing, where the group work context was essentially the same as in the SPRinG programme itself. Comparison of the effectiveness of the first two conditions with the third and fourth made it possible to pinpoint how far it is necessary to devise different resources where relational familiarity is greater; whilst comparison of the first and third conditions with the second and fourth allowed a similar evaluation of the need for different pedagogical frameworks for promoting productive group work where composite classes and mixed age groups exist. Comparison between each of the first three conditions and the fourth provided a means of assessing the need to adjust support for group work in *any* context that differs from the 'standard' urban primary school.

To summarize, then, the ScotSPRinG research aimed to provide systematic insight into the influence of an important set of contextual factors on productive group work,

a previously under-researched area. This had direct bearing on the wider SPRinG objective of developing a unified social pedagogy for group work, since the potential impact of contextual variation (cf. Brofenbrenner 1979; Pellegrini and Blatchford 2000) had already been identified as a central concern.

6.2 Research Design

The research took place over a school year, and replicated the key aspects of the SPRinG KS2 project (described in Chap. 5, this volume). Thus, it included extensive training in the relational approach and group skills using the SPRinG resources between October and December (and adaptation of classroom teaching to allow further development of group working activities through the year), followed by group work science programmes that focused on Evaporation and Forces which were implemented between February and April. A range of data was collected before, during and after the intervention, but this chapter will concentrate on: (1) observations and ratings of the group work carried out during it as a check on pupils' progress in group work activity and on implementation quality; (2) teachers' ratings of the impact of the intervention on their pupils once it had concluded, to the same end; and (3) pre- and post-intervention assessments of understanding of the two science topics and of peer relations among class members, in order to establish that the expected relational differences between children in rural and urban schools were present prior to the intervention, and to examine whether such differences or the use of cross-age group work were associated with differential effects on learning and social outcomes.

The pre- and post-test science scores of intervention pupils were compared with the scores of control pupils who did not participate in supported group work and who were taught the two topics in their traditional classroom manner. A non-instructed control group served to clarify whether, depending on class context, the intervention was differentially effective in promoting learning relative to an external reference point. Since classroom relations were expected to vary at the outset within the intervention sample itself, internal comparisons alone were deemed to be sufficient as far as change on this dimension was concerned, and no control group comparison was used.

6.2.1 Sample

Participating schools were recruited via a survey on the use of group work which was issued to a randomly selected third of the primary schools in eight of the 32 local authorities in Scotland. Four of the target authorities were in the east of Scotland, and four in the west. Altogether 221 surveys were issued and 85 (38 %) returned. From those schools expressing interest in taking further part in the study, a final sample of 24 classes in the last three years of primary education (children aged 10–12 years)

Table 6.1 Characteristics of the sample

Class composition	Number of classes	N	Males/ females	Mean age (standard deviation) in years, months	Age range	Mean class size
Rural						
Single-age[a]	6	131	60/71	10,9 (6.66 months)	9,3–12,4	21.8
Composite	6	126	67/59	10,11 (8.44 months)	9,1–12,5	21.0
Control	1	26	17/9	11,0 (3.73 months)	10,0–11,4	26.0
Urban						
Single-age	6	156	74/82	10,11 (7.90 months)	9,10–12,11	26.0
Composite	6	162	79/83	10,8 (7.28 months)	8,10–12,0	27.0
Control	2	52	28/24	11,3 (3.63 months)	10,8–12,8	26.0

[a] Single-age classes were defined as those where pupils had all started primary education in the same school year, composite as those where pupils had started in different school years

was randomly selected, each from a separate school, balancing rural versus urban location and single-age versus composite make-up.

The classes in each section of the sample were divided evenly between schools in the eastern and western authorities. The distinction between rural and urban schools was made using the criterion employed by government in Scotland: whether or not the local population was above or below 10,000. The rural schools had significantly fewer pupils than the urban ones (mean = 124.2, standard deviation = 89.8, and mean = 326.9, standard deviation = 118.9, respectively), but they were otherwise broadly comparable. In particular, all schools were located in socially mixed areas, with 19.75 % of attending children receiving free school meals overall, 21.42 % in urban schools, 15.34 % in rural (a non-significant difference). Only a small number (1.8 %) of children in the sample were from ethnic minority backgrounds. The intervention sample comprised 575 children in total, though absences at pre- or post-testing meant that analyses commonly featured fewer children. Control schools proved difficult to recruit due to reluctance to be excluded from the intervention, and the control classes were therefore single-age only. The characteristics of the overall sample are shown in Table 6.1.

6.2.2 Intervention: Teacher Induction and Support

Teachers of the 24 classes involved in the intervention attended three days of professional development training. The first training day focused on the potential benefits of group work, principles for facilitating effective peer collaboration, and classroom activities designed to enhance children's generic relational and communication skills. The SPRinG package of support materials was issued to each teacher, including plans for group activities designed to help students build up mutual trust and tolerance, agree rules for working together, develop advanced communication skills such as listening, speaking, explaining and compromising, and facilitate joint problem solving (see earlier chapters for details). Teachers were encouraged to devote

one hour per week to relational and group work training activities over the ensuing 12-week period, using the resources provided, and to allocate a further hour per week to collaborative work within 'normal' curricular contexts, using groups of four to five students. To facilitate accurate comparison between the different class contexts, teachers were asked where possible not to form groups based on existing friendships, but were otherwise left free to determine composition.

The second training day, 12 weeks later, focused on curricular applications of collaborative work in the context of the two science topics, Evaporation and Forces. The day included practical experience of collaborative group work among the teachers in activities related to these topics (partly to ensure correct understanding of the underlying scientific principles). Subsequently, teachers were expected to devote at least an hour per week over a 6- to 8-week period to structured group work on the two topics, supported by the classroom resources relating to these developed for the SPRinG KS2 research. They were asked to begin with Evaporation, and take Forces second, covering the programmes associated with each in full, keeping to the intended sequence, and implementing all group activities. However, teachers were also encouraged to adapt the programmes to the specific needs of their class, spending more or less time on any single activity as required. In addition to these activities, teachers were again expected to try to extend their use of group work across the rest of the curriculum. They were advised to maintain stable group membership throughout, as far as possible, in order to allow students to develop relationships with all other students in the classroom, although it was accepted that some fluctuation was inevitable.

Throughout the school year, schools were visited by researchers both to collect data and to support teachers' development, as in the KS1 and KS2 research (see Chaps. 4 and 5). In addition, teachers exchanged contact details and were encouraged to discuss their experiences with each other, though no formal support was provided to assist this. A final training day after the science activities had been completed provided teachers with the opportunity to engage in structured reflection on their experiences, the lessons they had learnt about the use of collaborative work, and permitted the collection of more formal data on their evaluations of the intervention programme.

6.2.3 Pre- and Post-Intervention Measurements

6.2.3.1 Pupil Attainment: Science

Learning of the two science topics was assessed using pre- and post-tests presented in booklet form to allow written responses, and covering all aspects of the activities associated with each. The tests were close in form to those used in the KS2 research (Chap. 5), but the wording was adapted in certain respects to reflect differences in local language usage. There were 16 questions in the pre- and post-tests for Evaporation (15 multiple-choice and one open-ended). Each pre-test question had a post-test equivalent, with the tests differing only in their problem content

and the order in which multiple-choice options were presented. Seven questions focused on concepts of evaporation, five on concepts of condensation, and four addressed how to conduct suitable tests to explore the effects of the two processes. There were 29 multiple-choice questions in the Forces pre- and post-tests, and again the two tests were identical apart from the ordering of options and minor aspects of content. Fourteen questions addressed the properties of slopes and cars relevant to speed of rolling. Twelve questions focused on forces concepts, including gravity, friction and air resistance. The tests ended with three questions requesting explanations of the different rates of movement of example cars down different slopes.

The participating teachers were introduced to the science pre- and post-tests during their second training day, and were asked to administer the pre-tests at the start of the first lesson relating to each topic, and to administer the post-test two weeks after the topic had been concluded. Control class teachers were introduced to the pre- and post-tests via individual sessions within their schools. Schedules for administration were agreed with them that ensured comparability with the intervention classes. Children's responses were subsequently scored by members of the research team in terms of the number of correct answers they gave. However, since the best responses on occasion involved selecting more than one option, as was intimated to pupils, the maximum score achievable was 19 for the Evaporation tests, and 37 for the Forces.

6.2.3.2 Classroom Relational Assessment

An instrument entitled 'People in your Class' was developed to provide information on children's relations with their classmates, in terms of who they liked working with in class and who they liked playing with during school breaktimes; given that the criteria against which the two types of relationship are judged are likely to differ for many children (cf. Blatchford and Baines 2010). This instrument allowed measurement of change in these key dimensions pre- to post-intervention. The pre-intervention version also included four questions on out-of-school relationships, in order to ascertain that children attending rural and urban schools differed in the depth and breadth of these in the expected manner. The instrument presented a list of all members in the respondent's class and two contexts (columns for 'Like to play with at school breaktime' and 'Like to work with in class'; plus pre-intervention 'Play with out of school', 'See at local clubs or out-of-school classes', 'Know family of', and 'See at local events'). Children were asked to work down the list of names, simply placing a tick in the columns for the categories that applied to each person.

This instrument was also administered to children by their class teachers, after due guidance, with pre-testing taking place shortly after the first teacher training session, and immediately before initiation of relational and group work training; and post-testing occurring after the science activities had been completed, in the summer term. In order to correct for variation in class size, individuals' responses

for each context were scored in terms of the proportion of those in their class whose names they had ticked, yielding six variables in total pre-intervention, and two post-intervention.

6.2.3.3 Classroom Behaviour Measurements

Classroom Systematic Observation

Observations of classroom dialogue were made using a time-sampling method focused on the incidence of 12 categories of contribution, including those associated with productive learning outcomes in previous research (Howe and Tolmie 1998; Tolmie et al. 2005). Four categories related to the social context in which pupils were located: (a) working on their own; (b) engaged with (i.e., talking or listening to) a teacher or classroom assistant; (c) engaged with another pupil in the same group or in close proximity; (d) engaged with a pupil in a different group. The remaining categories covered key aspects of dialogue: (e) proposition—suggests an idea or course of action; (f) disagreement—rejects another's suggestion or explanation; (g) explanation—gives a reason for a proposition; (h) reference back—refers to a previous suggestion or explanation; (i) resolution—adjusts to/agrees with another's previous statement; (j) instruction—tells someone to say or do something; (k) question—asks an open-ended question (or gives another form of prompt); (l) uncodable—inaudible or not covered by the above categories. The context categories (a to d) were as used in the SPRinG KS2 study, while the dialogue categories (e to l) were adapted from the SPRinG study in accordance with the aims and context of the present research.

Observations were recorded *in situ* by researchers at three time points: during generic group work training, during group work on evaporation, and during group work on forces. At each time point, two observation sessions were undertaken, one during a lesson employing group work, and the other one during a conventional class lesson, to provide a baseline for comparison. Visits were arranged at short notice, on the basis of teachers' reported timetable plans, to reduce the possibility of observed lessons receiving special attention in teachers' preparations.

Prior to the first visit, six children per class, three girls and three boys, were identified at random from the class list to serve as observation targets, these same children (the majority of whom turned out to be members of different collaborative groups) then being used for all six observation sessions, which employed the methodology developed for the KS1 and KS2 research. During these sessions, each target child was unobtrusively observed for eight consecutive 40-second time windows (12 seconds to focus in, 16 seconds to observe and 12 seconds to record), before attention turned to the next child on the observer's list. Within lessons employing group work, children were only observed when they were supposed to be conducting activities involving group work (i.e., not during preparation or summing up). Observations were recorded via ticks on a grid, with rows corresponding to sampling period, and columns to codes. Where appropriate, multiple codes were used within the same time window (e.g., a proposition followed by an explanation and an alternative proposition would be scored as two propositions and one explanation), so that the final record consisted

of a measure of the total frequency with which dialogue elements of different types occurred within the same fixed period of time for each child and for each lesson type.

The two researchers who conducted the observations were trained in use of these grids prior to the initial sessions by applying them to previously recorded videotapes of interaction in primary science classrooms, and discussing the resultant coding until both were confident in its use. Inter-rater reliability was then checked via independent coding of 64 forty-second extracts from further videotapes of the same character. Agreement between coders across the different categories averaged 92 % (kappa values could not be calculated because the system employed left coders themselves to decide when dialogue fitted a coding category; there were therefore no predetermined coding events, as kappa analyses require).

6.2.3.4 Classroom Rating Scale

Wider, class-level measures of the quality of group activity and its management by both teachers and pupils were taken at the conclusion of each observed group-work lesson (i.e., on three occasions for each class), using a multiple-item index similar to that devised for the main SPRinG programme evaluation. This index, referred to as 'SPRinG—Teaching Observation Protocol' (S-TOP), was used by the researchers to capture on a 3-point rating scale (not true, partly true, very true) the presence during their observations of key features relating to: a) the quality of the learning context (S-TOP Learn: 4 items); b) the suitability of tasks and activities (S-TOP Tasks: 7 items); c) the nature of adult (teacher) involvement (S-TOP Adults: 9 items); and d) the group work skills displayed (S-TOP Group Skills: 11 items). Items included: 'The size of groups maximized pupil-pupil interaction' (S-TOP Learn); 'The group work task warranted the use of exploratory talk/discussion (suggestions, explanations, conjecture etc.)' (S-TOP Tasks); 'The teacher modelled good interaction skills' (S-TOP Adults); 'Pupils showed good conversational skills (e.g., active listening, no interruption, presenting a line of argument, etc.)' (S-TOP Group Skills). Ratings for items in the different subscales were totalled separately at each time point, higher scores indicating greater evidence of the relevant features in a given class. As well as the separate ratings for each time point, cumulative measures of the quality of group work—and in this sense, of the implementation—were derived by computing the total rating for each subscale across the three points of observation.

6.2.3.5 Teacher Ratings

As part of activity during the final training day, teachers completed an evaluation questionnaire which provided further indirect information on implementation quality. In particular, seven questions explored their perception of the impact of the group work programme on children in their class. These items, which covered positive and negative changes in students' group skills and motivation for group activity (e.g., 'The children have been able to transfer their collaborative group-work skills to

other curriculum areas'), were rated from 1 (not at all agree) to 4 (completely agree). Ratings were totalled to give a single, class-level score, with higher being better.

Towards the end of the intervention, teachers also completed a 17-item scale (Collaborative Learning Evaluation Form, CLEF, developed by Topping 2003) rating the progress in collaborative learning skills demonstrated by their class as a whole. Items offered three response alternatives, scored 0–2 (no progress made, some progress made, substantial progress made), and covered similar issues in part to the S-TOP Group Skills subscale). However, there was less focus on specific management of dialogue, and more on the wider organization of group activity (e.g., 'Do the groups take turns and help everyone to join in?'). The two measures also differed in terms of emphasis, with S-TOP assessing absolute performance and CLEF assessing improvement. The score used was the total across items.

6.3 Data Analysis

Initial analyses focused on establishing that children attending rural and urban schools differed as expected in their degree of out-of-class acquaintance prior to the intervention. To do this, a one-way MANOVA (rural vs. urban area) was conducted, taking the four out-of-school indices for which data were collected at pre-test as dependent variables. In order to ascertain whether variation in implementation quality was a potential source of influence on outcomes, this was examined next using a two-way class-level MANOVA (Area × Class Type), taking the four cumulative S-TOP observation measures, and the teacher ratings of impact and progress in collaborative learning skills as dependent variables. Attention then turned to how far pupils exhibited: (a) improvement across the observation sessions in levels of productive dialogue and reported group work skills; (b) pre- to post-intervention gains in understanding of evaporation and forces; and (c) pre- to post-intervention improvements in work and play relations with classmates. ANOVAs (Session or Pre/Post × Area × Class Type) were employed to examine progress. Effect sizes for attainment gains in the two science tests were calculated as partial eta-squared (η^2) in the MANOVAs and subsequent ANOVAs, as an index of the proportion of explained variance. Finally, the factors influencing changes in science understanding and class relations were examined using ordinary least squares (OLS) multiple regression. Results are reported below in this order.

6.3.1 Results During and at the End of the Group Work Programme

6.3.1.1 Effects of ScotSPRinG Training Over Time

Urban vs. Rural Differences in Pre-Intervention Out-of-Class Relationships

As can be seen in Table 6.2, rural and urban children exhibited a consistent, and significant, pattern of pre-intervention difference in out-of-class acquaintance, as

Table 6.2 Mean proportion of classmates rated pre-intervention as falling into each of four categories of out-of-class relationship (standard deviations in brackets)

	Children in rural classes ($N = 237$)	Children in urban classes ($N = 302$)
Play with out of school	0.20 (0.17)	0.14 (0.11)
See at club etc	0.28 (0.28)	0.18 (0.19)
Know family of	0.31 (0.23)	0.17 (0.14)
See locally	0.45 (0.34)	0.13 (0.22)

Table 6.3 Mean scores and distributions on quality of implementation indices

	Mean	Standard deviation	Range
S-TOP Learn (max = 36)	34.42	2.47	25–36
S-TOP Tasks (max = 63)	56.50	6.45	40–63
S-TOP Adults (max = 81)	68.67	8.80	42–81
S-TOP Group Skills (max = 99)	84.92	8.67	60–99
Teachers' ratings of class impact (max = 28)	24.37	2.65	17–28
Teachers' CLEF ratings (max = 34)*	23.35	6.05	11–34

$n = 24$ classes, except * $n = 23$, due to non-completion by one teacher

anticipated (multivariate $F(4, 534) = 47.87$, $p < 0.001$). Follow-up ANOVAs revealed that although within-group variability was high, rural children were significantly more likely to play with each other out of school ($F(1, 537) = 31.84$, $p < 0.001$, to see each other at local clubs or out-of-school classes ($F(1, 537) = 24.47$, $p < 0.001$), to know each other's families ($F(1, 537) = 86.33$, $p < 0.001$), and to see each other at local events ($F(1, 537) = 173.91$, $p < 0.001$). Whilst the differences in general familiarity indicated by knowing each others' families and seeing each other at local events were more pronounced than those in contacts more likely to involve developed relationships (i.e., playing with each other out of school, and seeing each other at local clubs or out-of-school classes), there was clear evidence that, compared to urban children, rural classmates had better-grounded relations with each other, and relational distance was likely to be lower. It is important to note that although the pre-intervention ratings for out-of-school contexts were designed to capture extent of familiarity rather than liking, taken together these and the two ratings of liking did form a homogenous scale (Cronbach's $\alpha = 0.69$), indicating that liking was at least partially related to contact. It was therefore probable that out of school contact impacted positively on work and play relationships in school, as anticipated.

Variation in Quality of Implementation

Data on the measures of implementation quality are shown in Table 6.3. The four cumulative S-TOP observation measures all showed a strong bias towards values in the upper part of the range, but with a tail of cases with lower values. Teachers' ratings of class impact and of progress in group work skills (CLEF scale) exhibited a similar picture. Statistical analysis identified no effects on these variations involving rural vs. urban location or class type suggesting that they simply reflected local differences.

The four researcher ratings were intercorrelated ($r = 0.53$ to 0.67, $p < 0.01$), as were the two teacher ratings ($r = 0.56$, $p < 0.01$), indicating that cases with lower values tended to have these across the different indices. Correlations between the two sets of measures were positive but non-significant, perhaps unsurprisingly given that the researcher ratings were formative and absolute, whereas the teacher ratings were summative and focused on relative progress.

Taken overall, it would appear the quality of implementation was generally good, with the majority of classes scoring highly from the outset in terms of the presence of key features (values close to maximum were only possible if high scores were obtained at all three time points), and most teachers concurring that the positive impact of the implementation was close to ceiling. There was nevertheless sufficient variability in the ratings to make it possible to consider whether differences in implementation affected outcomes. The group work skills measures in particular had lower means relative to the maximum, indicating that teachers found it easier to put the basic resources of appropriate classroom organization (S-TOP Learn), tasks (S-TOP Tasks) and support (S-TOP Adults) in place than to ensure high levels of pupil group work skills.

Improvements in Productive Dialogue and Group Work Skills

In order to establish whether participating pupils showed improvements in productive dialogue during the course of the intervention, the total observed frequency was computed for each of the seven main dialogue categories (i.e., excluding uncodable utterances) within the group work and whole class lessons at each of the three observation points. Four-way ANOVAs were conducted on frequencies for each category with time point (1, 2 or 3) and type of lesson (class lesson or group lesson) as within-subjects factors and school type (urban or rural) and class type (single-age or mixed-age) as between-subjects factors. All seven analyses yielded main effects for type of lesson, with the observed frequency of dialogue behaviours always being greater during lessons in which children were expected to be engaged in group work as compared with conventional, teacher-led, class lessons, as would be expected. The two key, contrasting context categories, 'child working on their own' and 'child engaging with another pupil in the same group' also yielded differences between whole class and group work lessons. As would be expected, children were much more likely to be observed working on their own during conventional class lessons ($F(1,116) = 642.93$, $p < 0.001$), and conversely, much more likely to be observed engaging in dialogue with another child in their group during group lessons ($F(1,115) = 623.90$, $p < 0.001$).

As far as changes over the time course of the intervention are concerned, significant main effects of time and interactions between time and lesson type were identified for propositions ($F(2,230) = 22.86$, $p < 0.001$; $F(2,230) = 24.27$, $p < 0.001$, explanations ($F(2,230) = 10.57$, $p < 0.001$; $F(2,230) = 4.16$, $p < 0.05$) and instruction ($F(2,230) = 12.12$, $p < 0.001$; $F(2,230) = 10.66$, $p < 0.001$), but not for the other codes, which all occurred less frequently. In each case, the pattern was the same: an increase in

Table 6.4 Mean frequency of target children's observed use of propositions and explanations (maximum = 8) in group work lessons (standard deviations in brackets)

Class composition	N	Propositions			Explanations		
		Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Rural							
Single-age	34	1.68	1.89	2.85	0.82	0.76	1.00
		(*1.85*)	(*1.57*)	(*2.52*)	(*1.14*)	(*1.04*)	(*1.37*)
Composite	28	2.00	2.33	2.85	0.59	0.74	1.26
		(*1.88*)	(*2.20*)	(*2.36*)	(*0.80*)	(*1.29*)	(*1.43*)
Urban							
Single-age	27	1.52	2.78	3.54	0.25	1.11	1.21
		(*1.53*)	(*2.17*)	(*2.56*)	(*0.64*)	(*1.16*)	(*1.26*)
Composite	31	1.71	1.97	2.99	0.84	0.97	0.97
		(*1.74*)	(*1.82*)	(*2.74*)	(*1.32*)	(*1.11*)	(*1.58*)

frequency over time, but only within group work lessons. Table 6.4 shows the mean frequencies during group work lessons at each of the three time points for the two most frequently observed dialogue categories, propositions and explanations, broken down by school location and type of class. These are of particular interest since they are also the categories most strongly linked to positive learning outcomes in past research (see e.g., Howe and Tolmie 1998). Taking the joint frequency of these two categories within group work lessons as a central index of productive dialogue, the increase appeared to be roughly linear, and to amount to an improvement of 75 % across Time 1 (group work training; mean = 2.39), Time 2 (the first observation of group work in science; mean = 3.14) and Time 3 (the second observation of group work in science; mean = 4.18). The same scale of improvement was apparent across urban and rural schools and in both single-age and composite classes. The only respect in which there was any variation was that the frequency of explanations for urban, single-age classes (i.e., the standard SPRinG context) was at a lower level at Time 1, but by Time 3 these children had caught up with the other school and class types. This same pattern was also observed in the frequency of the context category 'child engaging with another in their own group'.

The class-level S-TOP ratings of students' group work skills also showed a significant increase of 37 % over the same period ($F(2,40) = 25.12$, $p < 0.001$; for Time 1, mean = 25.75; for Time 2, mean = 28.00; for Time 3, mean = 31.17; minimum = 11, maximum = 33). Participants therefore showed sizeable gains in group work skills as well as levels of productive dialogue following initial group training. Again, these gains were unaffected by classroom context, save that initial variations in group work skills reduced as progress was made. At the first time point, skills tended to be rated as better in rural mixed-age (mean = 28.83) and urban single-age classes (mean = 27.17)—despite lower levels of engagement and use of explanations as far as the latter were concerned—compared to rural single-age (mean = 25.00) and urban mixed-age classes (mean = 22.00). By the third time point, however, the range in the values of the means had decreased substantially, from 6.83 to 2.83 (for rural mixed-age, mean = 32.50; for urban single-age, mean = 30.33; for rural single-age, mean = 32.17; for urban mixed-age, mean = 29.67). Moreover, as levels of group

Table 6.5 Mean pre-test and post-test scores on the measures of understanding of Evaporation and Forces (standard deviations in brackets)

Class composition	Evaporation (max = 19)		Forces (max = 37)	
	Pre-test	Post-test	Pre-test	Post-test
Rural				
Single-age	9.45 (3.02)	12.37 (3.41)	22.47 (4.69)	24.86 (5.04)
Composite	9.26 (2.73)	12.48 (3.98)	19.86 (5.12)	23.59 (4.94)
Urban				
Single-age	8.35 (2.70)	11.32 (3.60)	19.85 (4.97)	23.04 (5.28)
Composite	9.85 (5.07)	12.67 (3.17)	19.87 (4.47)	22.78 (5.19)
All intervention classes				
	9.21 (3.59)	12.18 (3.57)	20.51 (4.90)	23.52 (5.18)
Controls				
	10.30 (3.26)	10.14 (3.00)	23.15 (5.09)	23.88 (5.04)

work skill increased and became more similar, they also became positively related to the improved individual levels of the index of productive dialogue (at Time 3, $r = .17$, $p < 0.05$), suggesting better group work skills helped facilitate more frequent productive exchange. The S-TOP measures of classroom organization (S-TOP Learn) and task suitability (S-TOP Tasks) also showed improvements over time but with smaller effects ($F(2,40) = 6.52$, $p < 0.05$; and $F(2,40) = 12.00$, $p < 0.001$), suggesting the dialogue improvements were less directly a function of these). The S-TOP teacher support measure (S-TOP Adults) showed no change over time.

Pre- to Post-Intervention (Attainment) Gains in Understanding of Evaporation and Forces

Table 6.5 shows the mean pre-test and post-test scores for understanding of Evaporation and Forces, broken down by class context for the intervention sample. The overall means for the intervention and control pupils are also displayed. As can be seen, although there were minor fluctuations in the pre-test scores, with the urban single-age children tending to do slightly worse, all the intervention groups showed pre- to post-test gains for both topics. These gains were not only statistically significant (for evaporation, $F(1,575) = 31.30$, $p < 0.001$, partial η^2 [1] $= 0.06$; for forces $F(1,516) = 9.75$, $p < 0.01$, partial $\eta^2 = 0.03$), but also of similar size within topic area regardless of class context. In contrast, the mean scores of the control pupils did not change, and though they did have higher pre-test scores than the intervention children, it seems unlikely that the lack of change was due to their performance already being at ceiling since they were a long way short of the maximum possible scores. Importantly, then, not only was the group work intervention effective in promoting learning, the gains were independent of the classes' status as single-age or composite and urban or rural, in much the same way as the gains in productive dialogue and group work skills.

[1] Partial eta squared is an effect size statistic which estimates the variance explained by an effect relative to the combined value of that effect and the unexplained or residual variance.

Table 6.6 Mean proportion of classmates rated by students pre- and post-intervention as those they a) liked working with, and b) liked playing with during school breaktime (standard deviations in brackets)

Class composition	Children in rural composite classes ($N = 108$)	Children in rural single-age classes ($N = 121$)	Children in urban composite classes ($N = 139$)	Children in urban single-age classes ($N = 113$)
Mean Proportion of Classmates Like to Work With				
Pre-intervention	0.46 (0.32)	0.39 (0.25)	0.47 (0.33)	0.27 (0.24)
Post-intervention	0.50 (0.34)	0.47 (0.29)	0.46 (0.29)	0.38 (0.28)
Mean Proportion of Classmates Like to Play With				
Pre-intervention	0.43 (0.21)	0.48 (0.23)	0.34 (0.20)	0.38 (0.19)
Post-intervention	0.45 (0.21)	0.51 (0.26)	0.40 (0.25)	0.38 (0.17)

Pre- to Post-Intervention Improvements in Work and Play Relations

The upper half of Table 6.6 shows the average proportion of classmates students indicated they liked working with pre- and post-intervention, broken down by rural vs. urban and single-age vs. composite classes. As can be seen, there was a general tendency for the number of classmates regarded as desirable work partners to increase pre- to post-intervention, though there were fluctuations in both the actual proportion and degree of change depending on class context, and individual variability was fairly high. Overall pre- to post-intervention change was highly statistically significant ($F(1, 477) = 22.03$, $p < 0.001$), though children in single-age classes showed larger improvements in work relations than those in composite classes (mean = 0.10 and 0.01, respectively). However, since composite classes had better work relations pre-intervention, the greater gains exhibited by children in single-age classes were due primarily to them catching up—though to a lesser extent in urban schools—as if the intervention acted to provide an influence on work relations corresponding to one occurring more naturally in mixed-age classes. There was also a weak effect of area ($F(1, 477) = 6.12$, $p < 0.05$), with rural children enjoying on average better work relations both pre- and post-intervention than urban children, consistent with the evidence of better-grounded initial relations reported above. Rural children showed no difference in the size of their gains than urban, however.

The proportion of classmates children identified as those they liked playing with during school breaktimes pre- and post-intervention is shown in the lower half of Table 6.6. As with work relations, there was a general and significant trend towards an increase over the course of the intervention ($F(1, 477) = 8.13$, $p < 0.01$), but with fluctuations in the baseline proportion and the degree of change involved. The extent of change was weaker than was the case for work relations, though, suggesting that play relations were affected less directly by the intervention. The somewhat distinct nature of play relations is borne out by the larger impact of school area ($F(1, 477) = 30.40$, $p < 0.001$), and the absence of an effect of class type. Although rural setting had its expected effect, as with work relations the higher initial levels of play relations found in rural classes were not associated with differences in the extent of change.

6.3.1.2 Factors Influencing Changes in Science Understanding

Regression analyses were used to determine whether the extent of pupils' change in understanding of Evaporation and Forces (controlling for the relatively high level of variation in pre-test performance) could be accounted for directly by differences in their observed group work activity. Interest focused on the joint measure of productive dialogue combining propositions and explanations, and on the researchers' S-TOP ratings of group work lessons.

As far as the first was concerned, values for the incidence of productive dialogue at Times 2 and 3 (i.e., during the science lessons and after group work training) were found to be highly correlated, so these were collapsed into a single index for the group work lessons and another for the whole class lessons. Observed children's scores on this index were consistently associated with their gains in understanding for both Evaporation and Forces: the greater the amount of productive dialogue they produced, the greater the gain in science-based understanding they showed. However, this effect was restricted to dialogue during the group work lessons (for evaporation, $\beta = 0.28$, $p < 0.01$; for forces, $\beta = 0.29$, $p < 0.01$); no comparable relationship existed for the measure of productive dialogue during whole class lessons.

The S-TOP ratings on the four different scales were also found to be highly correlated across the two science group work observations, so these too were combined into single indices. Each of the four scales were found to be positively associated with change in understanding of both Evaporation and Forces, but only that regarding the role of adults was significantly predictive (for evaporation, $\beta = 0.50$, $p < 0.05$; for forces, $\beta = 0.64$, $p < 0.001$). The more the adults approximated a supportive, non-directive role—encouraging and facilitating productive dialogue—the more the pupils learned. Overall, then, the aspects of group work activity that were expected to promote learning did indeed do so, and since the degree of change was comparable across the different class contexts, it may be inferred that these worked in the same way and to similar extent regardless of setting—and topic.

6.3.1.3 Factors Influencing Changes in Class Relations

Hierarchical regression analyses were used to establish how far different aspects of the quality of pupils' experience of group work predicted change in work and play relations (controlling for pre-test value, in order to remove the influence of area and class type on baseline ratings). Variables entered at each stage of the analysis were as follows: (1) change on whichever class relations variable was not the subject of the analysis (i.e., play relations when work relations were being analysed, and vice versa), to check on cross-influences; (2) total productive dialogue (propositions and explanations) during the observations of group work in science lessons, as a key predictor of gains in understanding; and (3) indices of the quality of group work, that is, the four S-TOP observational measures and two teacher ratings.

For change in work relations, the second stage of the analysis identified a *negative* effect of productive dialogue ($\beta = -0.18$, $p = 0.05$), with greater incidence of propositions and explanations acting to suppress growth in work relations. This suggests that whilst dialogue that engenders explication of ideas promotes cognitive growth (Howe and Tolmie 1998; Piaget 1932), it also creates tensions in working relationships, presumably because of its association with disagreement given that the productive dialogue index was correlated with disagreements during the same observations ($r = 0.42$, $p < 0.001$). Interestingly, subsequent analysis using multilevel linear modelling showed this negative effect of productive dialogue was consistent across classes, indicating that the better initial work relations in composite and rural classes offered no protection from it.

However, when the measures of group work quality were included in the third stage of the analysis, the picture changed. The negative dialogue effect became non-significant, and teachers' ratings of progress in group work skills were found to be positively related to change in work relations ($\beta = 0.33$, $p < 0.05$). The implication is that where group work skills were better, these served to reduce the tensions in work relations produced by greater incidence of productive dialogue, and allowed both those relations and that dialogue to develop positively.

As far as change in play relations was concerned, the analyses identified change in work relations as a positive effect ($\beta = 0.20$, $p < 0.05$), indicating that they primarily stemmed from the impact of the intervention on work relations, in line with other signs that effects on play relations were less direct. And, teachers' ratings of progress in group work skills were again positively associated with change ($\beta = 0.31$, $p < 0.05$).

6.4 Discussion: Implications for the Applicability of the SPRinG Support Programmes

As noted in the opening section of this chapter, the principal objectives of the Scot-SPRinG research were to examine whether the SPRinG resources for the support of productive group work varied in their effectiveness according to class context, and thus whether the underlying model of social pedagogy needed to be modified or extended. In fact, regardless of context, significant pre- to post-intervention gains were found in understanding of the two science topics that formed the focus of group work lessons, and in class work and play relations. Moreover, far from these positive outcomes varying according to rural versus urban setting and single-age versus composite classes, they were in fact either uniform in scale or else associated with an ironing out of initial variations. Levels of productive dialogue and group work skills showed similar improvements and accompanying reductions in variation over the course of the intervention.

It is important to note that this pattern of convergence was found despite the very real nature of the initial variations, which were in many respects as expected. Children in rural schools exhibited initial greater out-of-school familiarity as predicted, for instance, together with stronger work and play relations. As anticipated, these

differences were in turn associated with better initial levels of productive dialogue, if not group work skills per se, especially compared to the 'norm' of urban single-age classes (though admittedly the representativeness of instances of the latter in the present sample is unclear).

The similar benefits of composite classes for work relations were less expected, and merit further exploration. The fact that these were apparent in urban as well as rural classes suggests a distinct effect from that of greater familiarity; indeed, whether relational distance was greater or less seemed to be immaterial, contrary to initial conjecture. The implication is that the effect is more connected with the dynamics of cross-age interaction; but given that the emphasis of the intervention was on collaborative work rather than peer tutoring, it would appear that the fact that this context more naturally permits the latter is not relevant either. A more plausible possibility is that cross-age interaction tends to be better regulated and less subject to off-task distraction, which would explain why the SPRinG support framework was apparently effective in engendering the same dynamic.

It should be noted too that the key role of improvement in group work skills in driving or facilitating other changes is also consistent with the SPRinG model. This was not only the primary influence on improved work relations, but it acted to moderate a negative relational effect associated with the incidence of productive dialogue, one of the main influences on improved science understanding. It therefore effectively permitted this dialogue to occur without disruption, with knock-on effects for both work and play relations; these findings are similar to the developments in children's dialogue reported in Chaps. 4 and 5 and add explanatory value as to why some dialogue (talk) programmes had limited effect in classrooms (Reznitskaya et al. 2009) while showing positive relational effects as suggested by Barron (2003). The emphasis of SPRinG on promoting initial relational and group work skills therefore seems to be completely supported, and to be supported moreover regardless of class context, in view of the uniform pattern of effects. Preparation of this kind appears to redress any initial contextual imbalances, and to create a level playing field.

There is perhaps one point of elaboration to add. The smoothing out of initial variations noted above came *after* the preliminary group work training period, and it was not completely evident till Time 3 and the post-intervention tests, in a manner similar to the cyclic process discussed in relation to the KS1 research (Chap. 4). The training itself did not achieve this but may, instead, be seen to put in place the key elements to get effective group work off the ground; it was the subsequent deployment and experience of the group work skills that appeared to be crucial. Any notion that optimal relational conditions must be in place before the potential of collaborative group work can be realized is wide of the mark, then. Instead, it would appear that provided essential levels have been gained, it is actual engagement in collaborative learning which acts to extend the range of relational and group work practices and boost both achievement and class relations to relatively uniform levels, counteracting the effects of contextual difference.

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Chapter 7
Teachers' Experiences of Implementing the SPRinG Programme in Schools

Ed Baines

7.1 Introduction

This chapter focuses on KS2 teachers' experiences of implementing SPRinG training and group work in their schools and classrooms, their reflections on the recommended principles and practices and their effects and the overall impact of the research. As such, the chapter complements Chaps. 4, 5 and 6 by providing insight into how SPRinG activities were received at school and classroom levels. There has been previous research concerning teachers' views on and experiences of implementing group work in classrooms (e.g., Baines et al. 2003; Bennett and Dunne 1992; Cohen and Intilli 1981; Cowie et al. 1994; Galton and Williamson 1992; Gillies and Boyle 2010; Lewis and Cowie 1993; Plummer and Dudley 1993). But this chapter is particularly concerned with exploring the challenges that teachers face when implementing the relationally-based group work that characterizes SPRinG and the perceived difficulties experienced by pupils when undertaking group work over a full year.

The SPRinG project focused almost exclusively on the learning and engagement of pupils in everyday classroom settings over the course of a year or more. From an early stage in the development of the SPRinG programme there were many spontaneous accounts from teachers about the implementation process, how pupils were changing and improving in their behaviour and skills and how teachers themselves had been affected in terms of their professional skills and confidence. To be successful, teachers had to work very hard to implement the ideas, strategies and practices along with the skills training activities. In some cases they had to persuade Headteachers and senior management teams to allow them to participate in the research and then to take a lead role in determining how best to organize implementation. We decided early in the research process that it would be important to gain teachers' views and reflections concerning their experiences of the process of implementing SPRinG ideas as part of a whole school approach and their views on implementing the SPRinG programme

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P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,* Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_7,

and group work into their classrooms more generally. We also wanted to gain their reflections on the recommended practices along with an overall sense of the ways in which the SPRinG programme had an impact on them and pupils' skills and learning. We kept records of teacher meetings and discussions, and we also collected data on teachers' views and experiences more formally through semi-structured interviews.

7.2 Four Aspects to Examine

7.2.1 Whole School Approach to SPRinG Implementation

It was our belief that the most effective way of getting teachers to take on SPRinG was by encouraging them to adopt a whole school approach. In particular, a whole school approach would help to support teachers and their school colleagues in their sharing and consideration of the use of SPRinG ideas and practices and the approach would also provide continuity for pupil learning when they made the transition from one school year to the next (Johnson and Johnson 1998).

In the year after the SPRinG evaluation, we worked with a number of schools to support them in achieving this whole school approach. The main aim was for schools and teachers to adopt SPRinG as their own. Different schools could organize implementation in different ways. A feature of the whole school approach we adopted was that all schools had a facilitator, i.e., someone with the expertise and credibility to support the implementation of SPRinG across the school. In most cases teachers that had been involved in the programme during the previous evaluation phase of the research took on the role of facilitator. In all cases a member of the research team was involved in inducting and summarizing the basics of SPRinG at an INSET training day event or special staff meeting. Schools with multiple year groups were able to jointly plan as a year group how SPRinG was undertaken within the timetable. Schools with a single year group adopted a different approach which involved working more directly with the facilitator or within key stage planning meetings. Some schools had a single facilitator, others had multiple facilitators. In some schools the Headteacher along with senior management staff had a particular interest in group work and worked hard to organize its implementation within the school. Other Headteachers left planning and implementation to the facilitator and the teachers involved.

Connected to whole school implementation was an interest in the approaches that might best sustain SPRinG ideas. We knew that once our research was finished, SPRinG would be something that would be handed over to schools and therefore had to be attractive and self sustaining—so we sought ideas from teachers and facilitators on how this could best be achieved in the light of their experiences of a whole school approach.

7.2.2 Implementing SPRinG into the Classroom Curriculum

As well as gaining teachers' views on the organization of the whole school approach to implementation, we were also interested in the implementation of SPRinG at the classroom level. There had been discussion from the start of the project about the best way to support schools in implementing SPRinG training and group work into the day-to-day curriculum covered in classrooms. There was a range of views about the merits or not of implementing interventions as a stand alone module that sits outside of the curriculum, as a module that is implemented and integrated into one curriculum domain (such as Science, Literacy or Mathematics), or as part of an infused approach (McGuiness 1999). There would be advantages and disadvantages for each method.

Possibly the simplest approach would be to adopt a stand alone model where teachers create a space for SPRinG activities within the curriculum. This approach was rejected, however, as we saw in Chap. 3, as it might lead to a separation of group activity and skills from the curriculum and could reduce the chances of transfer and integration of group work and the use of group skills for learning across the curriculum.

The possibility of creating a programme that was curriculum specific had its appeal, given that there is already much research on the use of group work in Social Studies, Maths and Science and other areas (Gillies 2003; Howe and Tolmie 2003; Mercer et al. 1999; Mercer and Littleton 2007; Webb and Mastergeorge 2003; Webb and Palincsar 1996). However, here too there might be difficulties with transfer of the skills by teachers and pupils to the wider curriculum. There was also the added problem, as discussed in Chaps. 3 and 5, that most of the primary schools with which we were involved at KS2 utilized 'setting' of whole classes by ability for particular subjects (usually literacy and numeracy), and this would hinder teachers in implementing group work across the whole curriculum.

For the evaluation phase of the research, we therefore decided to opt for an infused approach where teachers were trained to implement SPRinG training activities and group work opportunities in a range of possible curriculum areas and we encouraged teachers to implement group work across the whole curriculum. This approach was adopted because we wanted teachers to plan and utilize group working skills in their everyday lessons and for pupils to use these skills whilst engaging in learning across all parts of the curriculum. However in this post-evaluation phase of the research, schools could organize implementation in their own way. Some schools opted to create a specific time for SPRinG, while others had to work hard to incorporate SPRinG activities into the everyday curriculum.

7.2.3 Key Principles and Practices

We were also keen to get teachers' reflections on the key principles and practices that were at the heart of the SPRinG approach (see Chap. 3). We had informally discussed these principles with teachers at an early stage of the SPRinG project, and results of

these discussions were integrated into the handbook that teachers drew upon in the implementation of the programme (Baines et al. 2009a). Further we wanted to draw on the views of experienced SPRinG teachers in the dissemination of the programme to a wider audience of teachers. So a main feature of our interviews with teachers was about their experiences of utilizing SPRinG ideas: when preparing the classroom and groups for group work; when preparing lessons and activities involving group work; when thinking about the role of adults in supporting groups and individuals to work together; and, in terms of the relational approach underpinning the programme for group work skills training and pupils' group work interactions.

As well as exploring the key principles, we were particularly interested in obtaining teachers' views on the role of 'briefing' and 'debriefing' as there was a growing view that these elements were central for the success of the programme. The briefing and debriefing components were slightly different from conventional uses and in other group work programmes. Rather than the briefing consisting of instructions about what pupils are required to do in the task and the debriefing taking the form of an evaluation of the activity or group interaction, these components involved extended class discussions, teacher modelling and reflections on particular group skills, thinking about what they look like in practice and how to perform them in practice. This cyclical process aimed to connect together a process of anticipation, planning and reflection on group interaction and behaviour before and after the group work had taken place so that children's own skills, behaviours and strategies for group interaction are at the forefront of their minds. Such a cycle of reflection can take place with individuals or in groups and be about how they can change their own and other's behaviours and interactions in the future and how they can improve working together. These actions are not just about becoming 'meta-cognitively wise' about group work but also about providing a structure which enables children to adapt their own behaviours and interactions *in practice* and in line with their developing understanding. That is, the process builds on children's knowledge and understanding of what they could and should be trying to achieve and to encourage them to actually think about how to do this in practice. These periods of reflection and discussion are central in the process of developing children's interaction skills and to enable the skills to be developed at a faster pace.

7.2.4 Views On the Impact of SPRinG

We were also interested in getting teachers' views and experiences on the overall impact and effect of SPRinG training on pupils' learning and skills. Although the quantitative data from the systematic observations and attainment tests (see Chaps. 4, 5 and 6, this volume) give clear findings on the effect of SPRinG, we felt that teachers could provide us with complementary and more detailed experiences, examples and anecdotes. These would provide further insights into some of the processes that might explain the positive effects but also provide views on the effect of the programme in other areas not assessed by the quantitative research tools.

7.3 Data on Teachers' Views and Experiences

Data came mainly from semi-structured interviews with a sub-sample of teachers (see below) but also from two teachers' personal written accounts about the process of undertaking and developing SPRinG within their school. In one school a group interview consisting of 3 teachers and a member of senior management was conducted instead of individual interviews. Interviews took place toward the end of the year following the formal evaluation phase of the research.

Details of the schools involved and the number of teachers interviewed are presented in Table 7.1. Many of these schools were multi-ethnic London schools with high proportions of children receiving Free School Meals (FSM), children whose first language was not English (EAL), and children identified as having Special Educational Needs (SEN) but without a statement[1] were higher than the national average.

Towards the end of the summer term, we interviewed 21 teachers from 7 schools that had been involved in implementing the SPRinG programme for at least 8 months. The majority of the teachers were involved in implementing the programme in Key Stage 2 classrooms and only one teacher was involved with implementing SPRinG ideas into KS1 classrooms. The majority of respondents (18 out of 21) were female. We note that interviews only took place with teachers committed to the SPRinG approach and therefore we were able to compare SPRinG teachers (and their schools) but no comparison with non-SPRinG teachers was attempted.

7.3.1 Interviews

Semi-structured interview schedules were trialled to ensure question clarity. Interviews began with open ended questions which gave teachers the opportunity to talk about their SPRinG-based experiences and, as relevant issues were raised, interviewers probed with more direct prompts for further information or clarification.

The questions focused on an evaluation of the whole key stage or school approach; how it had been organized and managed across the stage/school; their own experiences of the programme in terms of what worked well and what did not go so well and suggested changes to the programme and implementation for the future. Teachers were also asked to comment on group work from the perspective of the 4 main principles underlying the SPRinG programme, as outlined in Chap. 3.

Each interview lasted approximately 40 min and took place in quiet locations within the school to minimize interruption. Interviews were recorded using a tape recorder and microphone and later transcribed.

Transcripts were analysed thematically (see Boyatzis 1998; Braun and Clarke 2006). Overall themes were identified a priori (from the group work literature and

[1] In England, a 'statement' is provided by the Local authority and indicates that to meet a child's special educational needs, additional special provision, beyond the everyday resources and provision that a school has, is required.

Table 7.1 Details of schools involved in post evaluation phase of the research and numbers of teachers interviewed

School no.	School description	Year groups involved	Teachers Interviewed*	Roll	FSM (%)	SEN with statement (%)	SEN no statement (%)	EAL (%)
1	Inner city multi-ethnic junior	Y4 & 5	3	230	51	5	35	36
2	Inner city primary—mainly Indian sub continent	Y4, 5 & 6	2	382	59	3	39	97
3	Inner city multi-ethnic junior	Y3 + Y4	2	209	33	5	15	37
4	Rural primary—mainly white British	KS1 & 2	6 +	315	0.3	0.3	17	0
5	Inner city multi-ethnic primary	Y4, 5 & 6	3	210	34	4	39	87
6	Inner city multi-ethnic primary	Y4, 5 & 6	3	226	44	12	27	60
7	Inner city multi-ethnic primary with mobile population	Y5	2	145	47	2	24	80
Approximate national average		–	–	–	17	1.6	16	8

*all teachers were female except for 1 teacher in school 5 and 2 teachers in school 6
+3 teachers were interviewed one-to-one and 3 other teachers were interviewed as a group with a member of the senior management team present
Roll number of children attending the school at the time
FSM Proportion of children in the school receiving Free School Meals; a proxy measure of social class
SEN Proportion of children in the school with Special Educational Needs either with or without a statement
EAL Proportion of children in the school with English as an Additional Language

experience of the evaluation phase) and we also identified subthemes that emerged from the data. Transcripts were scrutinized sequentially and repeatedly and notes were made in the margins of each text. Sections of text identified as being related to the a priori overriding themes were identified for further interrogation and coding into subthemes.

7.4 Findings

This section presents findings from the thematic analysis of teacher interview data and will cover the main overriding issues of: integrating SPRinG at a whole school level, teacher implementation of SPRinG group work within classrooms, SPRinG principles and practices and perceived impact of SPRinG on learning and skills. The analysis identified a wide range of sub-themes and perspectives. A selection of the experiences and views expressed by teachers as relevant to the subthemes and overriding themes are presented here.

7.4.1 Approach to the Integration of SPRinG at A Whole School Level

Teachers and facilitators made a range of comments about how best to organize a whole school/key stage approach to the implementation of the SPRinG ideas. The following quote highlights the main reasons for success in one school. These reasons were: the importance of senior management being in favour of the programme, making time for the implementation of the programme in the timetable and actually having one or more confident facilitators who can take charge, model the practice and support colleagues in its implementation.

> T What worked well? I think the way it's been planned. It's needed somebody to give the information, to act as a reference and to be able to demonstrate. It's having someone who's confident; who understands the process and it's the whole timetabling of it that has worked very well. And I feel by putting it on a timetable schedule, it's shown our commitment towards it. From the Head, Mrs X's not here today but it was her profiling of it, 'this is really important, we're going to make it work' and having that from the start prevented any worries, panics of timetable or scheduling. Most definitely. (Teacher 1, School 6, P1)

Many of these points ran through the reflections made by teachers and facilitators within other schools as reasons for success or in terms of how to improve implementation in the future. A main theme expressed is the importance of time being made available within the timetable to implement SPRinG training activities but also within meetings between staff.

> T The school have got to have a massive commitment to it. That might mean dropping other things or . . . , its freeing up of time. I think it needs to be a weekly slot. (Teacher 1, School 5– P7)

Particularly key was the importance of the facilitator and that person having time to take charge of organizing the implementation and in supporting colleagues.

> T We found it worked well because we had staff meetings every three or four weeks and regular updates and feedback. Possibly that person's time, your key worker or facilitator as such, your SPRinG representative, they need time out to be able to be in other classes, and it would make it work even better, to do the modelling role (model the SPRinG approach). (Teacher 1, School 6, P2)

However, being dependent on one person as the driving force means that success rests on their shoulders and sustaining implementation can be difficult if the facilitator for whatever reason is unable to sustain support for teachers. While other resources including the handbook and contact with the researchers were available for teachers, the way the facilitator organized and supported implementation was important. In one single year entry school, and despite best intentions, support was limited to an intensive discussion led by the facilitator at the start of the year followed by some discussions at various points—but otherwise there was little in terms of support, joint planning or reminders. This limited support led to what we refer to as 'SPRinGLite' which was a partial and intermittent implementation on the part of teachers with few opportunities for teachers to discuss and resolve problems with the facilitator (and presents a similar point to the variation in teachers taking on a SPRinG orientation as discussed in Chaps. 4 and 6). As a result in this instance some teachers remained unsure and uncommitted to group work.

In another school the facilitator had built thinking about implementation of SPRinG training and group work into year group planning meetings and was also in a position to support colleagues in the implementation of the training component, for example through demonstration and direct within-class support.

> T The most important thing is the planning and that's what X (Headteacher) said when she came up . . . . so that it's not an extra pressure, so that it's not something that you're feeling negative about . . . Year 3 & 4 meet every Monday, so we built it into those meetings, but generally the class teachers have been talking together looking through the book and working out which activities to take to do with their classes, so we've been going out . . . and doing some of the more practical activities . . . . we're fortunate to have a 45 minute period together in a big hall that we can do that (the social skills training activities) in and be able to support each other, because one of us might have led it and the others be moving around supporting groups and that sort of thing, so that's worked really well. (4 Teachers, School 4, P2)

How planning meetings are organized also seems to be important, especially when combined with the shared use of resources and opportunities to try out the activities. One teacher reported on how the facilitator had organized implementation within meetings.

> T what we found has worked well was timetabling from the start, so from the introduction at the start of the year . . . and we worked through the book in a number of staff meetings, 3 or 4, where we each had to go away, read a section by a certain time, have completed this element, carried out that element, carried out this activity, and also it's allowed for feedback and therefore X (facilitator) could go in and support classes who were having difficulties with it or have any questions. So we got the whole theory about it, we understood it and we actually participated as a staff in the activities, that was really

> helpful, actually doing it yourself. So it's been managed well in those terms. We had a big support at the start where we most needed it, and then classes have gone on to work with it. (Teacher 1 –School 6, P1)

An equally important point for the success of a whole school approach relates to how teachers receive the ideas and therefore the need to sell the programme to them. A number of facilitators raised this as important.

> F You need to sell it to them and they need to own it and they feel it's something they really want to do. And they're doing it because they feel it will be worthwhile for the children. You've got to do that with them . . . and you say, it has come from the top. And the Head's both very keen on the idea and sees the benefits of it because we do lots of other things as well. I think that's very important, it's got to be seen to come from the top—and then people have got to feel they want to do it as well. Sell it to them, get them to own it. (Facilitator 1, School 4, P9)

Other teachers highlighted the importance of seeing group work in action both for promoting it to staff colleagues or other schools but more importantly to support teachers in undertaking and implementing the programme themselves.

> F I think maybe it would be quite nice for them (teachers) to see a class in action before they actually did it, so they could see what was going on, to see one of the activities or talk to the children. That side would be quite good, something to show people that it's actually worthwhile. (Facilitator 1, School 4, P3)

Another teacher reflected on how to persuade other schools to take the programme on.

> T So if someone wants to take it on, come to a school that's made it work, see how it can work and I believe they'll do it. The small steps first, do it with one class first. Definitely. (Teacher 1, School 6, P2)

Other teachers made similar comments but also suggested that teachers' may have found it helpful if they had video clips to support them in their efforts to implement group work.

So the views and experiences highlight the importance of a considered and strategic approach to implementation at an organizational level. Such an approach requires the commitment of senior management who can create time for staff, specific time during meetings where teachers can work together to plan implementation of the programme and the use of facilitators who are able to demonstrate, model and provide support for the implementation of the practices involved in such a programme. Success at an organizational level affects how well the programme is implemented actually in the classrooms.

7.4.2 Teacher Implementation of SPRinG Group Work Within Classrooms

Teachers expressed a range of views and experiences about implementing SPRinG group work into the daily work routines of their classrooms. First, and foremost,

teachers were concerned about issues associated with how and where SPRinG work could be integrated into the timetable. Second, there was some uncertainty about the loss of control and the unsettling effects on pupils of introducing a new and complex way of working and learning. These concerns will be discussed in turn.

7.4.2.1 Implementing SPRinG Into the Timetable and Curriculum

The project had asked teachers to undertake at least two lessons a week that incorporated either a group work training activity, follow up or use of some form of group work within the curriculum. In discussing with schools the possible ways of integrating SPRinG work, we had suggested two alternatives: providing a clear space within the timetable for SPRinG work or undertaking SPRinG work during time allotted for personal, social and health education (PSHE), social and emotional approaches to learning (SEAL), circle time or during various lessons within the curriculum. This suggestion created some tensions within schools because the activities, while curriculum relevant, were not always central to the curriculum being covered in the particular classes during that year or at that time within the year. In some schools, Headteachers were very committed and allowed teachers to devote a particular slot to SPRinG training work. Other Headteachers were less enabling and thus required teachers to be creative and to adapt SPRinG training activities to fit in with the topics they were covering in the existing classroom work.

This latter approach introduced a range of difficulties for teachers and appeared to be successful only when teachers were committed to SPRinG and collaborated in their planning or when an individual was facilitating in partnership with others.

A number of teachers, therefore, felt that making and creating time was the largest barrier to overcome in the implementation of SPRinG and this appeared to be particularly the experience of teachers in schools with a single year group entry. When asked about what had proved difficult when implementing SPRinG, one teacher said:

> T Time to do it, which seems weird because it is such a flexible school, but there are just so many things going on . . . . So physically the time. (Teacher 1, School 5, P1)

Those teachers that had been required to adapt SPRinG training to fit in with the curriculum being covered at the particular time were concerned about where and when it could be implemented and how successful this was.

> T SPRinG groups have worked really well when the task has been related to something that we've been doing. So when it's been literacy based we did one on adverts and it was discussing ideas about that. So that's when it's been most effective when the children have seen a really clear link or purpose to why they're getting in a group and what the outcome is going to be. But then maybe that's me, that I feel happier when I know that it fits in with something we're doing, so in turn they're happier because I am" (Teacher 1, School 5, P2).

Clearly one way of enhancing and encouraging group work in classrooms would be to develop group work activities that are linked to a particular subject area. However, this would not have worked to support the transfer of group work skills and experiences

and the use of group work across a range of curriculum areas. SPRinG, after all, aimed to support teachers in developing their own skills for planning and setting up opportunities for group work in their classrooms. The SPRinG programme was deliberately not a set of lesson plans for teachers to deliver since teachers would then be less well equipped for developing their own group work once the lesson plans ran out. It is quite likely that those teachers who went through the process of adapting SPRinG so that it fitted into what they were doing may have had, in the end, a greater understanding of the key ideas behind the programme.

7.4.2.2 Teacher Uncertainties About Implementation

Teachers highlighted some difficulties that arose when they began to implement a new way of working and how this could make them reluctant to use group work with their pupils. These views focused on concerns about pupils' ability to develop the skills and their own feelings of powerlessness. These views are similar to the reasons identified in previous research about why teachers are resistant to using group work in primary school classrooms (see Chap. 2).

Pupil Immaturity

Some teachers were reluctant to implement group work because they felt that their pupils were not ready for it or because it would be risky for particular pupils. In discussing why a couple of teachers in one school had used SPRinG work in a very limited way one facilitator said the following:

> F Sometimes it's (about not doing SPRinG) because you've got difficult pupils and that interrupts the flow. For example I know one teacher had not such a strong pupil and something like group work is more risky. So therefore what takes priority is getting your pupil's self confidence up, so the group work has to take a lesser place. (Facilitator, School 5, P1)

A similar view had been expressed by a teacher during the development phase of the project. This teacher had shown an unwillingness to do group work training activities with pupils because they were unable to stay focused on the task, there were too many individuals that disrupted others while they were working and because pupils showed little trust or sensitivity to each other. Some of these expressed concerns are at the very heart of reasons why relational training in social and communication skills ought to be undertaken in the first place; that is, opportunities to develop relational understanding and skills are part of the solution. But these concerns do highlight the pressures teachers are put under when trying to undertake group work with a class of pupils and that for some teachers allowing children to work together seemed too risky.

Similarly, during the evaluation phase of the KS2 research, observation of groups in the control group condition undertaking group work activities as part of the filmed comparisons (see Chap. 5 and Baines et al. 2009b) illustrated how some pupils found it difficult to interact positively in group settings. Group work could bring children into conflict and put pressure on pupils' self regulatory skills and ability

to control their frustration and anger. Other pupils tended to use group work as an opportunity for 'free-riding'. These problems required teacher attention and support for their effective resolution, and this put pressure on the teacher and their classroom management and negotiation skills. Under such circumstances group work might be more effectively undertaken incrementally, for example, maybe with one group at a time or through the use of paired work.

These difficulties emphasize the need for teachers to encourage and gradually adopt group working patterns from an early point in children's schooling so that children know what is expected of them and so that these pupils develop the skills to resolve difficulties early on.

I If someone approached you wanting to do SPRinG as a whole school, what advice would you give?

F I would say start with the younger children and let it work its way through. (Facilitator 1, School 4, P4)

It is also interesting to note that one primary school located in one of the most educationally disadvantaged areas of the country undertook a very successful implementation of the SPRinG programme with children in KS1. The teacher responsible was very enthusiastic about the implementation of the programme, but aware that she had to introduce the programme 'gradually' and with sensitivity to ensure that all of the pupils in her class were fully involved. A further note in the overcoming of issues of pupil immaturity is that statistics cited in Chaps. 4 and 5 note that all children, including those who were deemed low attaining at the beginning of the year, showed equal attainment benefits over the school year.

7.4.2.3 Teacher Control, Classroom Management and Confidence

A common sub-theme relating to teachers' uncertainty about implementation centred on their discomfort in relinquishing control of their class and worries about whether they had the ability to manage and cope with the problematic effects that might result. Many of the concerns were to do with pupils' responses to undertaking group work and particularly problematic were times when children argued or fell out with each other, became frustrated or unco-operative. These experiences were far more common in the early stages of the SPRinG programme when new skills were being developed. These problems were observed on a few occasions when less experienced or confident teachers became stretched from having to manage multiple groups within their class.

I In your view, are there any negative sides to group work?

F Things I mentioned earlier, you haven't got the same sense of control and quiet and calm. The working atmosphere is slightly different. (Facilitator 2, School 4, P3)

But there was a clear sense that if teachers and pupils met these problems head on and endeavoured to support children in addressing them themselves, they were soon resolved.

> F They're much more positive about it certainly. And I've seen the benefits of it too. Because at the beginning getting the children to work relatively together when the children are arguing, you haven't got such tight control over your lesson. Whereas if you're all doing the same thing and you were in charge you have a nice quiet classroom, no problems. But the minute you give them an open ended task like that and encourage them to talk they're bound to argue and that's difficult to manage if you're a kind of teacher that likes things very controlled. So I think they've (other teachers) seen the benefits of that and seen how the groups have gelled and worked well together. (Facilitator 2, School 4, P2)

Another teacher, when explaining why she had not undertaken as much group work as she had wanted to suggested that "*Whether it's me not wanting to let go. I don't know*." *(Teacher 1, School 5, P2).* Thus, teacher confidence in the SPRinG approach appears to require a 'leap of faith' by the teacher—entering into an unfamiliar classroom world.

A number of teachers during the evaluation phase of the research had spoken at our meetings about a troublesome period or 'hump' that took place early on in the implementation process. This period involved pupils reacting to the new arrangements and increased the possibility of disputes between children, free-riding and group negativity, sometimes aggression, as emotions ran high. This early response to the intervention and time of crisis needed to be worked through with consistent messages of support, alongside repeated exposure to group work and effective use of 'briefing and 'debriefing', to be considered later in this chapter. Once things had begun to settle, group work became calmer, more manageable and effective. Another teacher wrote about this part of the experience for a SPRinG newsletter.

> F Now came the difficult part. We watched and supported groups of children as they argued, shouted and sulked. We were very tempted to split them up, but the researchers said it was important that the children worked through these difficulties with adult support. For a long time all we could 'see' was noise and disruption. But after a while we realized that the noise we could hear was actually productive noise. They weren't arguing or talking about last night's EastEnders[2], they were actively engaged with the work. (Facilitator, School 7, SPRinG Newsletter)

In many ways the onset of this difficult period is not surprizing. Getting adults to discuss issues, reach decisions and compromise let alone work together with equal involvement and responsibility can be difficult! Asking children to do these things is therefore also likely to result in increased strains. To add to this, there is a likely reaction against a new and less definite way of working where the teacher is no longer perceived as in overall direct control and not the holder of all relevant knowledge. The possibility of this reaction highlights the importance of the social, communication and advanced skills training activities along with the periods of briefing and debriefing built into the SPRinG approach. The development of these skills enabled pupils to get through the difficult times. But this period was not just difficult for the pupils; it was also personally and professionally difficult for the teachers. We need to acknowledge that SPRinG offers a new way of working for teachers as well, particularly as this was often the first time that these teachers had undertaken group work to such a regular and extended level. Another facilitator neatly summed the problem up.

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[2] A UK television soap opera.

F I think they (teachers) have to feel confident in the children; that the children can do it. A lot of teachers will feel that they want to control it. It is difficult to let go. Teachers, especially class teachers are in control, and they are guiding everything and I think that's the most difficult thing, letting go, letting your children do it. (Facilitator 1, School 4, P8-9)

This early phase in the implementation of SPRinG seemed to be 'make or break' for many teachers and those who were less confident tended to adopt a SPRinGLite approach.

7.4.2.4 Impact on Teachers' Professional Practice

Earlier chapters have highlighted that the SPRinG programme, as adopted and implemented by teachers, had a positive impact on attainment and pupils' interactions and behaviour. Teachers' comments also serve to highlight the marked effect that SPRinG had on their professional practice, their understanding of teaching, and understanding of themselves as a teacher as well as the way they approached teaching. One facilitator was keen to highlight that colleagues within the school had really learnt a lot from their involvement in the SPRinG project.

F It's (group work) the best way of working. Obviously as teachers you do put children in pairs naturally, you do put them in groups, you do work them individually, that's what your training course is for, and that's what we do. But I think it's made us focus that much more. In our planning as well, if you look around A's class and B's class you'll see much more big pieces of paper on the table, a spokesperson and a writer . . . and children working together as opposed to separately, sitting in a group. Much more that style of thing in RE, English, planning stories, all sorts of things. So it's brought it (group work) to the front of their minds, it's a good way of working. It's been very positive in that way. (Facilitator 2, School 4, P2)

As highlighted by this teacher, SPRinG encouraged amongst teachers much greater strategic thinking about classroom grouping practices for teaching and learning purposes. As we have argued in earlier chapters, this social pedagogic approach to teaching and learning is not common in everyday primary and secondary classroom contexts. Further evidence of how SPRinG had affected teachers' practice is evident from the views expressed in the context of how they interacted with and supported groups, as discussed in the next section.

7.4.3 SPRinG Principles and Practices

As part of the interviews with teachers we were keen to receive feedback on the practical recommendations underpinning SPRinG. Many of their responses provided interesting insights into the use and success of these practices. These insights will be discussed in the sections that follow organized by the four key principles.

7.4.3.1 Preparing the Classroom and Groups for Group Work

The SPRinG programme made a number of recommendations relative to the preparation of the classroom layout and the composition, size and stability of groups. Group composition can be used to enhance inclusion which can in turn pay dividends for all pupils in the class both in terms of learning and social skills. Group composition can also be used to bring a positive and inclusive social and emotional atmosphere to the class. In terms of classroom layout, teachers indicated that children quickly learned to move tables around and to position themselves so that they could interact as a group.

> F This class they've become used to moving tables around very quickly. They're absolutely, very quick at making sure there's four on a big table, however, if there's three, what I've found is that they try to climb the tables to look at the sheet etc, so they found that if they just go into the corner (of the table), one sits in the corner and the other two there, that's much better. In fact these tables are a bit too big for four, they think so as well. Seeing each other is important. (Facilitator, School 6, P2)

Teachers expressed a range of points about the size of groups. At Key Stage 2 we suggested using group sizes flexibly relative to the challenge posed by the task undertaken and building up from pairs to no more than a group of 4. All teachers had tried this and many used groups of 4. Teacher's confidence in their use of group work, though, was based upon developing initial relational/group skills of sensitivity, trust and communication which allowed children to move easily from paired work into larger groups.

> F ... it always used to be a few tables of six to get around the literacy strategy. Now I sit them in tables of four all the time and it's about either pulling the chairs closer together ... But I found that actually, because you can always put a couple more onto a table if you want to even in a group of four, but it is much easier for a teacher because a group of 6 is quite large—I automatically went back into fours again. (Facilitator, School 5, P3)

Others were keen to emphasize a flexible approach and others still distinguished between group sizes for group work as opposed to small group instruction (which were often larger).

> F I guess if they're talking about their own writing, its better in two's because (they can focus on each other's work) and if there's four of them then there's too many different opinions coming through. There's time when pairs work and there's times when bigger groups work well. If they're making a poem, sometimes it's good in a four .... They have done it in fours, writing poems as a group and that's worked quite well, because sometimes in a pair you might not have enough ideas. So if it's something like a poem, or story, a four works well. But if they're discussing each other's writing, it's better in a pair rather than a four. That seemed to work better. (Facilitator 1, School 4, P7)

Teachers also made a number of comments about group composition. A main issue that teachers spoke about was the balance of ability within groups and how both low ability and higher ability pupils were aware of the benefits of mixed ability groupings. The following teacher talks about a questionnaire that she had undertaken with her students independently of her involvement in SPRinG.

F The questionnaire (about how children felt about group work at the end of the year) I did last year, which is now a year six group . . . the low ability felt that they could benefit because other children helped them. But then you also found high ability children would say it's all about learning about life and in work you'd have to learn to co-operate and things. There was only a couple that felt they preferred working on their own. (Facilitator, School 5, P4-5)

Others spoke about the advantages of the interactions within mixed ability groups as opposed to same ability groups especially for low attaining pupils.

T I'm thinking about L who's low ability, if I were to put him with two other low ability children, they would never have the ability to include him and ask him the questions and think about things beyond themselves, but because he's with middling, quite good children actually, although that can be frustrating for them, they're also able and mature enough to say 'and what do you think' and 'can you see' and 'why don't you do this bit', so there's possibly a problem there isn't there, if you've got a low achieving child with other low achievers, that actually nothing very much would get done at all. So it's quite a balance isn't it? (4 teachers, School 4, P2)

Teachers also spoke at length about the difficulties associated with integrating children with SEN into groups for group work. A main problem often observed was that pupils with emotional and behavioural needs often had negative experiences of group work since the interaction with peers brought them into direct conflict with less capable peers and also disrupted the rest of the group.

F It (group work) works well when, I think it can support quiet children as well a lot. But sometimes it can exacerbate a situation and bring out problems, especially if you've got children who are emotionally disturbed and want to lead or dominate, and then it becomes very frustrating for them and for the rest of the group . . . The rest of the group get fed up because they want to dominate and they get fed up because they're not being allowed to get involved and it's not working. (Facilitator, School 5, P5)

This teacher continued . . .

F I was thinking there was A and C last year, and they're both, their behaviour showed emotional disturbances . . . . Although both of them at the end said they enjoyed it, and appreciated people helping them, but at the time they found it really hard. Particularly C. His was the group that was particularly disrupted. (His group also contained) One quiet child and one not so quiet child. Group work was not it for them anymore, they'd had enough. (Facilitator, School 5, P5)

Another instance of attempted inclusion within the classroom was outlined when teachers came together to 'de-brief' at the end of the evaluation year. Each teacher presented a synopsis of her year with SPRinG. As the session moved along, one KS1 teacher began reflecting on how her responsibilities in the classroom changed over time. She began the reflection by saying that at the start of the year:

F I was heavily involved in putting pupils into groups and making sure that they undertook group work and other classroom activities . . . If the group did not 'click', children would come to me and complain. (Facilitator 3, School 4, P2)

But, as the year moved on:

F I realized that the children were not coming to me as frequently . . . groups were sorting out many of their 'what to do next' problems. (Facilitator 3, School 4, P3)

Other teachers emphasized the value of mixing boys and girls within groups and the importance of early identification of 'free-riders' so that they can be separated and spread across groups.

A key recommendation of SPRinG was that group composition should as far as possible remain stable for a period of time. This stability allows trust, sensitivity and mutual understanding to develop within the groups but also means that tensions and difficulties between group members need to be addressed and resolved rather than avoided, for example, by reorganizing groups. In the event, teachers interpreted this in different ways. Some teachers kept the groups stable for the whole year, others for a term, while yet others, after at least a term, allowed groups to decide whether they wanted to change. In general teachers reported that they preferred stable groups.

> F One of the things you said after the initial meeting was that pupils might want to change after a term. I did try that but I think they were better staying in their groups. That was better. I went back to that (stable groups), I found it was better. Because they'd already got this relationship and were used to taking turns . . . . (Facilitator 1, School 4, P5)

While there was every indication that group stability functioned to enhance group working for the majority of groups, there were experiences that functioned to make it difficult for groups to benefit from group stability.

One teacher highlighted that children that were often absent could be experienced as 'virtual strangers' and this could destabilize the group and undermine the positive effects of working in a stable group. While there are a number of ways of overcoming this constraint, for example by undertaking further team building exercises or encouraging pupils to update a child that has been absent, this might be particularly problematic in schools with high levels of pupil mobility.

Other teachers raised the issue of group stability when the group contained difficult children or children with problem behaviour.

> F When I did my research talking to the children, there was one group with one particularly difficult character, because I kept that character in the same group, although most of the children had a very positive response to group work, there were two children specifically in that group that didn't. I thought about moving him halfway through, and perhaps sharing the load in a sense. I think I should have done. I think sometimes it's about having flexibility. (Facilitator, School 5, P1-2)

Another teacher said . . .

> T3 I had a great deal of difficulty last year with B (during SPRinG evaluation phase). Because absolutely no group wanted to have him because he spoilt every single activity you did, so he was never actually particularly in a group, where he could bond with them, to make much trust. I found it really difficult, and it didn't even help just having him watch a good group and try to pick up ideas that way, he could not apply it and this year I really tried hard not to swap people out of groups because the ones who managed to stay together without any interruptions tend to work better as the year's gone on. (4 teachers, School 4, P9)

While there is no easy solution, there are a wide range of strategies that can be used to manage the situation, including encouraging the particular individual to observe others interacting, sharing them across groups, and coaching and counselling them

in particular skills and in self managing their behaviour and feelings (see Baines et al. 2009a). These can also be useful opportunities for the rest of the class to develop understanding, sensitivity, awareness of their own behaviour and others' difficulties and to adopt a positive approach to inclusion. Either way, teachers need to be flexible and thoughtful in the way that they respond to these situations and try to balance the needs of all pupils.

When commenting on how things had changed over time another teacher reported on the success she had experienced integrating a child with particular needs.

> T I found that groups were changing in their composition—with children asking other children to join them . . . I realized this especially with regard to an autistic spectrum child in class. At the beginning of the year, I was very concerned to integrate X into groups—and neither he nor the others (group members) really worked well together. Later in the year, other children found that X was very good at drawing and groups asked him to join them for the contributions he could make . . . it changed my approach to X . . . (Teacher, School 2, P4)

A number of other teachers reported similar experiences, though there was the clear sense that this form of inclusion did not easily take place at the start of the year and required support and the trying out of different strategies before progress was made.

The inclusion and involvement of children with SEN and other social difficulties can raise tensions and dilemmas and is probably one of the most complex aspects of introducing and managing group work in classrooms. We can take encouragement from the quantitative findings reported in earlier chapters that children from different attainment levels made positive progress in their learning and understanding as a result of SPRinG involvement. However this is an area the requires further research along with the development of additional practical advice for teachers in just how they can manage the involvement and inclusion of SEN pupils in group work.

7.4.3.2 Preparing Lessons and Activities Involving Group Work

Teachers had a lot to say about using group work within lessons and particularly in relation to the briefing and debriefing components of the SPRinG programme. Views were also offered about how to set up tasks that enabled effective group work and how to use group work in the curriculum.

Briefing and Debriefing

A number of teachers felt that the briefing and debriefing aspects of the programme were particularly successful and used these elements both during training activities and when group work was used in the curriculum. Briefing and debriefing were also used to coach and support pupils and groups in developing their group work skills and ensure productive interactions in the group.

> F There are certain skills in group working that maybe before you just assumed that putting children in a group they'd get on and work without spelling it out for them. I think this is really spelt out (in SPRinG). It's important to take turns. It's important to look at each other, it's important to share jobs, they're made aware of it really. That's the difference,

> they're not normally aware of those things. We've made little cards with group rules on and put them around the table and say 'this week this activity, you on this table I want you to concentrate on not fiddling, or looking at each other', or whatever it might be. We'd never have done that before. We'd have just done the activity, not thought about how they were going to do that activity—that's quite a big difference. (Facilitator 2, School 4, P2)

As this teacher highlights, briefing and debriefing are key but are for many a new approach to developing group and interaction skills. It is suggested that the use of briefing and debriefing are essential ingredients determining whether teacher experiences of group work are positive or negative.

When group work was used outside of the training sessions, teachers used the briefing and debriefing phases to focus pupils on particular group rules or to resolve particular problems that had arisen or simply sustain reflections that had begun during training sessions. Two teachers in the group interview spoke of the briefing element and emphasized how the two phases can reinforce children's skills.

> T1 What I found helped . . . for all of them actually, is to give them . . . before an activity to give the group something, one of those rules to concentrate on, just to keep them focussed on that thing, that helps. Even if they've just got one. Sometimes you can give two, but mainly just one is enough to keep them concentrating on some particular aspect of working with a group. I find that does help.
>
> T2 That's what I found useful as well. Because there are so many skills for them to remember, but if they know their particularly concentrating on taking turns or particularly concentrating on eye contact, or not fiddling, whatever it is, they can manage that, then they feel they've achieved something as well, don't they. They feel positive. (4 teachers, School 4, P6)

A number of facilitators in particular also indicated how valuable the reflective (briefing and debriefing) components were whilst also acknowledging how difficult it is for teachers to integrate these into their teaching.

> F The strongest thing for me was talking through with the children how and why the group worked or whether we'd met that specific group objective. That's the bit which is the hardest bit to adopt in some ways. I know that some of our teachers are still struggling with that. It's actually talking through the aspects of group work with the children. (Facilitator, School 5, P2)

One reason why this aspect can be difficult for teachers is that they can run out of time and leave out the debriefing element, especially if the lesson was not a group work skills training session.

> T . . . at the end of a busy science lesson where children had been working in groups, to then find ten minutes at the end to discuss how they worked together in their groups, I honestly didn't think I could do that for every single lesson. I would if I was making the point of teaching them the (group) skills. (4 teachers, School 4, P3)

There were also indications that briefing and debriefing were perceived by some teachers (though not facilitators) as less important than the actual experience of group work itself. One or two teachers, whilst undertaking a group work activity, used briefing and debriefing infrequently, even during group skills training. This was another characteristic of a SPRinGLite approach. Of course without the group work

element reflection cannot take place, but a main reason for briefing and debriefing is to assist children in making sense of their group experiences and facilitating the adaptive process as well as controlling the attribution of blame and fostering the development of positive attitudes towards group work. Briefing and debriefing can therefore help to manage and mediate the messages adopted by pupils, thus discouraging negativity and enhancing understandings that are more constructive in helping pupils adapt their skills and strategies in group interaction.

Teachers felt that once group work had become an established and productive part of everyday lessons then there was less of a need to engage in extended briefing and debriefing periods every time and that a more intermittent or flexible use could be acceptable.

> T You would probably take your lead from the children. If you had a particularly successful lesson where you really notice the children working well, you might discuss that at the end, or else at that point if children are falling out and weren't working well together you'd probably think 'well I need to talk about this' and we'll have a whole session on this next time or we'll talk about it now. I suppose you take your lead from the children. If it's all working smoothly, perhaps you just let it go. (4 teachers, School 4, P3)

This flexible use of briefing and debriefing removes some of the time constraints on using group work in the curriculum. This opens up multiple opportunities for teachers to use group work for a variety of quick activities where briefing and debriefing time can be used for other learning purposes. It is important however that opportunities for reflecting on group learning and group skills are still regularly available.

Another area that makes a big difference to the productive use of group work is the appropriate matching of group work to tasks and curriculum. Much of the discussion about group work and curriculum related to the time available for the implementation of SPRinG, as discussed earlier. Teachers tended to indicate that once a good foundation of group skills had been established they would be increasingly likely to use group work right across the curriculum; and a number of teachers highlighted its value within literacy (particularly in terms of speaking and listening), numeracy and science, though this might reflect the expertise and focus of the teachers involved.

One of the key messages about getting group work to work effectively is to ensure that the task only involves one set of materials and resources. One of the early observations of a KS2 classroom illustrated this nicely. The teacher wanted groups to invent a monster and particularly to discuss a range of different characteristics. Group members were allowed their own paper and pens and the result was that there a complete absence of group discussion about designing the creature and each child devised their own version. Subsequent efforts by the teacher to bring the group together were fruitless. Teachers therefore need to be careful in the way they set up group work tasks and need to think carefully about how writing and drawing are undertaken within the group activity. There are of course many different ways of incorporating writing and drawing into a co-operative or collaborative activity and it might be preferable to break the activity into stages of group work followed by individual written activity. Teachers are often keen for there to be some outcome or output of an activity but SPRinG teachers became aware that sometimes during group

activity a written outcome may be counterproductive and may interrupt the flow of co-operative interaction and discussion and possibly lead to free-riding, arguments and/or disintegration of group interaction into individual work.

> F Once you put that piece of paper there then somebody has to write on it. Then you get the question of how many write on it, or whatever . . . when you're trying to get children to write down things, record, . . . then they can start doing their own corner. (Facilitator, School 5, P4)

This tendency to separate out their own contribution was particularly observed when pupils and teachers were relatively new to group work or when pupils were young. Once pupils are familiar with undertaking group work, and aware of the group nature of the activity, then they are less likely to do this. Nevertheless children need to feel that they are involved in the activity much of the time and there should not be long periods where group members are sitting and waiting for the writing part of the task to be completed by one group member. This same teacher continued.

> F I think it's counter-productive if the task is such that people in the group feel that they're not doing anything. That's often the case when it comes to the paper and pencils tasks. When there's paper and pencil for one between four, others can be left not doing anything, even though you can take turns. But then there's also the boorishness of writing things down, other people barge in, tell a joke or something, the work loses the impetus. It can work, I did some nice posters last year with the Year 5 and on the whole I think it does work much better with just one pencil. (Facilitator, School 5, P4)

Other teachers highlighted the need to structure the group work task and to keep the activity moving—especially in the early stages of group work and with younger children not able to regulate and plan group interactions independently especially during open ended collaborative project work.

> T As I say we've done a lot in discussion so we need more trying to keep it focused on what they're trying to get to rather than let it go, it's in discussion that they've been doing most of the work. Giving them a step-by-step into it really rather than letting them talk and talk, then it becomes too wide. (Teacher 2, School 5, P1)

7.4.3.3 Adult Role In Supporting Groups and Individuals Undertaking Group Work

We asked facilitators and teachers about how SPRinG impacted on their approach to teaching and their role in relation to groups. Many of their initial responses focused on issues associated with the loss of control, letting go as discussed earlier. But many teachers were keen to emphasize that SPRinG had gradually affected in a positive way their approach to teaching and learning more generally.

> T I feel like my teaching has altered. I'm more adventurous myself and I suppose more child centred . . . for them to discover and work together, less controlling, basically. (4 teachers, School 4, P3)

Teachers also expressed a range of experiences and views about the particular ways that SPRinG had recommended they work with groups and support group interactions. A number of teachers spoke about the SPRinG recommendation that adults should monitor and support groups and not overly dominate or impose their ideas on pupils' work. As we have said before, we tried to sum up our approach in terms of teachers acting like a 'guide on the side' rather than a 'sage on a stage'. Many teachers reported that prior to SPRinG they had tended to adopt a more lecturing and controlling style of instruction and often structured everything the children did. But as a result of SPRinG, many teachers allowed groups to work more autonomously.

> F you know that 'guide on the side' thing, it definitely made me aware that I'm a teacher that likes to talk at children (unclear) I'm thinking that I'm giving guidelines, however, I'm becoming more aware that I'm actually taking them off on a tangent . . . but now I realize that it is so important to let them bash things out themselves. They set their own ideas basically. (Facilitator, School 6, P3)

This approach to teaching did not come easily to many teachers who often see themselves as the source of knowledge and learning.

> T I think in a way it's about not interacting too much. Perhaps teachers get involved too much and they shape the discussion. The hardest thing I found is stepping back . . . . It's quite nerve racking at first because the role is different. Most definitely, for myself seeing X (a teacher facilitator) do it, helped, definitely. (Teacher 1, School 6, P4)

As suggested by this teacher, being able to observe another teacher/facilitator adopt this approach to working with and supporting groups (either live or on video) was seen as valuable for enabling teachers to learn how to work with groups.

Another teacher suggested that sustaining a 'guide on the side' approach was one of the hardest things to do.

> T Not trying to take it over, letting it progress at its own speed and not trying to force it, giving them ideas but not directing is the biggest problem. (Teacher 2, School 5, P1)

It can be difficult for teachers to put aside years of repeated experiences of leading, directing and telling pupils what to do that they can find it difficult to know exactly what to do and when to do it when they adopt a more non-directive yet facilitative approach.

> T At the beginning I was a bit lost because I didn't want to give too much direction to it, so it was more moving around and encouraging children to take part. That's really what I've tried to stick to while I've been doing group work in the SPRinG influenced way. Occasionally you need to sit down and give them some directions as to what they're supposed to be discussing because there won't be a clear idea in the group. That's what I'm trying to do rather than structure it up for them. (Teacher 2, School 1, P1)

We should not forget that adopting these new styles of working can put huge amounts of pressure on teachers who are expected to cover a set curriculum and convey certain knowledge and ideas by the end of the year. Teachers are judged on the basis of how much children know and how much they have developed and adopting a less directive approach to teaching can feel like it is a very slow way of getting to these outcomes. It is of little surprise that some less confident teachers did not feel comfortable with

these methods and felt a need to be more direct in the way that they managed their class and groups. One teacher who had expressed doubts about the programme and struggled to get SPRinG going in her class highlighted the limits of being able to monitor group activity, particularly when it came to specific individuals she felt a need to use her presence to ensure that certain children remained on task.

> T I like leaving them and just watching, definitely. But then as I've got a student (teacher) full-time I can do a lot more of that anyway. And with a student, I've been trained to keep a step back . . . but I usually end up having to be with either K or L (difficult children in the class) . . . I feel sad that I have to sit with them and then they know there's an adult there and I know that ideally I wouldn't be there, and then they start talking to me, and however much I say 'just ignore me', they know I'm there, so that's the frustration I think. But I would love it if I didn't have to . . . . I'd have no problem with literally sitting back and watching. But that hasn't happened with these two. (Teacher 1, School 5, P3)

As is evident, this teacher, who was relatively new to teaching, never really developed the confidence or the trust in her pupils to let them do the group activities. There are plenty of strategies for overcoming the issues that she describes but irregular use of group work or a SPRinGLite approach can mean that these issues are never overcome.

Finding the time to monitor pupils in group work did not come easily to some teachers at the start of the SPRinG programme. Building in more monitoring and offering formative feedback to pupils and groups can contribute in an important way to interactive classroom development. At the start of the year, pupils were very dependent on the teacher for the establishment and running of learning tasks, classroom procedures and grouping procedures. As the children became more competent in their group working skills, their groups were able to provide support concerning learning tasks, classroom procedures, and so on. Correspondingly, even those children who were once labelled 'difficult' did not demand as much time from the teacher for procedural activities. Being freed from frequent child dependencies allowed teachers more time to monitor, observe and reflect upon what was taking place in their classrooms.

Interacting with the Group

Teachers spoke about a wide range of different interventions that they might use with groups. Sometimes these were not always consistent with the SPRinG approach (e.g., teacher sitting next to problem children to control their behaviour). What was evident was that for the younger children and those in the early stages of group work there did need to be some intervention to get them to reflect on what they were doing and where they were going to enable them to manage the activity and tasks themselves.

> T Supporting groups, to clarify what they've talked about, if you're in the group supporting them, making them stop and just make a note or agree with what they just talked about because it makes it clear in their mind what part they're up to in the discussion. (Teacher 2, School 5, P1)

A related matter to intervening in group work was how teachers went about motivating children to persist with group work. A range of different approaches were used.

F I talk about the real world a lot and I tell them, I'm quite harsh, I tell them that I've seen people who don't want share their ideas etc. often get missed out, don't get picked etc. It's making them aware that if they want to be like that, unfortunately the world is set up not for them, its set up for the other people. And even if you're wrong—I tell them that how do you know if you're wrong unless you open your mouth and try, it's all about that. It's making sure that this is real stuff. I always put it back to real life . . . (Facilitator, School 6, P4)

Another teacher emphasized the importance of children having to decide for themselves that they want to participate and get involved and persist with the group work.

F I think the most effective is in fact when they end up putting themselves out and realize they're missing out. You can encourage them but it's when they realize that they're missing out, that's the motivation to make them work together better. (Facilitator, School 5, P6)

This self-involvement, of course, may work with the children who get annoyed with the rest of the group and decide they do not want to co-operate but this might be less successful with the children who are happy to be in a group but are also happy not to pull their weight. One of the facilitators emphasized the view particularly central to the SPRinG approach which is to try to make the group work challenging and fun.

T If you make it as a challenge, don't you find if you say 'this is a really difficult activity, it's going to be so hard to do this because you're going to be very tempted to be silly, but if you try your absolute best' . . . and say, 'many adults would find this difficult', if you build it up and build it up, they really rise to that. Looking through here (the interview questions to be discussed) there was a question about how you do that (motivate children to be effective group workers), and I was thinking, it's just to do praise isn't it? . . . because it's just massive amounts of praise and making it a challenge for them. (4 teachers, School 4, P5)

Using positive approaches to make group work challenging and fun and an experience where children feel positive about themselves and in working with others are really the key and lead to greater participation in group work and improved group working.

Coaching

Other teachers spoke about a coaching role that they might adopt when encouraging group skills. Such a role enabled teachers to individualize their support and the facilitation of particular skills through the targeting of particular individuals within the group. This coaching or personal intervention was often used to encourage children to adopt a different strategy to group work, for example, when pupils are being over-domineering or getting upset about not having their own way or when pupils were not included. As one teacher said:

T it's almost like trying to talk to just one person, or the two people in the group, the one that isn't taking part and the one that seems to be controlling. I try to encourage the one who isn't taking part to do so, and the one who's controlling it not to stop, but to invite the person who is doing very little to join in. (Teacher 2, School 5, P1)

Reminding groups to include others and follow the group rules was also an activity that teachers often spoke about.

> F Some children need me to remind them. I'm not sure if I haven't gone over and said 'is everyone having a turn', 'Why don't you ask him what he thinks' whether they wouldn't have done that naturally. They're still very egocentric at this age, they're not very able to look around at other people in the group particularly. But with encouragement they will. And there's certainly no one in these groups that refuses to take part. (Facilitator 2, School 4, P2-3)

Another teacher spoke at length on how he had coached a Year 4 girl to encourage her to be less domineering.

> T On the whole I've left them to their own devices to sort out their roles. There was a girl . . . who is very bossy, but very good at organization, and she got very frustrated. I put her in a group of people that were not responding to her bossiness and she was getting more and more frustrated . . . I took her aside and said 'look, you're really good at organization but you're just telling people what to do and they don't like it, so you've got to say to them things like: you're very good at that, so you do that, so you can get everyone to do what you want, but you're doing it in a more subtle way' . . . It's a skill. You're going to come across people who don't do what you want to do but you've got to learn how to get them involved. (Teacher 2, School 6, P4)

It is not always straightforward or constructive for group members to tell a peer that their approach or manner is not helping. The teacher adopting this sort of coaching approach can be very effective and may be enough to turn a group experiencing difficulties into a more effective group.

7.4.3.4 A Relational Approach: Pupil Training and Group Interactions

Teachers were very aware of the value of the relational approach underpinning SPRinG and particularly the group skills training and what it enabled children to do. We have written elsewhere about the effects of SPRinG training on pupils' social and interactive skills (Baines et al. 2009b; Blatchford et al. 2006; Kutnick and Berdondini 2009) but there were a range of comments from teachers about the usefulness of the wide range of SPRinG relational and group training activities and more specifically how these helped children overcome some of the common difficulties they have when engaging in group interaction.

Teachers throughout the SPRinG project acknowledged that when they had tried group work in the past they had tended to assume that group work just happens and that group skills training is not something that is part of a teacher's remit (see also Baines et al. 2003). Studies of teachers' reasons for not using group work include comments about pupils' immaturity and poor cognitive and social skills. In our earlier research in this area virtually none of the teachers questioned indicated that they endeavour to develop children's group working skills or they assumed that this sort of thing would be mopped up as part of circle time (Kutnick et al. 2002)—where children often learn about socio-moral issues and not about *how* to do these skills in practice. As one teacher during the interviews said in relation to SPRinG skills training:

T1 I think you assume that you put children in groups and they'll work together. Well actually they need to be shown how to do that, don't they? I think that's the beauty of the SPRinG project, you're actually giving them those skills, teaching them how to work with the group.

T2 And they can see the benefit of it can't they? (4 teachers, School 4, P2)

The importance and value of learning how to work with other group members in practice was something as a team we were very aware of from an early stage. During the development phase of the research we visited many classrooms where children knew about social and group work rules but when observed they rarely utilized these skills in practice. This highlighted for us the importance of training and the process of briefing and debriefing in the group skills development as well as strategic reminders that teachers could use [such as WILF (What I am Looking For) which highlighted to children the sorts of interactions and behaviours they expected to see when monitoring groups]. One teacher reflected on the SPRinG training and highlighted the positive effect a focus on doing group work in practice had on the interactions of her pupils.

F But the reality of the situation is that children will say what they are expected to do as a group, but then in reality, what they do as a group is a different thing . . . Generally it (SPRinG training) makes them more aware of being co-operative and helps their behaviour in and outside the classroom. (Facilitator, School 5, P5)

The SPRinG activities and associated briefing and debriefing sessions were ideal for encouraging children to adopt and utilize positive strategies to working together and as groups but it was also necessary that these skills, reflections and discussions about skills needed to be sustained when group work was used within the curriculum. This highlights the importance of continued and regular use of briefing and debriefing for sustaining group development and the fostering of group work skills.

The Aspects of Group Work Pupils Find Difficult

In talking about pupil's skills and experiences many teachers indicated that group work could be particularly challenging for many pupils and sometimes resulted in frustrating and negative experiences. A teacher of a Year 3 class highlighted the difficulties that a particular child and group had early on in the programme but also noted the general challenges that children face in this context for example in staying on-task and not disturbing or being disturbed by others.

I What aspects of group work have children have found the hardest?

F . . . one child found things difficult when he hasn't had his way, that's been the hardest thing for them. He's expressed his view but the rest of the group haven't agreed and if the rest of the group are able to agree and come to a compromise and one can't that's very difficult for them. But certainly that's maturity as well and that's beginning to improve with that child. And remaining focused on it too because if there's a classroom full of chattering children as there's meant to be, it's quite hard to stay focused on your group when there are other things to listen to and other things to do. Especially if it's a practical thing like racing cars around. Staying on task I would say. (Facilitator 2, School 4, P3)

Behaviours that teachers felt that students found particularly frustrating were things like free-riding behaviour, arguments and blaming each other, pupils with behavioural problems becoming angry and responding in an extreme way. A teacher spoke about some of the more difficult problems she had come across over the course of the year.

I What aspects of do you think children have found hardest?

F That's going back to the very difficult characters ... sometimes it can exacerbate a situation and bring out conflicts, especially if you've got children who are emotionally disturbed and want to lead or dominate, then it becomes very frustrating for them. (Facilitator, School 5, P5)

The concerns that this teacher expresses about group interactions, bringing about conflicts and some children getting frustrated, was something that was also observed. These concerns were especially evident when pupils were new to group work and amongst the group interactions of pupils in the control group—who had not experienced any group skills training. In particular there were a few observations of pupils becoming frustrated and angry with each other at these times. These situations highlight firstly how involved children become when engaged in the activities and how heated the discussions and conflicts can become but also how important it is for them to be supported in their resolution of these tumultuous interactions and to be able to improve their skills for dealing with these situations. These difficulties represent some of the challenges that led to the SPRinG project in the first place since these tensions are difficult for teachers to overcome and often put teachers off using group work. If these situations are resolved then the outcome can be very positive.

T For those children when someone's making it impossible to work it can be a negative experience for them, although it can be positive if they find ways around the problem. (Teacher 1, School 5, P5)

A key aspect of the SPRinG ideas was that children had to take responsibility for their own learning, to try and manage themselves and work as autonomous groups and to resolve their differences and interpersonal complaints themselves. Some teachers allowed pupils to opt themselves out of group work and were confident in the fact that at some point they would want to opt back in. One teacher emphasized that pupils soon realize and develop strategies to ensure that they are able to undertake the interesting activities.

T I'd say ... it's up to you ... if you don't work well as a group then you don't actually get to do the activity.... You make it clear, they can all have a go but only if they work as a team. If they argue who goes first then the activity is over by the time they've finished arguing. After a few times of doing that a few kids realize ... I'm missing out every time here'. Part of it is if you actually stand back and let them argue it through .... I think the whole thing about children have to resolve their differences themselves, to be an effective group, makes really good sense really. I think giving them fun activities where if the group doesn't work as a team, they just don't get to do them. (Teacher 2, School 6, P1-2)

Other teachers highlighted the effect of the training and repeated briefing and debriefing discussions about group work such that children began to turn the corner and become more proficient at handling the trickier and frustrating situations.

I Have you've noticed a change in them (pupils)?

F They're more aware of it (being co-operative) because at the beginning certainly last year as well, if you asked them to work in groups, they'd go 'no, not in groups' because they knew it was going to mean arguments and not getting on, but now they've got some more skills, they can get on better. And you can hear them saying to each other 'come on, you've got to look', 'we've got to get this right', 'we've got to take turns here'. So they know that those skills will help them help themselves. (Facilitator 2, School 4, P2)

Another teacher also reflected on the early difficulties children had had and how this had changed over the year.

T3 I'm thinking back to the beginning, when giving them a task a few of them would not have got very far through because they would have been off task, they'd have been bickering about things and fiddling and all those things. (4 teachers, School 4, P5)

Within the same group discussion a second teacher flagged the progress that a few key individuals who had initially struggled with group work had made during the spring term.

T2 . . . B and J (two girls) and R (a boy) are very proud of themselves with the fact that this is the second week now this half term that they've worked really well together and no one's fallen out, no one's stormed off in a huff, no one's argued, and they're really proud of themselves for that. So they're very able to value their own performances. So it's good for them as well, it's their self evaluation. (4 teachers, School 4, P4)

Similarly a facilitator highlighted how some pupils took charge of the group interactions and ensured that everyone contributed and remained involved.

F They say 'you've got to contribute, you've got to think of something'. If they say they don't know, then they say 'we'll come back to you'. And they do. (Facilitator 1, School 4, P8)

There were clear indications that many of the problems experienced by pupils and groups were overcome during the SPRinG project and it was very much the view that although group work brought these tensions to the fore—the relational and group skills training, combined with briefing and debriefing and coaching and repeated experiences of group work helped children to resolve these problems themselves. One Year 5/6 facilitator highlighted how Year 4 children that had been involved in the project for over a year were much improved in terms of their argumentative and disruptive behaviour.

F They're better about that (the arguing) actually I think because they did do it last year. You don't get so much of the squabbling; . . . mostly they're very good and they don't squabble and it actually seems to be a lot better than it was last year. They've worked that part through I think. Definitely. Last year, you'd get them squabbling, it's as if one always wants to be king pin and one doesn't want to say anything, so they're a lot better. (Facilitator 1, School 4, P3)

This highlights the importance of continuous and regular opportunities throughout primary education to undertake group skills training and within a continuous whole school experience. In order to make improvements, there have to be year on year opportunities, experiences and efforts to sustain group skills training and the regular use of group working for teaching and learning within the curriculum.

7.5 Perceived Impact of SPRinG on Learning and Skills

In Chaps. 4, 5 and 6 results on the beneficial effect of SPRinG have been presented from careful quantitative studies. All teachers and facilitators also highlighted a range of areas where SPRinG training and group learning had impacted on individual pupils' skills and learning. Some teachers and facilitators highlighted the improvements in social skills and helping that came about as a result of SPRinG and group working. One facilitator highlighted how groups can provide a more immediate and safer form of support than the teacher.

> F Often where teachers may be too overpowering, peer group support can help children help each other a lot more. Or the fact that you've got one teacher and thirty children, they can be there more often than you can. If you use your children as a group, the support is not as threatening. (Facilitator, School 5, P5)

Teachers and facilitators also highlighted the benefits in the longer term, that once the group working skills were developed the children and groups could move on to learning skills at a higher level.

> F Last year I felt like I was imposing on them how to do it in Year five. 'This is what we've got to do'. Now that we've got a Year four group that have done it (SPRinG training), they've gone beyond that stage, so you're on the next stage with them now they are in Year five. You can actually get them working as a group, you don't have to say 'you've got to listen'; if anybody were to ask them what they should be doing, they'd all know it and they'd all do it. They've gone past the first stage where you tell them 'you listen, you write' they're on to the next stage—that's part of what they're doing. It's internalized . . . . They can take turns, they can do it. As I say it carries through. I noticed it very much, when I do the school council meeting, they do it. (Facilitator 1, School 4, P4)

One facilitator later highlighted the positive personal and social benefits of SPRinG training and group work.

> F Generally it (SPRinG training and group work) makes them more aware of being co-operative and helps their behaviour in and outside the classroom, their attitude and motivation to learn, the more confident you feel the more you learn. I think it helps children's confidence a lot. (Facilitator, School 5, P5)

This teacher specifically highlights the benefits for behaviour not just inside but also outside of the classroom. Comments of this nature were made by a number of teachers in relation to both children at Key Stage 2 and Key Stage 1. These comments were usually in relation to specific individuals but this is a positive sign that SPRinG might have wider benefits and this may be due in particular to the reflective elements of

briefing and debriefing where teachers and pupils together can seek to extend these understandings beyond the context of the classroom.

There were also many other comments from teachers emphasizing the value for developing children's voice and willingness to express themselves and the confidence to participate more actively in class.

> F I think it has helped children who are maybe quieter and maybe when you're in the class when you ask them to contribute they might not and you'd have to encourage them. It's helped them because they don't feel quite so threatened in the group and . . . now when I have lessons, almost every child will put their hand up and they feel they're not going to be put down. So I think it's built up their confidence in the small group and they're bringing it into the whole class situation. (Facilitator 1, School 4, P8)

This is also suggestive of a more co-operative classroom environment generally, thus going beyond the development of individuals' skills, where children are less anxious about speaking up in front of the rest of the class. Another teacher suggested that this was achieved through an increased feeling of being a valued member of the class

> T . . . children find it hard often having to contribute their ideas for fear of them being mocked or ignored. So it's that thing of feeling valued. (Teacher 1, School 6, P2-3)

This is important and suggests that in normal circumstances those children that tend to avoid vocally participating in class activities may feel little sense of belonging or inclusion in the class. It is important that teachers provide opportunities to feel more valued and included and group work provides a specific occasion for this to take place. This same teacher elaborates on this point in the interview.

> T I found girls seem to have found it a little bit more difficult than boys, very interestingly . . . boys have always gelled together quite well anyways. But some of the girls have taken a more . . . quieter role, but that's changing. So the less assertive girls, let's say, who have often sat back and now with this structure have come out of themselves a lot more . . . . I've seen that with a child in my class who does not communicate much at all and I've seen her speak in SPRinG activities, even more so than communicating with me. She felt a responsibility to the group. She's selective in her choice of not speaking, however in the group she's got that commitment, that's interesting. (Teacher 1, School 6, P6)

Of course there is a fixed amount of time in the curriculum and this often means that something else has to be limited or dropped to ensure that SPRinG training is integrated. Some teachers tried to implement SPRinG in creative ways, as discussed earlier, so that it did not mean reducing coverage of the curriculum. But it is not surprising that teachers who are so often under pressure to keep up with an ever demanding curriculum become anxious about having to introduce training and group work activities, which can at times seem painfully slow. One teacher, within the group discussion of teachers with the senior member of staff, had identified a range of benefits of SPRinG for pupils in her class; but she was also unsure whether these made up for the loss in time and coverage of other skills, for example in reading. In response, others in the group believed that the group skills gained would enable children to be more independent and would enable them to be more efficient in their learning in the future. This highlights the importance of the evidence base and the larger scale evaluation—that we can actually say that group work as used in the SPRinG way can have positive effects on learning and attainment.

As noted already all teachers were positive about the impact of the SPRinG group work programme on a variety of different areas and this was also in relation to the quality of the work, learning, thinking and understanding. For example, one teacher highlighted the change in the quality of planning and interaction and their effect on the outcome

T1 I'm just thinking back to the beginning of the year when you set children a task, for example, that environments thing that I showed you earlier on, ... each pair or group has taken the desert or the tundra or wetlands or something, and they've researched it and they've drawn a big scene and put animals and plants into it and they've labelled it and decided what to put into it and they've worked very much together on it. In the past a group activity would have ended up with disastrous results. Scruffy, tatty, ill thought out ... arguments would have happened. All sorts.

T2 (interrupts:) and you would have had to tell them what to do.

T1 It wouldn't have been satisfactory. But now a really decent piece of work has been produced that they're both really proud of it, it's discussed, a decision has been made exactly where to position animals. It's worked brilliantly. (4 teachers, School 4, P5)

One facilitator highlighted the importance of children being able to discuss their ideas and thoughts and how this had impacted positively on pupils.

F It's very hard to monitor these things isn't it, but generally I think it does extend their thinking because when children have the opportunity to interact with each other, then in the first place they might have thought, 'oh the answer's this' or 'we'll do this in this way' whereas if they've got somebody else to discuss it with it might take them to another level. (Facilitator, School 5, P5)

Another teacher highlighted the value for one's own understanding of having to teach or explain something to others.

T I think there is always the element, if you're explaining something to other people, to actually put it in a language that will convince them is actually developing greater clarification in your own mind. If you teach something to someone ... you become clearer in your own mind what it is. (Teacher 2, School 6, P3)

Other teachers highlighted the impact that SPRinG group work was having on curriculum learning particularly in science but also within literacy.

T I think also a big impact that it's had for me is on the discussion, the focus on discussion in the SPRinG activities has really impacted on the speaking and listening skills that are so flagged up now in the curriculum, so that's really helpful. I feel it certainly has (had an impact) with our literacy. (Teacher 1, School 6, P6)

7.6 Discussion

This chapter has reported on teacher's views and experiences of implementing the SPRinG programme. We found a range of different experiences, but what all teachers were keen to convey was that they had benefitted professionally from their involvement in the SPRinG programme. Many highlighted the positive elements

and practices of SPRinG and the perceived benefits that they can bring. But there were also views about issues that were not easily resolved, matters that pupils found difficult and areas that need to be addressed by future work in this field. We will draw together and comment on some of these issues in this section.

Teachers and schools are regularly asked to undertake new strategies and adopt the next new initiative that will purportedly develop their children's skills. So what can we learn from teachers about how to make implementation of a programme like SPRinG successful? We do not underestimate the amount of time and effort by teachers that made the SPRinG intervention work in their classes. SPRinG required teachers to attend training sessions, to reflect on their own practices, to plan with colleagues and try out and then adopt new ways of working in the classroom. These things required a substantial commitment from teachers. But to be successful it was also important that the programme be integrated as part of a coordinated whole school approach to group work so that the hard won benefits for pupils in one year group were built on in subsequent years. Equally important is that a whole school approach can establish a culture of group skills development and use of group work in classrooms. A number of aspects were central for the success of such an approach.

The first important aspect of a successful whole school approach was the need for senior members of staff as well as individual teachers to believe in the value of the programme and what it can do for children. They must establish a commitment on the part of the school to support teachers in planning for and implementing group work. A second aspect was the need for at least one person to lead and facilitate the implementation of the intervention. This facilitator needs to champion group work but also support teachers in planning for and implementing group work and group skills training. Many teachers reported how helpful it can be if the facilitator demonstrates, models and advises teachers on how to do good group work, possibly through the presentation of video examples, through observation and advice or even from team-teaching. Where support from facilitators was less consistent, there was evidence that teachers were less committed to and consistent with their use of group work (SPRinGLite). A third aspect important for effective whole school implementation of the group work programme was the need for time to be made available to teachers to work together to plan for its implementation. The teachers that reported group work as figuring in their planning meetings also seemed to be more successful at integrating it into the curriculum. The fourth and final aspect, relates to the need to provide time and space within the curriculum for teachers to implement the group training programme and group working. Group work training appears to be most easily implemented during timetabled time, possibly as part of PSHE, circle time or SEAL rather than relying on teachers to adapt the training to fit in at different points across the curriculum. This is simply because the latter approach leads to a fragmented implementation where the sequencing and timing between sessions can quickly become disrupted.

Teachers consistently commented on how useful they found the SPRinG Handbook (Baines et al. 2009a), and how helpful they found the advice and activities. Given the difficulties teachers and pupils can experience with group work it is clear that they profited from the guidance we were able to offer them, and from the hard-

won experiences of other teachers. It was quite clear that they would not have found acceptable a researcher's manual that had not been tested and nurtured in classroom contexts and which did not relate to their immediate curricular and behavioural concerns. However teachers were also keen to highlight that they would have benefitted from video examples of particular practices and modelling of how to do the various activities that we were recommending, for example, the briefing and debriefing or how adults might support and engage with a group. These resources would also have benefitted the facilitators and may have enabled teachers to more quickly get to grips with some of the practices. These additional resources certainly would be useful in future classroom based interventions.

Teachers were keen to highlight that they had benefitted professionally. They had learned a lot from their involvement in SPRinG and valued the times when pupils worked together. There were some cautionary tales about how at first the use of group work in the classroom can be challenging, especially if teachers lack confidence or are inexperienced with group working. Increased levels of noise and the new found freedom that pupils have can lead to heated arguments, particularly when children do not have the skills to equitably resolve arguments. This can result in teachers having to calm a class of disgruntled pupils. In this context teachers also have less control over pupils but many reported that, despite these early challenges, persistence in the use of briefing and debriefing and group skills activities enabled children to develop the skills to manage and make productive use of group work and to work more autonomously from the teacher.

The SPRinG principles and practices were well received and teachers' comments demonstrated that they were thoughtfully engaged in their use and application. As we have said, one area where teachers reported varying levels of success was in relation to the inclusion of pupils that had particular special needs. All teachers reported having to work hard to enable SEN pupils, especially those with emotional and behavioural difficulties, to become included within the groups and group work. Where there were success stories one can infer that these pupils became more included in the everyday social activity of the classroom than may be found in classrooms that would not normally use group work. These occasions have led to other benefits in terms of the whole class being more inclusive both within and outside of the classroom. Nevertheless, despite the wide range of SPRinG suggested strategies for supporting the inclusion of pupils with SEN, there is a need for further research to examine the implications of using these strategies and for a wider consideration of how group work can impact on pupils with SEN.

The briefing and debriefing parts of the SPRinG programme were also well received by teachers and they acknowledged these elements as central in helping to equip pupils with the social and communication skills necessary for effective group working. But teachers also highlighted that once group work skills were well established, there was less of a need for briefing and debriefing. This change in their thinking makes sense, though one would want to guard against becoming too complacent and removing briefing and debriefing entirely. The time devoted to briefing and debriefing also enables pupils to 'voice' their ideas and concerns about how things are going, and there is a need to undertake briefing and debriefing even if it is just to confirm that everything is going well.

Teachers reflected on their role in relation to groups. While some teachers felt they still needed to use their own presence to sustain pupil attention, others highlighted the success of being less controlling, intervening in group interactions less frequently and allowing children to have the space and freedom to develop their own ideas and take control of their own learning. Teachers used a range of strategies when supporting and intervening in groups but these were more likely to be subtle and facilitative rather than directive or controlling as is frequently used in everyday classrooms. Teachers' strategies had clearly changed over time – both as a result of their own developing confidence in the practices that we were asking them to try out and adopt but also as a result of their pupils becoming increasingly able to engage in group work and increasingly work independently of the teacher.

Teachers were also very positive about the SPRinG training activities and spoke about the different ways that children had really benefitted from group work in the longer term, for example, in terms of greater co-operation, improved social skills and awareness of each other and pulling together to contribute to the work and learning together. There was a real sense that the relational training activities that aimed to develop social, communication, group planning and decision making skills, furnished children with social awareness and understandings, confidence in others and a host of communicative tools and strategies that enabled them to function effectively in group contexts and to get the most from group work. There were also suggestions that children had benefitted in terms of their attitudes towards learning and motivation to learn; reflecting a broad view of attitudinal developments over two years. There was also a concern expressed by one teacher about the time spent working on SPRinG preventing time being spent on other important areas of learning. This concern may be a result of the school not having allotted a distinct time for the SPRinG training to be implemented or lack of support expressed by school leadership. Teachers are often faced with making difficult choices about which things can or cannot be covered in class time. However it may be the case, as pointed out by the senior staff member in this case, that developing the skills associated with group work and participating in group learning might speed up the learning of these other topics and skills and make it more enjoyable in the process.

There were plenty of views about the difficulties that children experienced when engaging in group work, especially initially, and how some children became upset or angry because of the arguments that they had with peers in their groups. Initial interpersonal tension when introducing a new practice such as group work made life difficult for teachers, as discussed earlier, but serves to highlight that these activities mattered to children. Children wanted to be involved and engaged, they wanted to have their ideas listened to and to make decisions, to lead the group and so on. It is also a good thing that children engaged in disputes and debates. As we know from previous research in this area (Doise and Mugny 1984; Howe et al. 2000; Howe 2010), conflict can stimulate thinking, reflection and cognitive development and lead groups to become effective. These conflict-based opportunities provide a space where children need support and advice and the chance to reflect and thus highlight the importance of briefing and debriefing discussions. Conflict should not be allowed to become destructive or affect children so that they are

frightened to speak or anxious about group work. Observations of groups early on in the SPRinG project showed that some disputes were focused on procedural or relatively irrelevant matters and children could become overly focused on these disagreements. These occasions need to be handled very carefully so that conflict can be harnessed (not discouraged) and used productively so that children are not put off group work. It may be that teachers and students need further strategies to help them get through these periods of unrest which may have been partly responsible for some teachers to give up on the potential for effective group work or to adopt SPRinGLite.

As noted in our earlier discussion of SPRinGLite, it was clear that teachers varied in how involved they were in the project and how fundamentally they took on principles and activities (also see Chaps. 4 and 6). We used the term SPRinGLite to describe teachers that did not use the ideas and activities as extensively as we wanted. This tendency is not surprising given the enormous external and school pressures teachers are under. Some teachers had trouble finding as much time for group work as others, and some seemed less successful in overcoming resistances to group work. This partial implementation probably served to reduce the effects of SPRinG on pupil outcomes. There are, no doubt, a number of reasons, both personal and professional, why some teachers were not as committed as others. But one main reason seemed to be where a teacher was working alone with many other pressures and commitments in school and received little impetus or support from the facilitator. This lack of support highlights the importance of a well managed and well embedded whole school approach to group skills training and group working where teachers can plan together and receive support from one or more expert facilitators. There are huge benefits in terms of, for example, consistency of approaches and classroom rules across the school. Those teachers involved in SPRinG over two years remarked on the value of developing social-relational, communication and group decision making skills early in pupils' school careers that can then be revisited, developed and extended as they progress through school rather than having to start afresh in each year group. This is a main reason why an approach grounded and organized around guiding principles rather than one that involves the provision of specific activities and lesson plans is likely to be most useful and generally applicable.

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Chapter 8
Conclusions: The Contribution of SPRinG to Knowledge About Collaborative Group Work

8.1 Introduction

In this book we have emphasized four key points. First, effective teaching and learning for the most part takes place in authentic classrooms—involving all children and their teachers. Second, teaching and learning (and researching) in authentic classrooms requires the recognition that classrooms provide contexts for learning—that is, what goes on in classrooms will be affected by how classrooms are set-up and operate, how the teacher and class operate within the whole school, and how the school operates within society (see Fig. 8.1 towards the end of this chapter). Third, previous studies of classroom groups often have limited direct relevance to classroom-based learning because they often examine the effect of group work separately from normal classroom conditions, including a multiplicity of groups, and have not seen as problematic the choices children make about who they will or will not work with. Thus, our fourth point is the realization that effective teaching and learning requires a social pedagogic knowledge of the classroom and a relational approach that will help all pupils and their teachers to develop supportive relationships among themselves. We suggest that these supportive relationships create a 'region of sensitivity' in which children develop trust, communication and collaborative opportunities amongst themselves that will enhance classroom learning—even when they are not working under the direct presence of the teacher. The SPRinG programme was based upon and further developed such a social pedagogic and relational approach—and the significant outcomes of the SPRinG studies in England and Scotland support its efficacy as a way of promoting effective learning and associated classroom behaviour.

8.2 What SPRinG Has Contributed to Knowledge About Collaborative Group Work

We argue on the basis of the chapters in this book that the SPRinG study has the potential to make a considerable impact on contemporary educational policy and

P. Kutnick, P. Blatchford, *Effective Group Work in Primary School Classrooms,*
Professional Learning and Development in Schools and Higher Education 8,
DOI 10.1007/978-94-007-6991-5_8,

practice. The main SPRinG study tested the effectiveness of a collaborative group work programme which was co-developed between researchers and teachers and designed to provide teachers with strategies for enhancing pupil group work in 'authentic' classroom settings. The study was characterized by an intervention over a far longer time frame than most studies, and undertaken on a much larger scale in terms of the number of pupils, classrooms and schools. Further, the SPRinG studies were undertaken using a strong quasi-experimental design and comparisons with matched 'control' classes and showed that the academic, communicative and behavioural advances (associated with SPRinG) were not simply due to children's expected development over time—but were attributable to the SPRinG programme. The evaluations reported in Chaps. 4 through 7 deliberately addressed a general programme of guidance and activities accompanied by teacher meetings and visits to schools covering a whole school year and was designed to underpin all class and curricular activities. The SPRinG programme was different to many other collaborative group work approaches in that it was designed as a total package rather than focusing on particular/singular skills, and was evaluated as such.

While slightly different methods were adopted for the different Key Stages and contexts, the main evaluation of SPRinG showed that it had positive effects in terms of academic outcomes. In Chaps. 4–6 the results from quasi-experimental studies at KS1 (5–7 years), KS2 (7–11 years) and in Scotland (10–12 years) show significant effects for many comparisons of SPRinG in relation to control groups. The magnitude of these effects, expressed in terms of effect sizes (standard deviation units or equivalent) are strong when one considers that we were working under normal classroom conditions, rather than specific experimental manipulations of discrete factors. There were also marked changes in classroom behaviour. SPRinG children made more effective use of their groups for learning via time-on-task, high level communication and less distractability than the children in control classes. SPRinG children progressed substantially more over a school year in a range of subjects (including reading, mathematics and science). And SPRinG teachers were able to devote more time to group work during the working day—knowing that their children were focused on the topic and sharing/supporting ideas in their groups. Results concerning pupil attitudes towards group work were less clear cut, but still showed SPRinG children's preferences for working/learning with one another than the more individualistic orientation of the Control classes. As far as we are aware, this is the first time positive effects on academic progress, attributable to a programme of group work implementation in everyday classroom settings, have been found in the UK and elsewhere. Advances have been found for similar interventions which involve pupils working together (see Mercer et al. 1999; McGuiness 1999) but these interventions focused mainly on talk and thinking skills rather than group work training and interactions and a number of these approaches have been criticized for their lack of inclusiveness (see Reznitskaya et al. 2009) and lack of planning for relational and other social contexts that characterize classrooms (Barron 2003).

Further, we found—despite the early views of teachers to the contrary—that group work can be successfully used and implemented in everyday primary and secondary school classrooms. There were similar effects for high and low attaining groups of

pupils and pupils in urban and rural schools, and in same-age and mixed-age classes. Interpersonal relationships between teachers and the class and between pupils within the class improved, provided teachers took the time to train pupils in the skills of group working.

These outcomes have important implications for current concerns about school discipline where the trend is to concentrate on school managerial solutions and whole class teaching designed to control rather than eliminate the problem. SPRinG sets an interesting challenge for future research concerning the extent to which children can take greater responsibility for their own and their peers' behaviour that underlie practices such as formative assessment, collaborative and problem-based learning.

We found that teachers and schools have responded positively to their involvement in the SPRinG project and have contributed greatly to the development of a set of key principles and activities for use by other teachers. Valuable lessons have been learned about the effects of aspects of group composition, stability and size, classroom layout and seating arrangements, group work training for pupils and ways in which teachers can encourage and evaluate group work. The Handbook produced for the two primary Key Stage age groups (Baines et al. 2009) has been widely appreciated. Valuable information has been collected about the applications of group work, e.g., in terms of whole school approaches and schools working under difficult circumstances—information that we believe is essential if group-work is to be applied more extensively. At the same time, as discussed in Chap. 7, we are aware that teachers need to be supported by their colleagues and within-school policy; otherwise there will be a lower commitment to effective group work with correspondingly less effective outcomes.

We can also add to this account of the impact of the SPRinG project, by pointing to separate but allied reports of positive effects found for pre-school age children and at the secondary level. At the pre-school level, implementation of an age appropriate SPRinG programme facilitated both cognitive and social developments among children in the UK (Kutnick et al. 2006) and across Europe (Kutnick et al. 2008a). As a result of implementing the programme, pre-school children were much more likely to extend their choice of learning partners in a socially inclusive manner, became less dependent on their teachers when they needed to solve problems and became more engaged in activities with high levels of cognitive challenge. In secondary schools, students who engaged in SPRinG programmes (see Galton et al. 2009) showed greater motivation to work with and help one another in increased achievement in English, science and social studies. In another study, undertaken in the Caribbean (Kutnick et al. 2008b), academic progress in secondary schools was found amongst all participating students (and especially among students who were initially deemed 'low attainers'), suggesting the SPRinG programme could be applied to cultures outside of the United Kingdom. Currently, a SPRinG approach is being initiated in Hong Kong (a region already noted for high school-based achievement) and this initiative will compare results with a further study of the SPRinG approach that focuses on primary school mathematics in England (Kutnick et al. 2012).Thus, evidence for the efficacy of the SPRinG approach is not tied just to the primary school years, and a social pedagogic understanding of classrooms and a relational approach are fundamental to enhanced school achievement across all age groups and may be applicable in a variety of cultures.

8.3 The Contribution of the SPRinG Methodology to Understanding Collaborative Group Work

Our claims for enhancing the effectiveness of children working in groups in their classrooms could not have been made if our studies were not based on solid and rigorous use of research methods as well as developing a 'joint' ownership in the programme with teachers. SPRinG drew upon and developed a range of research methods that established more fully a social pedagogy of groups in classrooms. At the beginning, the SPRinG project drew upon a simple, but helpful concept of 'classroom mapping' to establish that most children in primary schools learn within a social context—and noted that many of the social contexts that children are placed within are as likely to inhibit their learning as to enhance it. The 'classroom map' shown in Chap. 1 was a method developed in response to our criticisms (see Chap. 2) that: (1) pupil groups are rarely structured in authentic classrooms in the ways described in experimental studies undertaken in support of co-operative and collaborative learning; and (2) naturalistic studies which show that the pupil groups that do exist in classrooms tend not to be associated with productive learning. Classroom mapping allowed us to identify that pupil groups were rarely set up to be consistent with the type of task/challenge that characterized a lesson, and the composition of pupil groups based on friendship and attainment was likely to be associated with social exclusion and limitations on learning. In addition we found that pupils received little training or support in how to interact with one another for effective learning. Mapping helped to clarify what we meant by a social pedagogy of groups in classrooms—where the classroom and learning task were planned to support group working, where children developed skills to engage with others and where the teacher provided both modelling and support for effective group working. We also note that classroom mapping is one of the most straight-forward methods for describing the social pedagogic contexts of classrooms, and is easily adaptable for use by teachers and researchers (see Baines et al. 2009; Kutnick et al. 2002, 2005).

The SPRinG study was based on a social pedagogic understanding of classroom groups but was designed to move beyond just a critical analysis of classroom activity and introduced an approach and associated methods to implement effective group work in classrooms. SPRinG involved what we see as two unique contributions to the literature. We have introduced, first, an applied theoretical concept of the development of relationships (our 'relational approach') as fundamental to learning and, second, empirical methodologies that allowed us to undertake research in 'authentic' classrooms, using a large-scale quasi-experimental approach within an ecologically valid setting.

But perhaps the main contribution of the SPRinG project described in this book is that it was conducted on a larger scale than previous research and involved an unusually large and multi-site research design (see Chap. 3). Overall, the project comprised quasi-experimental studies on four sites—three of which are described in this book: children aged 5–7 (Chap. 4), children aged 7–11 (Chap. 5) and the Scottish extension (Chap. 6). The fourth site was based in secondary schools with children aged 11–14 years and is not covered in this book (see Galton et al. 2009). There

were of course limitations and compromises in the study, some of which we come to shortly. No doubt a number of refinements and extra data could have been collected, but we are pleased with the way we were able to attain high levels of research quality while at the same time attaining a high degree of ecological validity. It is difficult to get the balance right but such was the size and thoroughness of the SPRinG project, across several sites, we are confident that the results are well grounded and applicable to a wide range of ages and to other cultures.

8.4 'Warrant'

One way in which the credibility of the project can be more precisely addressed was encouraged by the overall research programme of which the SPRinG project was one part. As we have said, the SPRinG project was funded as part of the large-scale UK research initiative called the 'Teaching and Learning Research Programme (TLRP)'. The Directors of the TLRP were keen for contributing projects to address their work in terms of, and consider the usefulness of, the notion of 'warrant'—a term coined to refer to the overall credibility of the research and described formally in James et al. (2005). In terms of the four categories advanced in the model of warrant in James et al. (2005), the SPRinG project aimed to be strong *empirically* through close attention to: reliability and validity of data collection; strong *theoretically* through the grounding, interrogation and extending of theories of co-learning and social pedagogy; strong in terms of *user* credibility through the close involvement of teachers throughout the project and through application of group work to 'authentic' classroom contexts; and *cumulatively* strong, in an internal sense, through the testing and integration of findings across phases of the research, across sites and across age levels and stage of education.

8.4.1 Some Methodological Issues: Validity within a Quasi-Experimental Design

The general nature of the SPRinG programme meant that providing a fair test as part of the evaluation has proved challenging. As we have said, in educational research there is often a trade-off between precision of experimental control on the one hand and the validity and authenticity of the educational intervention on the other hand. Given the desire to work in everyday classroom contexts over a full school year, a strict randomised control design would not have been possible. The most obvious methodological choice was a quasi-experimental design, and this choice might have been to set up two Control groups: an alternative intervention group and a naturalistic, non-intervention group. As described in Chap. 3 this would then allow us to test for the possibility of a 'Hawthorne effect' such that involvement in the experiment, rather than particular characteristics of the experiment, was the main factor affecting pupils' progress. However, in the real world of education this kind of experimental

design is difficult to maintain. It became apparent early in the research that there was little sense in talking about a non-intervention group when teachers in the Control group were as intent on working hard to improve pupils' academic attainments and behaviour. We feel that SPRinG overcame the possibility of an intervention 'overload' by focusing our work on a common element of classroom life (i.e., pupil grouping) that did not require a totally new addition to the classroom or curricula—rather, we asked teachers to work with us to improve ongoing classroom practice.

There also would have been difficulties in setting up an alternative intervention group, as we described in Chap. 3. The point of the SPRinG project was to bring teachers on board in a project that they and the researchers believed in. This would also be required for the control group but we were not sure we could devise an alternative programme for a whole year that promoted a different way of educating pupils, nor that we could convince teachers to take part in it. One early plan to get Control teachers to concentrate on whole class teaching would have been hard to sell; moreover we knew that teachers already spent much of their time teaching to the whole class. We therefore decided to choose for the 'Control' teachers (and pupils) who were equally committed to improving classroom practice. In the KS1 Control classes, teachers were provided education and training time to pursue educational improvements for their classrooms. This time allotment was funded so that Control teachers could be released from the classroom for an equivalent amount of training as the SPRinG teachers received. In the KS2 Control classes, a parallel project on peer relations and classroom engagement was initiated within which schools were equally committed to the research process and pupil development; this project put no constraints on what teachers did in their classes. The main difference was that they had not received the SPRinG handbook or attended SPRinG meetings.

There are several other reasons why a 'Hawthorne effect' was unlikely in this study. If there was an effect it would apply to teachers who were involved with the researchers, but it would not directly apply to pupils whose progress, after all, was the main means of assessing the programme. Moreover, results from the observation component of the SPRinG study (see Blatchford et al. 2006; Kutnick et al. 2008c) showed that the pupils in the SPRinG project altered their behaviour in the ways predicted. It therefore seems most likely that effective group working results owed more to the involvement in a particular (SPRinG) programme rather than a Hawthorne effect on the teachers. And, this assertion is further backed-up by evidence in Chaps. 4, 6 and 7. In part, these chapters present evidence that some SPRinG teachers were not as fully committed to the programme as others (these teachers were referred in Chap. 7 as adopting a SPRinGLite approach). Children's performance in attainment and collaborative communication in SPRinGLite classes showed significant improvement over the school year—but not to the extent of the more fully committed SPRinG teachers.

It might also be argued that the results in Chaps. 4–6 could be attributed to something other than the group work context, for example, to the use of certain types of language that facilitated scientific knowledge and understanding. Particular focus on the training for 'exploratory' language use (Dawes et al. 2000) or argumentation

(Anderson et al. 1997) has been described by Mercer and Littleton (2007) as being premised on Vygotskian assertions of 'language as a tool for learning and problem solving.' (Vygotsky 1986). So, from this point of view, it is the type of talk that is important rather than anything to do with the characteristics of the group work. Our view on this is that both talk and group work are inextricably linked. Training in social and advanced group work skills, as well as creating contexts that will facilitate effective group work, are central in encouraging particular types of talk and interaction that are supportive of learning. A case, however, can be made that it is the particular type of group work designed into SPRinG that leads to a particular type of dialogue (e.g., symmetric collaborative discussion as opposed to peer tutoring) and thus the learning gains found. This is very likely to be the case, since KS1 concept mapping and KS2 science lessons on evaporation and forces the activities were based predominantly on collaborative decision making tasks.

The SPRinG programme therefore seems to have positive effects on academic attainment, but the general nature of the SPRinG project makes it difficult to establish whether some aspects of the programme were more important than others, for example, whether it was the relational approach, structuring the classroom context for group work, different aspects of peer collaboration (consensus, argumentation, etc.), or the curricular activities, which were more or less important, or whether all contributed together to the positive effects. We have speculated (Chap. 4 with parallel considerations in Chap. 6) that the effectiveness of SPRinG is brought about by its 'spiral/cyclical' approach wherein: (1) there is a sequence of developmental activities from sensitivity and trust that precede communication and joint problem solving; and (2) once this sequence is established in classroom practice the teacher and children can revisit (and further develop) any activity especially in the early part of the sequence if children are having any problems with the later skills. Evidence for the retention of early activities/skills as a basis for development of later communication and problem solving skills can be found in studies that led to the original structuring of the relational approach (Kutnick and Manson 1998).

8.5 What We Have Learned about Key Features of the SPRinG Project

The SPRinG project, as we have seen in previous chapters of this book, was founded on a social pedagogical approach in which high quality group work is seen to result from careful attention to four main components: a relational approach, the role of the teacher, the classroom context, and curriculum/group work activities.

8.5.1 The Relational Approach

The relational approach is a main component and we argue unique to the SPRinG programme. A few previous studies (e.g., Hall 1994; Leech and Wooster 1986) have identified a relational approach as a missing element of primary school classrooms.

These researchers, though, have been primarily concerned with children's social behavior within schemes of personal, social and health (PSH) education and not to group working or academic attainment. Similarly, group work has, to the authors' awareness, been only used once previously in promoting classroom-based social and relational skills (Thacker et al. 1992) as opposed to linking these skills to academic achievement and classroom working behaviours; yet, even this previous study did not place its version of group working skills within a developmental sequence which served as a prerequisite and continuing support for children's curricular experience in the classroom—the essence of the 'relational approach' within the SPRinG programme.

The results from the four studies (Chaps. 4–7) reported in this volume support the view that the relational approach was instrumental in affecting key aspects of successful group work at several levels: First, children were more participative and showed more sustained engagement in group activities. Second, children showed more connectedness within their groups, focusing their attention on group members and their assigned learning tasks and group work. Both KS1 and 2 children were able to use symmetrical, collaborative communication to a greater extent in their problem solving than children in Control classes. Third, SPRinG children showed more high order/cognitive inferential forms of reasoning than Control children. It is this high level of cognitive thinking and engagement that we assume is the basis of increased school-based attainment in subjects such as reading, mathematics and science.

In contrast to collaborative approaches reported by some other researchers, the SPRinG relational approach did not pursue particular types of speaking and questioning skills among the children—rather we see these skills developing because children want to work effectively with their group partners (as recommended by Barron 2003; Jarvelä et al. 2000 and others). Despite teachers' concerns that introducing group work might cause deterioration in pupils' behaviour and bring about more off-task behaviour, we actually found that behaviour associated with the support of learning improved.

Behaviours that supported learning were focused upon in Chap. 4, where one of our concerns was: when should the relational approach be initiated and was the effect likely to be immediate or longer term? This concern, also expressed by Howe et al. (2007), questioned whether an initial training period, such as the start of a school year or the start of a series of lessons, was more appropriate in the development of group working skills as opposed to a long term intervention. We were also curious to see whether there were immediate effects of training or would the effects emerge gradually over time. In common with other studies we were convinced that training in social and communication skills was essential for pupils. Yet, it would be difficult to infer whether results from our systematic observations of classroom behaviours (described in Chap. 3 as On-The-Spot [OTS] observations) and other observations were due to pupil training, SPRinG teachers' greater capability to set up the conditions, tasks and activities for more effective group work, or a combination of these factors. These results emphasize the importance of teachers working hard at establishing trust and confidence within pupil groups and developing communication skills within pupils and groups to initially establish relational training in their

classrooms. We cannot understate the importance of the teacher in this regard and to support this view we draw upon two aspects of our results: (1) In Chap. 4 we used the reflective rating scale to compare how effectively teachers planned and supported group working in their classrooms and found that both SPRinG and Control teachers set many group-based tasks (also seen in the OTS observations over the three terms), but it was only the SPRinG teachers who ensured that pupil groups could undertake their tasks collaboratively and supported this collaboration; and (2) in Chaps. 4, 6 and 7, even though the SPRinG teachers involved themselves to a greater extent in group work training and practice than Control teachers, there were clear differences among the SPRinG teachers regarding the degree of ownership for SPRinG. Children showed the highest levels of time-on-task, co-regulated communication and achievement in the classes where their teachers took-on higher levels of 'ownership' for encouraging/supporting SPRinG group work. Significantly, the OTS results at both KS1 and 2 also indicated that the hoped for benefits of SPRinG on pupil group work were not just specific to the context of structured group work tasks but transferred to their behaviour during normal classroom activities. The results also showed that involvement in the relational programme did not exacerbate misbehaviour, arouse conflict or increase dependence on the teacher—indeed it seems to have had a positive and developing effect over the course of the school year.

Thus, in answer to a concern of previous studies cited in Chap. 3 and 4, we questioned 'when' in the school year group work and relational training should be initiated in classrooms and when effects of the training would be realized. In line with some previous group work studies (Jarvelä et al. 2000; Kreijens and Kirschner 2005), we argue that initial relational training should begin as soon as possible after the start of a school year. This suggestion is made for two reasons: (1) development of effective group working is a long-term process—it is unlikely to achieve a maximum effect in a matter of weeks or a school term but we have seen its cumulative development over a whole school year; and (2) the positive effects of the SPRinG programme, as we have said, can best be explained as a developmental 'spiral' wherein initial group working skills of trust, support, sensitivity are seen to facilitate reciprocal communication (among children). As supportive reciprocal communication becomes easier to undertake, children can further develop their trust, sensitivity and support to enhance their collaborative problem solving and curricular achievement. These behaviours that support learning need to be introduced early in any school year, although their effects can only be seen progressively throughout that year when children can draw upon and further develop these skills.

We propose that relational skills shown in informal peer relations should be considered in relation to peer co-learning in classrooms. Informal and classroom-based relational skills are likely to involve similar social processes, e.g., perspective taking, mutuality, conflict resolution, problem solving and trust. So rather than see informal and classroom-based peer relations as separate, we feel we could do more to examine linkages between, and common processes underpinning, informal and formal expressions of peer relations as identified in Chap. 6. A focus on helping productive classroom relationships needs awareness of peer relations in different contexts—and there may be a feedback loop to better understanding and facilitating informal peer

relations, e.g., at breaktime/recess in schools (see Blatchford and Baines 2009, and Sect. 8.6.2 later in this chapter). To approach this point from a different direction, informal peer relations can provide conditions for 'psychological safety' (Chang and Lee 2001), i.e., when students feel comfortable speaking up in front of others because they know that their contributions and views will be listened to, valued and respected—creating a 'region of sensitivity' (Ellis and Rogoff 1982) within the classroom.

These findings also bear on debates about the appropriate motivational structures required to make relational group work effective. Damon and Phelps (1989) strongly favour approaches to collaborative learning that depend on intrinsic motivation. Slavin et al. (2000), on the other hand, favour approaches that stress the utility of extrinsic rewards, that is, the importance of motivating the group through group goals and individual accountability. Damon and Phelps' view was supported, though not explicitly tested, by the SPRinG project. Individual accountability and other extrinsic forms of motivation were not a part of the SPRinG approach; more likely it was the extensive experience over the year of trust and team building between the pupils which explained our results. It is our view that the relational approach encourages fundamental forms of interpersonal orientation unlikely to be encouraged by the group reward method integral to the extrinsic 'motivational' approaches identified by Slavin et al. (2000). Our findings suggest that one can directly affect social cohesion and cooperation through training by engaging in extensive team building (as Sharan and Shachar 1988), though the amount of preparation and effort required of teachers and pupils should not be underestimated. Adopting a relational approach is time consuming, at least at first, and teachers in Chap. 7 reported that there were times when they wondered whether they were creating problems rather than solving them. But they often found that the process of seeking to deal with relational issues worked in the long run. In addition, there were clear indications in Chap. 7 that the relational approach not only supported behaviours associated with actual school attainment, but SPRinG children became more able to overcome interpersonal and inclusion problems without this leading to teacher dependence.

8.5.2 Role of the Teacher

Previous studies of classroom groups and group working have in general given limited attention to the role of the teacher, aside from particular recommendations regarding types of talk (Gillies and Kahn 2009), questioning (King 1999) or modelling supportive behaviour (Webb and Mastergeorge 2003). The literature review reported in Chaps. 1–3 suggested that, at first, teachers have some difficulties with group work. Teachers can be resistant at first because group work can make classrooms appear noisier with greater levels of movement by children; classrooms may be more difficult to control as the teacher has responsibility for directing and regulating 5 or 6 groups at any one time as opposed to a singular whole class; and teachers worry that they will not find the time to implement group work. But, as we have found in the

range of SPRinG studies reported in this volume, teachers became strongly committed to the programme in a number of ways. Teachers co-developed, trialled and were fundamental to the evaluation of SPRinG approach. Teachers' roles in SPRinG became clearer over the course of the project which confirmed our adherence to the dual needs of allowing 'ownership' of the programme and the requirement that the programme take place in 'authentic' classrooms.

In this section we reflect on how the teachers' roles changed over the course of the SPRinG programme and key aspects within teachers' roles that led to the success, or lack of success, in developing high quality group work group work

The SPRinG studies reported in Chaps. 4–6 were primarily aimed at investigating pupil-pupil interaction and observations of teacher-pupil interaction were at a relatively general level. Systematic observation studies (especially in Chaps. 4 and 5) showed that there were a number of changes in teachers' approach and support for group working over the school year. Studies at KS1 and KS2 found that SPRinG teachers increased the amount of group working as the year proceeded. As the amount of group working increased we found that:

- Teachers spent less time at the procedural level of task introduction and task focus as children's groups explained task procedures among themselves and became less dependent on the teacher;
- As the children became more task focused in their group working, teachers became engaged in more monitoring of pupils than controlling them, while teachers in Control classes engaged in more direct teaching, e.g., explaining and questioning, as well as preparing tasks for pupils. This is in line with other studies which report decreases in direct supervision after training in cooperative norms (Cohen and De Avila 1983);
- In comparison with Control classes where the individual child remained the main focus of attention for the teacher (with the result that only a limited number of children could receive the teacher's attention), SPRinG teachers developed more contact with more children in their classrooms. The teacher's role evolved to cognitive-based monitoring and supporting learning within groups rather than direct teaching. This finding, perhaps, complements an earlier study by Tolmie et al. (2005) who found that peer collaboration did not work well when pupils were given strong procedural guidance by adults. Peer interactions could easily become uncoordinated, there was disagreement without explanation, and pupils fell back on what they called 'chairing' the discussion, that is, deciding on who should do an activity. In contrast to Tolmie et al. (2005), the evidence in this book shows that as a result of involvement in the SPRinG programme children became able to assess and support their own procedural guidance within their groups and the teacher was freed to observe and 'scaffold' children's actions when needed. Teachers can therefore be seen to adopt a guiding rather than a directing role as their children become more competent in group working. This point raises a related question concerning the inconsistent effects of argumentation and collaboration studies (from Reznitskaya et al. 2009). The question suggests that argumentation and other forms of classroom-talk based collaboration that are directed by teachers

may be less effective or efficient than the focus of a relational approach—where peer-based patterns of communication are associated with greater involvement by all children in the classroom.

We draw out what we consider to be four key aspects of the teacher's role in the SPRinG classrooms:

1. Effects of the SPRinG programme do not appear overnight. Teachers had to find time and means to integrate the relational approach into classroom events, planning and curriculum—allowing group working to be developed and practiced. As seen in Chap. 7, it was not easy for teachers to simply implement a new way of working in their classrooms and expect children to make immediate adaptations. As the observations in Chaps. 4 and 5 showed, teachers gradually found more time for group working, and this was associated with corresponding changes in the teacher's role (especially in the movement away from direct teaching to monitoring and observing).
2. In the move from teaching to monitoring, the teacher's role moved to one that can be described as 'scaffolding' children's learning activities. Teachers provided both group structure and curriculum tasks that could be undertaken by children working in groups—and then stepped back to allow children and their groups to become involved in their own learning. This scaffolding was reminiscent of the 'contingent' support identified as basic to scaffolding by Wood (1998), and indicates that scaffolding can be considered in a more general way than just classroom talk. Implied in the SPRinG approach is the point that the scaffolding role of adults can be seen in linguistic terms but also in terms of classroom organization. This form of scaffolding can be characterized as the teacher acting as a 'guide on the side' rather than the 'sage on the stage' (see Baines et al. 2009).
3. One of the main strategies that allowed scaffolding to be successful was the use of 'briefing' and 'debriefing'. Development and use of these strategies by teachers in the classroom was gradual. As described in Chap. 7, initial use of debriefing when found among teachers was associated with identifying what grouping practices would not be attempted in the future. But, as briefing and debriefing skills were developed, teachers used these skills to a greater extent and changed their orientation from discarding certain practices to trying to understand (with their classes) why a particular practice did not work and how it might be improved. Further, teachers working with their classes realized that everyone needed to be included in the debriefing; group working was enhanced if everyone was involved in pre-task briefing and both briefing and debriefing focused on both the task and also what went well and what did not go well.
4. We found in Chap. 7 that teachers' use of group work was best supported in a whole school and collegiate context—where any individual teacher is able to share benefits and concerns with others in the knowledge that the school management and collaborating teachers have agreed that effective group working is an essential practice in their school. Innovations such as the SPRinG programme were greatly facilitated if teachers were provided time and support—especially when time and co-planning sessions were offered to support implementation (see Chap. 7).

Without this full level of support from school leaders and colleagues, teachers may have taken the easy option of imposing classroom group activities without the necessary pre-training for children and strong teacher commitment. The likely effect of the 'easy' option may be similar to SPRinGLite—where there may be some overt positive effects for group working but the success would be unlikely to reach the depth and consistency of the full SPRinG programme.

8.5.3 Classroom Context

We have argued that previous research and group work training programmes tended to isolate groups from the everyday inclusive classroom contexts within which they will have to operate. A social pedagogical approach, on the other hand, provides a more dynamic view of classroom learning than traditional models of effective teaching and schooling which tend to assume a simple causal direction from teacher to pupil, with little recognition of the dynamic forces at work in classrooms—especially peer-to-peer learning. In the SPRinG programme we encouraged teachers to consider all aspects of the classroom layout, including seating, group sizes and composition, as well as the nature of the curriculum subject and the task undertaken by groups, in order to ensure the highest quality group work. We have tried to overcome the problems arising when teachers do not, for example, adapt seating patterns or group sizes, and the way this lack of attention can be self-fulfilling: teachers do not find groups work well together and so they do not believe group work is valuable and do not plan for group work in the curriculum. We have seen in the main evaluation chapters of this book (Chaps. 4–6) that teachers can be extremely successful in applying the SPRinG approach and this resulted in high quality, productive group work.

Findings presented in Chaps. 4–7 in many ways confirm the arguments that we proposed for effective group work in the first three chapters of this volume. Results showed that an effective social pedagogic programme helped to overcome a number of previous concerns in the literature as well as adding to teachers' repertoire of methods to promote more learning and learning-related behaviours via effective group work. The experience of working and researching in authentic classrooms has helped to move our understanding beyond results arising out of naturalistic and small-scale experimental studies described in Chap. 2.

Our understanding of the literature led us to believe that effective group work would be related to the size and composition of each classroom group and was also related to the type of learning task assigned. Early development work with teachers led to two qualifications of that literature. First, we quickly became aware that size of group mattered. Teachers noted and reported that different group sizes would relate to the intention of a lesson or part of a lesson. Thus, as described in Chap. 7, groups should not be too large—teachers spoke of children in groups working in pairs, fours and (sometimes) up to 6. Pairs ensured participation and inclusion within small groups. But, as children's group working skills progressed, it became evident that larger group numbers (of 4 to 6 children) would still allow participation—especially in discussion-based tasks. Children with group working

skills (Chaps. 4–6) were likely to stay focused, on-task and drew upon synchronous (peer-to-peer) communication. Teachers were also aware, though, that group sizes should not become too large (more than 6) and that group work training was essential to ensure participation and focus.

Second, the literature also established concerns about composition of groups—with a main focus on gender and ability mix. Again, early discussions with SPRinG teachers and trials in classrooms led us to two working recommendations: (1) Similar to a number of co-operative learning studies (i.e., Slavin et al. 2000; Johnson and Johnson 2003) we wished to promote the attainment of all children in a class, hence we agreed with teachers that groups should be a mix of boys and girls, even though this might conflict with friendships choices. (2) With regard to the range of attainment, we followed Webb's (1989) suggestion of 'banding' across groups—that is, each group maintained a mix of attainment without including the extremes (of high and low attainment) in any one group. Again, with SPRinG training (see Chaps. 4–6) both boys and girls improved their attainment in a similar manner and children of all attainment levels improved over the year. It was also likely that the use of heterogeneous grouping composition was a factor in promoting social inclusion among children within SPRinG classes. In the development of the SPRinG programme with teachers, it became both evident and important that groups should be socially inclusive in classrooms.

Chapter 7 provides a number of additional insights into the potentially inclusive role of groups work. Teachers who taught various year groups, noted that pupils on the autistic spectrum and pupils who had emotional and behavioural difficulties and other forms of special educational needs were more likely to be invited and integrated into classroom groups by the children themselves after SPRinG group work training. This finding needs to be more systematically tested but, reflecting on this unforeseen outcome, teachers realized that social inclusion had previously been a teacher-led responsibility. As a result of the SPRinG programme, children were able to share this responsibility with their teacher and classmates. The team working at KS2 conducted applied work on the involvement of pupils with SEN in group work. Though not part of the formal SPRinG evaluation there was strong anecdotal evidence that with a concerted effort to involve all pupils in a group, there were surprising advances in all pupils' abilities to work well as groups. At the same time, we cannot assume that SPRinG is some kind of panacea to overcome all inclusion problems found in school. Schools with high levels of poverty, Special Educational Needs, English as an Additional Language (or the equivalent in other countries) and mobile populations can be seen as particularly problematic as they frequently withdraw these children from SPRinG-like initiatives and try to emphasize the basics through individual work and pull-out interventions (Blatchford et al. 2012).

Another contextual dimension for group work is classroom seating. In line with recommendations from Hastings and Chantry (2002), teachers in SPRinG classrooms took a flexible approach to classroom furniture. In particular, teachers in Chap. 7 noted that discussion sessions required children to look at one another if the quality of their talk was to facilitate understanding. From these observations, it appears that teachers developed two types of seating strategy: (1) initially they had to ensure that

the assigned learning task required interaction and talk among group members, and kept the numbers per group limited so that all children in a group would have the opportunity to; and (2) tables had to be arranged in the classroom such that small groups would work effectively—that is, small groups could be arranged around an individual table where all group members could focus upon one another in their joint work and conversations or that very small groups (pairs or 3s) were seated around the corners of tables where children could work together.

Another strong recommendation, reinforced by teacher views in Chap. 7, was that children would get the maximum benefit of group work if their groups remained 'stable' over time. The relational approach emphasizes that in the early stages all children should develop their group working (sensitivity, trust, communicative) skills with all other children in the classroom. The initial stages, as discussed and trialled with teachers, were designed not only to provide group working skills not previously introduced/supported in their classrooms but to help children to overcome stereotypical friendship-based choices in their group working partnerships. Hence, early non-curricular exercises encouraged children to interact with all of the other children in the classroom—boys with girls, pupils with special needs, high and low attainers, etc. Once the children's group working skills developed alongside their ability to be inclusive with their grouping partners, the transition to classroom, curricular-based group work required them to use their skills with particular partners. Teachers in Chap. 7 strongly recommended that the groups undertaking learning tasks should remain 'stable' over a period of time—minimally to allow aspects of the Tuckman (1965) stages to be worked through among group partners. Teachers and researchers found that emphasizing stability in the classroom groups helped to overcome children's interpersonal 'niggles' and preferences that would have previously necessitated a change of group members. When coupled with briefing and debriefing about stability in group membership in class this allowed both teachers and children to appreciate the need to confront and resolve group-based and learning problems rather than avoid the problems by the 'quick-fix' of changes to group membership.

8.5.4 Curriculum and Group Work Activities

Previous research has tended to tie group working programmes to particular curricula, and group-based learning associated with those studies tended to apply to the specific curriculum area. In addition, our earlier studies (see Kutnick et al. 2002) suggested that effective group working may only be aligned to particular subjects within which there were large proportions of discussion planned to take place within curriculum activities (i.e., literature, history). Subjects such as mathematics were likely to be taught with a strong individualistic or whole class approach and group work may not be easily integrated into its curriculum activities. A further concern expressed by a number of SPRinG teachers early in the programme (see Chap. 7) was how to integrate the SPRinG relational approach and activities into a busy, curriculum-dominated school timetable.

Results from the evaluations (Chaps. 4–6) and teachers' reflections (Chap. 7) have shown that our initial concerns were overcome through the course of the SPRinG programme. Perhaps one of the most problematic of the concerns was when and how the relational training could be integrated into the school day which was so dominated in England at the time by coverage of the Government specified National Curriculum. In fact, many teachers came to see that group working skills were essential to their children's learning in the classroom, especially as children were likely to be seated in some form of small group for much of their time. Once the importance of effective group work was established, we saw, as in Chap. 7, that teachers were concerned as to 'where and when' the relational approach could be integrated into the working day, as well as understanding that certain basic group working skills (sensitivity to others, trust-building, shared communication) had to be established and supported before children could effectively use these skills in any curriculum applications of group working. Once the children became skilled in their group working, it was far easier to integrate group-based approaches across a range of curriculum subjects—as substantiated by the increasing amount of group settings for classroom learning used over the school year and identified in the OTS observations presented in Chaps. 4 and 5. And, with the children being able to draw upon their group working skills, teachers found it much easier to plan their lessons with group working in mind—across a range of curriculum subjects.

Results described in Chaps. 4–6 provide further evidence that the development and use of group working skills need not be tied to any particular subject within the curriculum. In reflecting on socio-cognitive and socio-cultural theories presented in Chap. 1, our results provide substantive support for the assertion that the group working skills developed via the SPRinG programme are generic to children's learning—that is, the skills help them to learn across a range of subjects that typify the curriculum as well as a range of curriculum tasks.

8.6 Thinking Beyond the Immediate Use of SPRinG; Some Further Concerns Regarding the Viability of Group Work in the Classroom

In this section, we move forward by further considering processes through which peer-based learning in the classroom takes place, the relationship between formal and informal peer relations, the role of other adults and trainee teachers in the classroom in facilitating group work and the limitations in training for effective group work.

8.6.1 The Potential for Peer-Based Learning in the Classroom

The SPRinG studies were not set up to provide a particular examination of the mechanisms behind group work. With this caveat in mind it is still worthwhile to consider a number of possible processes that might explain why we found group

work had such an influence on learning. Previous research suggests that group work provides pupils with the opportunity to process content information in greater depth (see Barron 2003; Reznitskaya et al. 2009; Webb and Palincsar 1996), imitate others' strategies (Tomasello et al. 1993), come into contact with alternative views (Doise and Mugny 1984) and construct new understandings with others (Rogoff 1998; Tomasello et al. 1993). Further, effective learning is most likely to take place within a 'region of sensitivity' (Ellis and Rogoff 1982) wherein children are able to make and reaffirm 'connectedness' (Damon and Phelps 1989) with one another. While more research would be required to examine the working of each of these particular mechanisms in SPRinG classrooms, we are able to provide some insight as to why these mechanisms may have worked in our studies.

We have already rehearsed the argument that the 'region of sensitivity' and development of 'connectedness' may characterize our studies (Chaps. 4 and 5) due to our focus on the relational approach. The theoretical and practical basis of this approach was initiated via an analysis of close relationships, how these relationships develop interpersonal (peer-based) sensitivity and trust at the root of effective learning, and the fact that the focus on relationships among peers had been unlikely to characterize existing primary school classrooms. We further noted in Chaps. 4–6 that the opportunities to process content information, come into contact with alternate information and construct new understandings are far more likely to take place in learning settings where children develop 'symmetrical' or mutual communication skills. Symmetrical skills emphasize a sharing among non-experts, and provide an alternative access to developing new knowledge and skills from teacher- and expert-dominated asymmetrical communication. We emphasize that children strongly benefit from having access to both types of communication but need to be supported in their development of the symmetric. A further explanation for effective group work brought about through the SPRinG programme draws upon the enhancement of argumentation and higher order thinking strategies such as the ability to apply, analyse, synthesize and evaluate knowledge (Wegerif 2000; Wegerif et al. 1999) engendered within the symmetric communication of children. And, it should be noted that argumentation and higher order thinking observed within SPRinG classes were most likely to have occurred among all children in the classroom—and this degree of joint involvement contrasts with some previously reported studies (for example, Reznitskaya et al. 2009).

Previous research has suggested that group work may influence learning by encouraging motivation to learn (Mesch et al. 1988; Slavin et al. 2000). Perhaps the clearest evidence of SPRinG having an effect on motivation was presented in Chap. 4. Using specially designed scales to identify social contexts to support learning, pre-/post-comparisons over the school year showed that children developed a preference for learning with their peers—whether in dyads or small groups, whereas the control children maintained an individualistic learning preference. In a similar manner, sociometric preferences for work and play partners considered in Chap. 6 showed that children expanded their range of peer-based work preferences over the evaluation period, and this expansion took place in rural classrooms where children already displayed high levels of peer preferences, as well as in urban classrooms. Further, in these Scottish classrooms expansion of preferences took place in the same-age as well as mixed-age classes.

There is, however, one major qualification that we must add to this consideration of group-based motivation for learning. Motivational effects are most likely to be developed in classrooms where teachers are fully committed and are supportive of the programme; less committed teachers (described as SPRinGLite in Chap. 7) will probably be associated with lower motivational effects, although this needs to be assessed in further studies.

We note that one feature of the SPRinG programme was also one of its limitations. The programme was deliberately designed as a total package, with an intervention that deliberately included a spread of activities and approaches. One question that remains unanswered relates to whether it is the training in sensitivity, social, communication, and advanced group work skills that leads to effective and successful group work or some of the key principles and practical strategies suggested by the programme. Furthermore, there may be particular aspects of the programme that were more successful than others. This suggests the value of bringing together in the future large scale studies like SPRinG with targeted studies on specific processes involved.

8.6.2 Informal Peer Relations

Group work might also be productively considered in the context of peer relations more generally. Howe (2010) is particularly keen to emphasize that it is often the informal contacts developed via games, play, etc. that help to overcome some of the potentially negative effects of differentiation and segregation that may inhibit learning in school. In the case of group work we see peer relations operating in a relatively formal way within classrooms, with relatively clear educational goals. Elsewhere, we have argued (Blatchford and Baines 2010) that the success of peer relations and group work in classrooms will depend to a large extent on developing and using an informal network of relationships between peers in the school. We suggest researchers seek a better understanding of the connections between informal and school based peer relations, not only because of their possible contribution to the wider study of peer relations but also because of its relevance to school learning and the ways schools deal with peer relations. These connections would do much to strengthen understanding of the antecedents and contexts for what Howe (2010) has called the 'co-operative' mode of learning in schools, in contrast to the more traditional and common 'performance' mode of learning. We agree with Howe that we need to recognize more formally the co-operative mode for its value in school learning. At the same time, and with regard to the enhancement of social inclusion in the classroom, we need to be cautious about the direct transfer of informal peer relations into the classroom. While there are strong benefits in the social aspects of peer-based learning that characterize the playground, we must also be aware that a number of playground actions can support and promote stereotypically gendered and status exclusive behaviours (see Kutnick and Kington 2005; Corsaro 2005; Lofdahl and Haaglund 2006). One of the important processes promoted in the SPRinG

programme is that children should develop their group working skills with all of their classmates—not just with preferred friends. Perhaps we should be aware that the interaction of informal and formal peer-learning process is, minimally, a two-way interaction; classroom developments may be transferred to the playground and playground preferences may be transferred to the classroom. In either case, teachers and pupils must be aware of this interaction and effects, possibly integrating its consideration into their briefing and debriefing activities.

Thus, we believe that the informal nature of peer relations is significant in relation to the wider role of peer relations in development and also their potentially unique role as a force in school learning. Consideration of peer relations may help bring out the potential of more informal contexts for learning. For example, Vygotskian thought on learning contexts (see Wertsch 1985) has tended to stress the one-to-one tutorial relationship, usually adult-to-child, or at least expert-to-novice, and relations between intellectual equals (and relationships around informal, playful activities) are not therefore central. However, peer relations can be an inherently motivating context for action and learning. In contrast to adult-child relations, they are more horizontally organized and power is more likely to be evenly shared. In comparison to adult-child tutoring relations, peers would tend to be seen as less effective, but we need to recognize and value the distinctively different nature of peer-to-child relations. This may require more recognition of the qualities that make them different to adult child relations (see Damon and Phelps 1989; Pellegrini and Blatchford 2000). As we have argued earlier (Blatchford et al. 2003), given the difficulties adults can have in adjusting to the child's way of looking at things, it may be that peers are for some things a *better* context for intersubjectivity (to use a Vygotskian term). To extend this Vygotskian analysis, peer relations may be a good inter-psychological context to further intra-psychological functioning. There is something paradoxical in the view that cognitive development depends on adults having to be very skilful in accommodating children into joint actions, and in a sense pretending to be at a level they are not, while children (e.g., during play with each other) typically and naturally have no such difficulty with each other—just watch any school playground (Blatchford 1998; Pellegrini and Blatchford 2002) or friends in the home. We too easily ignore the inherently informal and motivating nature of peer and friendship relations (see Blatchford et al. 2003 for a longer treatment of these points).

A further area of research therefore arises out of these likely linkages between children's informal peer relations and classroom engagement and learning. An assumption in the group work literature is that peers working together are of 'equal' status and indeed this is a key distinction between Piagetian and Vygotskyan theories of social learning as well as theories of co-operative and collaborative learning. While much previous research relates to peers being of equal cognitive status, there is little work that focuses on differences in terms of status on more social dimensions such as popularity, leadership, friendship and social involvement in social networks. Peer relations can have a huge impact on classroom life and the success or not of group work. Similarly, group work between certain types of pupils can have beneficial effects on children's peer relations (especially as identified by Cohen and Intilli 1981).

8.6.3 The Role of Other Adults in the Classroom and the Success of Group Work

8.6.3.1 Teaching Assistants

Returning to the classroom, there is one further consideration regarding the role of adults. While the SPRinG studies have relied on teachers in the development and implementation of the programme and we have noted the importance of teachers supporting the SPRinG programme and being 'a guide on the side', we are also aware of the huge increase in para-professional support from Teaching Assistants (TAs) in classrooms in the UK and elsewhere. In the UK this was one consequence of efforts to deal with teacher workloads and retention (Blatchford et al. 2012). In England TAs now make up one quarter of the school workforce and observations of classrooms in the SPRinG studies. More formally, the Deployment and Impact of Support (DISS) project (Blatchford et al. 2012) showed that TAs at primary level often worked with small groups comprised of pupils who had difficulties in learning, but that there were potentially negative effects for these groups, e.g., TAs tended to concentrate on task completion at the expense of understanding concepts and could dominate groups, not facilitating pupil involvement. This negative finding is understandable given TAs' general lack of training, lack of familiarity with effective group working practices and lack of allocated time to liaise with teachers (see Blatchford et al. 2012). In a manner similar to the Chap. 7 argument that a whole school policy for effective group work was really needed to support teachers who are implementing SPRinG, this policy also needs to include the numerous teaching assistants that will be found in many classrooms.

8.6.3.2 Training Teachers for Group Work

Another type of adult found in classrooms is the trainee teacher, and this raises questions about the type of support for effective group working that may (or may not) be found in their initial teacher education courses. It is manifestly clear from our study that to facilitate effective group work in their classrooms teachers need to have developed beyond the novice stage so that they have internalized a variety of subtle skills to do with problem solving, classroom management and personal relationships which are more characteristic of expert practitioners (Berliner 1987). From our previous mapping and questionnaire based studies of teachers (see Kutnick et al. 2002), we are aware that a large proportion of teachers recall that they have received some mention of group work in their initial courses, but very few of the teachers in the survey stated that they planned for effective group work (less than one-third of those questioned) and fewer (less than a quarter) stated that they provided any training in effective group work for their children. We are thus concerned that traditional undergraduate and postgraduate initial teacher training courses do not offer sufficient time for trainees to acquire sufficient skills to develop effective group

working in their classrooms. In addition, we are very worried that school based teacher training and speed tracking of professionals from other career paths (e.g., the armed forces) into teaching, which are an increasing feature of the UK system, will be even less likely to include essential coverage of group work skills. Even further, professional development courses for established teachers do not appear to provide for the effective use of group work in their classrooms. More generally, we argue that effective initial and professional development courses should include recognition of the value of a social pedagogical approach to classroom learning, as well as more traditional coverage of the curriculum, classroom management etc.

8.7 Toward a Broader Social Pedagogy of Classroom Learning

We have argued that the educational advantages of peer-based interactions have been neglected in the UK and elsewhere around the world—both in terms of current educational policy and classroom practice. The aim of the SPRinG programme was to complement and extend consideration of teaching and learning contexts and to help teachers to extend their repertoire of teaching approaches through greater recognition of a social pedagogic approach. We based this aim on previous findings that grouping arrangements that currently characterize many classrooms are just as likely to inhibit learning, as they are to promote it (Kutnick et al. 2002). In parallel work (Blatchford et al. 2004), we also found that teachers have a strong belief in the value of addressing pupils' individual needs. This informal/individual pedagogical view may all too easily be adopted in a way perceived to meet demands of a national curriculum and differentiating modes of teaching to account for different levels of classroom attainment. It is likely that this individual pedagogy can conflict with pressures arising from the curriculum and the classroom context, especially in large class sizes. Teachers feel forced to use more adult-led and whole class teaching than they might like and this is unlikely to encourage the participation of all children in a collaborative manner. In this section we develop a fuller social pedagogic approach which we feel begins to capture the kind of forces involved and the role of group work.

8.7.1 Contextual Approach

One of the limitations of many studies of teaching effectiveness is their lack of interest in classroom contextual influences on teaching. There is an underlying assumption of a direct model, where teaching affects, in a causal way, pupils' achievements and learning. There are a number of models which have conceptualised contextual influences on pupils' progress in school. One of the earliest and most widely cited is Dunkin and Biddle's (1974) model which supported research in the 'process-product' tradition of teaching effectiveness. There were four stages: presage, context, process

and product. Another model by Pianta et al. (2002) divided influences on education into 'distal' vs. 'proximal' and perhaps not surprisingly found that distal structures like class size have less influence than proximal factors like classroom processes, teaching and the emotional quality of the classroom setting.

One of the limitations of models like these—strongly suggested by the research reported in this book—is that contextual features are seen as background, necessarily 'distal' factors affecting teachers and pupils, and are therefore consigned to a relatively minor role. But, as argued by Blatchford (2003), teachers do not meet pupils out of context, and classroom contextual factors (like class size) can be seen as one contextual influence on classroom life, to which teachers and pupils will inevitably have to adapt, and which will affect their behaviour and the nature of the interactions between them.

A more developed expression of a concern with contextual factors is the well known ecological model of Bronfenbrenner (1979) and the ecological psychology approach of Kounin and Gump (1974). The basic idea is that within the school there will be smaller contexts, such as the classroom and the playground, which have qualitatively distinct sets of relationships, rules and dynamics (Pellegrini and Blatchford 2000). Different contexts may well induce different dynamics, which influence both teachers and pupils. This is a very different view to that in the Dunkin and Biddle model, where their model of contextual factors is more static and feeds into influences on teaching and pupils. The ecological approach is better able to account for the influence of contextual factors on both teacher and pupils.

8.7.2 Social Pedagogical Approach

The ecological approach adds a number of dynamics which we believe can account for interpersonal patterns of interaction that help move beyond classic models of teaching and learning as well as help understand inhibitors to attainment (especially among children with a range of disadvantages). At the same time, the ecological approach is overly deterministic in the sense that it tends to assume that the behaviour of teachers and pupils are both directed by contextual factors. One important extra feature not usually included in consideration of an ecological approach is the adaptability needed by teachers when faced with a range of contextual factors, like the number and attainment range of children in a classroom or the number and size of pupil groups. Teaching is an intelligent activity and intelligence is required in adapting constructively to new and changing opportunities. There are other ways in which the ecological model is limited. Teachers and pupils will also face two important other factors in classrooms—the curriculum and pedagogy. Further, their classrooms will have to be organized to meet the demands of school policy and national curricular policy.

A model is therefore needed in which all these factors, i.e., group size and composition, teaching roles, learning tasks, perceptions of different curriculum and pedagogy come together in a dynamic relationship. It is important to adapt teaching to'fixed' classroom level factors but also include classroom size, seating arrangements, characteristics of children and the curriculum as well as larger contexts as the school and

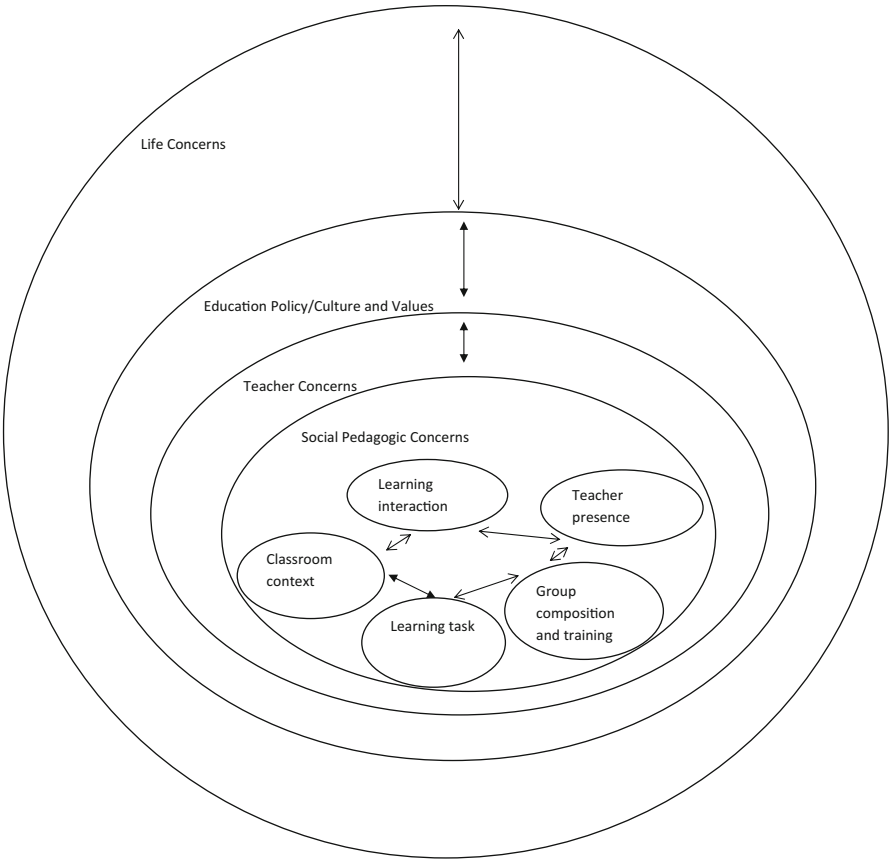

Fig. 8.1 A social pedagogical approach to classroom learning

society. Blatchford et al. (2003) initially introduced and used the term 'social pedagogy' to help show how classrooms are not so much the undefined context within which teachers simply exert an influence on individual students. Classrooms involve distinct physical and social settings within which decisions are taken about how to best coordinate and manage the various factors involved. These components exist in dynamic relationship with each other and effective teaching requires an understanding of their separate and interconnecting influences. One pictorial version of the factors involved in this kind of approach is shown in Fig. 8.1

The figure is complex but it is meant to convey the dynamic and interactive relationship between the factors. The figure notes that any classroom activity will be affected by external as well as internal factors—and each of these factors exerts effects in a number of different directions. A brief explanation of the figure notes that:

1. 'Life Concerns' in relation to education will include children's and (their) parents, home background, preparation and support for education, expectations of the values that education and schooling may bring. These Life Concerns overlap with a number of sociological analyses that include effects of social class, gender and religion on educational aspirations. But the dynamic and interactive relationship between factors may allow us to redress classic interpretations of social class and other effects (usually drawn upon to explain the denial of access to education or privileging of certain backgrounds in schooling) by attention to effective within-classroom developments.
2. 'Education Policy/Culture and Values' are evident when Life Concerns enter the school. Schools provide an arena to 'teach' particular values (of achievement, differentiation, etc) that may express a country's orientation to knowledge and social order. At the same time, national (and school-based) educational policies will have to be interpreted through teachers and other school personnel (see Goodson and Numan 2002) who may agree or disagree with policy. There are numerous examples where schools (state and private) have disregarded national policy and set different and distinct values for their pupils (for example, Jones 2010).
3. 'Teacher Concerns' will be affected by their Life Concerns as well as Education Policy/Culture and Values and social pedagogic aspects of the classroom. Teachers do not live in a vacuum and the characteristics of their teaching have often shown aspects of their home and educational background as well as their interpretations of school and national curriculum policy. As noted in this volume, teachers (and support staff within their schools) are crucial to the implementation of change in the classroom—and they must be aware and act upon the social pedagogic aspects of their classrooms and pupils.

While the concerns of this book have been focused on the inner circle, 'Social Pedagogic concerns' in the classroom should be seen in dynamic interaction with all other concerns (especially with Teacher Concerns). Each of the Social Pedagogic Concerns have been described and discussed in the SPRinG principles. In describing the principles individually, we wish to also add that each concern interacts with all other concerns. And, it is the social pedagogic focus of the classroom where the potential for change and development (minimally in terms of attainment and behaviour) is most likely to be seen—affecting children's achievement as well as providing an alternative to traditional patterns of teaching, learning and educational policy.

8.8 Final Conclusion

We end by returning to a concern that arises out of conflict between the pedagogical assumptions of the current study and current classroom practice. Our research shows that peer-based group-working can be a productive part of classroom activity, but observational studies of classrooms show that teachers tend to work with the whole class and groups in their classrooms, but rarely plan, or create opportunities, for the

development and use of interactions *within* groups. It has been found that teachers in English schools have a strong belief in the value of addressing the individual needs of pupils (Blatchford et al. 2004). This informal pedagogical view can conflict with pressures arising from the curriculum and the classroom context, especially when they have large numbers of children in their class. They feel forced to use more teacher-led and especially whole class teaching sessions than they might like.

It seems to us, therefore, that we need to rethink pedagogical theories. We suggest teachers and teacher trainers could help themselves by making more use of a social pedagogy of classroom learning which incorporates group work as a way of facilitating pupil involvement. This offers learning possibilities for pupils not provided by either teacher-led situations or individual work. Such a social pedagogy, as outlined here and in Blatchford et al. (2003), emphasizes the importance of thinking about key principles relative to group work but also other teaching and learning contexts. Such a social pedagogy needs further development and deserves to be given a much more central role in educational policy and school practice.

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