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## INTERIM REPORTS

### Research Survey 2/1b

# CHILDREN'S SOCIAL DEVELOPMENT, PEER INTERACTION AND CLASSROOM LEARNING

Christine Howe and Neil Mercer  
University of Cambridge

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PEER INTERACTION  
AND CLASSROOM LEARNING**

Primary Review Research Survey 2/1b

**Christine Howe and Neil Mercer**

This is one of a series of 32 interim reports from the Primary Review, an independent enquiry into the condition and future of primary education in England. The Review was launched in October 2006 and will publish its final report in late 2008.

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The report forms part of the Review's research survey strand, which consists of thirty specially-commissioned surveys of published research and other evidence relating to the Review's ten themes. The themes and reports are listed in Appendices 1 and 3.

This survey relates to Primary Review theme 2, **Learning and Teaching**.

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# CHILDREN'S SOCIAL DEVELOPMENT, PEER INTERACTION AND CLASSROOM LEARNING

## 1. INTRODUCTION

Within educational research a particular theoretical perspective has become influential over recent decades, from which classroom learning and cognitive development are seen as cultural processes. Here, knowledge is regarded not only as possessed individually but also as created and shared amongst members of communities, and the ways that knowledge is created and shared are seen to be shaped by cultural and historical factors. This *socio-cultural* perspective differs from other influential approaches to the study of education, such as those inspired by Piagetian stage theory or notions of inherited intelligence, by treating children's intellectual achievements as the product not just of their own efforts or discoveries but also of interaction in a cultural context. This does not mean that socio-cultural researchers believe that intellectual achievement is determined entirely by social experiences. Rather they share the view that, no matter what other factors are involved, one cannot fully understand the nature of thinking, learning and development without taking account of the intrinsically historical, social and communicative nature of human life. In the survey that follows, we shall be adopting a socio-cultural perspective, and therefore our focus too will be upon the social processes that shape children's growth. Equally though, we shall not be denying other influences, and from time to time (for example when discussing temperament) we shall consider these influences explicitly.

Detailed accounts of the socio-cultural perspective as applied to education can be found in Wells and Claxton (2002) and Daniels (2001). The assumption that is crucial for present purposes is that development and learning are shaped to a significant extent by social and communicative *interactions*. These interactions will inevitably reflect the historical development, cultural values and social practices of the societies and communities in which schools and other educational institutions exist, as well as the more local cultures and practices within particular schools and classrooms. An important implication is encouragement to look for the causes of educational success and failure in the nature and quality of the social and communicative processes in classrooms, rather than in the intrinsic capability of individual students, the didactic presentational skills of individual teachers, or the quality of the educational methods and materials that have been used. In this survey, we review a proportion of the research that this implication has stimulated. We have not attempted to cover everything, for the material is extensive. In any event, some aspects are dealt with elsewhere in The Primary Review, and we could not do justice to them while giving space to aspects which those other surveys do not cover. This means, in particular, that we do not deal with interactions between teachers and children, or go into detail about interactions amongst children when they are not engaged in school work (both of which are important, but are dealt with elsewhere). Instead, we discuss the educational significance of classroom interaction amongst children, and consider which factors seem to be most important for their learning and cognitive development. We also review research which has attempted to improve the quality of collaborative activity, usually with the aim of improving both the productivity of that interaction and its learning outcomes for the individuals concerned. For reasons which we will explain, we give special attention to the quality of talk amongst children.

Classroom interaction amongst children has been studied from perspectives that contrast with the socio-cultural one that we shall be adopting; perspectives that will also be covered elsewhere in The Primary Review. For instance, the *co-operative learning* tradition (for example Johnson & Johnson 2000; Slavin 1995) usually emphasises the goals that children pursue together, rather than the social and communicative processes through which this proceeds. Research into *peer tutoring* (for example Goodlad & Hirst 1989; Topping & Ehly 1998) involves instructing one child in how to assist another, but typically focuses on the outcomes of instructional exchanges rather than their content. In fact, there are, arguably, only two approaches to interaction amongst children that can be regarded as genuinely socio-cultural. The first approach stems from research reported in Vygotsky (1962, 1978), scarcely unexpected when Vygotsky's work provides the foundations for socio-cultural theory as a whole. The source of the second approach may be more surprising, for it is the early work of Piaget (for example 1932), who is more usually associated with a theory of individual development than with the effects of social interaction. In what follows, we shall start by outlining the Vygotskian and Piagetian approaches to interaction amongst children, and the research that these approaches have inspired. This will allow us to draw conclusions about the nature of productive interaction.

With a clear conception of what productive interaction involves we shall then consider research, which shows how rarely it occurs classrooms. We shall acknowledge that the problem lies partly with the tasks that children are typically asked to perform, and we shall propose alternative approaches to task design. However, informed by our socio-cultural perspective, we shall emphasise that interaction amongst children does not take place in a vacuum, but is heavily influenced by the social histories that children bring to bear. After discussing how these histories should be conceptualised, we shall argue that as well as influencing classroom interaction, they are themselves constituted, in part at least, by social interaction, both within and outside the classroom. Thus, any attempt to promote interaction that is conducive to learning will of necessity have to acknowledge a contextual dimension. Our survey will conclude by discussing the implications for classroom intervention.

## 2. THE WORK AND INFLUENCE OF VYGOTSKY AND PIAGET

Vygotsky's (1962, 1978) guiding assumption was that the acquisition and use of language transforms children's thinking. He described language as both a cultural tool (for developing and sharing knowledge amongst members of a community) and a psychological tool (for structuring the processes and content of individual thought). He also proposed that there is a close relationship between these two functions of language, which can be summed up in the claim that *inter-mental* (social, interactional) activity stimulates some of the most important *intra-mental* (individual, cognitive) capabilities. Since both forms of activity depend upon language, Vygotsky's emphasis upon inter-mental processes is implicitly an emphasis upon dialogue, and more specifically upon the co-ordination of meaning through talk. Thus, researchers following the Vygotskian tradition emphasise reciprocity, mutuality and the continual (re)negotiation of meaning as interaction proceeds (as described, for example by Barron 2000; Nystrand 1986). Participants in effective social interaction may experience what Ryder and Campell (1989) call *groupsense* – that is, a feeling of shared endeavour. Such co-ordinated activity depends upon the establishment and maintenance of what Rogoff (1990) and Wertsch (1991) have termed *intersubjectivity*. It will necessarily involve a shared conception of the task or problem. Partners will not only be interacting, but also *interthinking* (Mercer 2000).

For Piaget (for example 1932, 1985), the pathway to development and learning is the process of *equilibration*, a process that involves the reconciliation by individuals of conflict between prior and newly experienced beliefs. As such, equilibration implies that children need to encounter beliefs that differ from their existing ones but that, by virtue of not being too advanced, can be related to these. Since the beliefs of the children in a class are likely to be displayed through similar (although certainly not identical) levels of understanding, this implies that discussing beliefs with classmates ought to be productive, so long as beliefs differ and tasks are structured to draw differences out. Although Piaget noted the implication himself (for example Piaget 1932), he did not elaborate it further, and his ideas remained largely undeveloped until the late 1970s. Piaget's colleagues (see, for example, Doise & Mugny 1984) then consolidated his ideas into the concept of *socio-cognitive conflict*, and initiated a programme of empirical investigation. The earliest studies were centred on Piaget's own classic tasks, with conservation and spatial transformation (that is, the famous 'three mountains' task) being particular favourites. Some of these studies (for example Doise, Mugny & Perret-Clermont 1975) compared children who worked on the tasks in groups with children who worked on them individually. Although these studies document greater progress in the 'grouped' children (as ascertained from pre-tests administered before the tasks to post-tests administered afterwards), the positive results do not necessarily stem from the expression of difference. Perhaps the mere fact of being part of a group was sufficient to stimulate progress. Other studies (for example Ames & Murray 1982; Bearison, Magzamen & Filardo, 1986; Doise & Mugny 1979; Mugny & Doise 1978) have, however, focused directly upon difference, by comparing groups where members hold contrasting beliefs with groups where members hold similar beliefs, and/or by relating the extent to which differences are expressed in dialogue to pre- to post-test growth. These studies provide strong and consistent evidence for the relevance of differing beliefs.

Research with Piagetian tasks soon stimulated work in other contexts, with a particular focus upon children's understanding of the social domain. For instance, Damon and Killen (1982) and Kruger (1992) considered the relevance of group interaction to primary school children's reasoning about 'distributive justice', as exemplified in a scenario where four children were described as receiving ten candy bars for making bracelets and the task was to divide the bars fairly bearing in mind, for example that one child had made the most bracelets, and another was younger and had made fewer bracelets. Leman and Duveen (1999) recorded pairs of children working on a moral reasoning task. The task, which has been employed in research with children working *individually* for over 50 years, requires judgments of who is naughtiest, a boy who breaks a large number of cups while engaged in routine behaviour (for example opening a door which the cups happened to be stacked behind) or a boy who breaks a small number of cups while engaging in forbidden behaviour (for example stealing food that he had been prohibited from touching). Using a specially designed board game entitled 'Conviction', Roy and Howe (1990) examined 9- to 11-year old children's collaborative reasoning about legal transgressions that ranged from the relatively trivial, for example parking on a double yellow line, to the relatively serious, for example stealing from an elderly woman. In all of these studies, the exchange of contrasting opinions played a key role in effecting progress, although (importantly for material discussed later in our survey), Damon and Killen's data indicate that when contrast led to personal hostility the benefits were lost.

The research reviewed above is potentially significant for primary education: conservation and spatial transformation have long been recognised as relevant to mathematics, and the social topics relate to issues covered in citizenship education. Nevertheless, the research does not address the primary curriculum directly, and therefore it is encouraging that from

around 1990 studies began to be published that tested Piagetian ideas with standard school subjects. Literacy and the arts have been examined (for example Miell & MacDonald 2000; Pontecorvo, Paoletti & Orsolini 1989), but the focus has undoubtedly been upon mathematics and science. With mathematics, support for the Piagetian emphasis upon difference has been obtained in research on rational number (for example Damon & Phelps 1988; Schwarz, Neuman & Biezuner 2000) and matrices (Blaye, 1990). With science, some of the clearest evidence comes from research conducted by one of us which involved groups (pairs or foursomes) working on tasks relevant to elementary concepts, for example whether small objects float or sink, the paths that objects trace as they fall through space, and the relative speeds of toy vehicles as they roll down slopes. In all cases, the groups jointly predicted outcomes, observed what happened, and jointly interpreted what they observed. The majority of the studies (for example Howe, Rodgers & Tolmie 1990; Howe, Tolmie & Rodgers 1992a) were with primary school children aged 8 to 12 years, although some studies included secondary- or tertiary-level students (for example Howe, Tolmie & Mackenzie 1995a; Howe, Tolmie, Anderson & Mackenzie, 1992b). In every study, individual pre-tests prior to the group tasks allowed some groups to be comprised of participants with differing preconceptions about the subject matter, and other groups to be comprised of participants with similar preconceptions. Individual post-tests some weeks after the group tasks revealed consistently greater progress after working in differing groups. Sometimes the participants who worked in similar groups made no progress whatsoever, despite observing the same physical outcomes as the differing groups and being equally engaged in the tasks. Importantly, when the participants in the differing groups also had differing levels of understanding (which was not always the case), the more advanced individuals progressed as much as their less advanced partners.

Currently then, there is a sizeable body of research stimulated by the Piagetian approach, and producing broadly consistent results. Nevertheless, while this must be acknowledged, the results are not necessarily incompatible with the Vygotskian emphasis upon inter-mental processes and the co-ordination of meaning. After all, these processes also seem to depend upon contrast of perspectives. Thus, questions are raised about the precise relation between the Piagetian and Vygotskian approaches. Are their claims genuinely different? If they are, do the differences amount to incompatibilities, or are they matters of emphasis within a broadly consistent framework? In our view, there *are* fundamental differences between the Vygotskian and Piagetian perspectives. However, these differences centre upon the role of language in *individual* cognition, and therefore, in effect, upon the sufficiency of a socio-cultural perspective. As noted already, few (if any) socio-cultural theorists believe that development and learning are purely the result of social and communicative processes, and Vygotsky would certainly not fall into this camp. Nevertheless, Vygotsky undoubtedly placed more emphasis on such processes than Piaget; and unlike Piaget, Vygotsky believed that knowledge growth actually requires social experiences. On the other hand, insofar as both theorists believed that social and communicative processes are relevant, they appear to be carrying complementary implications about how these processes operate. Moreover, it is not simply that Vygotskian theory implies the developmental importance of children's engagement with different views, as noted already; it is also that Piaget's account of such engagement seems to depend upon children establishing mutual goals and shared understanding of the task at hand. Note, for instance, that participants in the studies reported by Howe *et al.* (1990, 1992a, 1992b, 1995a) were required to predict and interpret *jointly*.

### 3. DIALOGUE AMONGST CHILDREN IN THE CLASSROOM

Much of the research reviewed in the previous section did not simply examine the implications of having group members with differing ideas; it also considered the consequences of having these differences expressed during group interaction. As intimated already, progress has been consistently associated with the range of ideas expressed. It has indeed also been found in studies by Tolmie, Howe, Mackenzie, and Greer (1993), Howe, Tolmie, Greer, and Mackenzie (1995b), and Howe, McWilliam, and Cross (2005), which followed up the research outlined in the previous section and used similar tasks. More recently, Howe, Tolmie, Thurston, Topping, Christie, Livingston, Jessiman, and Donaldson (in press) have recorded the dialogue of primary school children aged 10 to 12 years, while they worked through extended (3+ weeks) programmes of teaching on evaporation and condensation, and force and motion. The programmes were delivered by classroom teachers, and although they incorporated group tasks modelled on those used in Howe and colleagues' earlier work, they involved whole-class teaching and practical demonstration in addition. They were, in fact, fully embedded in routine practice, and group work was only one component amongst many. Yet the expression of contrasting opinions during group work was the single most important predictor of learning gain. Crucially, this was gain that was detected not simply between pre-tests prior to the programme and post-tests a few weeks later, but also found to be sustained after an 18-month interval (Tolmie *et al.* 2007).

However, while the expression of differences is important, it should not be forgotten that the work of Howe and colleagues (as with much of the other research summarised above) explored dialogue in the context of tasks that constrained participants to joint activity. Thus, the tasks ensured that the expression of differences was co-ordinated and coherent, as illustrated in Transcript 1 (below). This transcript, which comes from data collected by Howe *et al.* (1992a), involves a group of 10- and 11-year-olds discussing the relative speeds with which a toy lorry and a toy car will roll down parallel slopes. The slopes had identical paper surfaces and were supported on pegs, whose height determined their angle.

#### Transcript 1: Group work in science

- Jonathon: Well, the lorry's heavier, and it gives more. See like it pulls down like. If it's light, it just moves down in its own time, but if it's got a lot of things it'll make it go faster. Also, it's on the higher peg.
- Anna: But say it was like going down a water slide, and there was a great, big, heavy person getting down.
- Chung: That's different. Skin's different to rubber, and you slide down in water.
- Anna: I know, but cars are metal.
- Chung: It's rolling on paper, so the lorry'll hit it, and it'll stop. But it's got weight to push it in the start, so I think it'll go faster.

The possible significance of the dialogic (perhaps not scientific!) coherence displayed in Transcript 1 can best be understood with reference to the work of Barnes and Todd. In one of the most important early studies of children's talk while working together in school, Barnes and Todd (1977) identified a form of dialogue that they regarded as particularly conducive to intellectual achievement. They termed the form *exploratory talk*, and saw its key features as the effective sharing of information, the clear explanation of opinions, and the critical examination of explanations. Barnes (1977 – see Barnes 1992) had initially stressed the value

of exploratory talk for learning and development in terms of it being a kind of thinking aloud that precipitates ideas, as the mind draws on previously unconnected reserves to come up with something new. But, as characterised by Mercer and Littleton (2007), exploratory talk is seen as beneficial because of its collaborative quality: it involves partners in a purposeful, critical and constructive engagement with each other's ideas. Statements and suggestions are offered for joint consideration. These may be challenged and counter-challenged, but challenges are justified and alternative hypotheses are offered. Partners all actively participate, and opinions are sought and considered before decisions are jointly made. Without doubt, the expression of differences is one component of exploratory talk, but it is not the only one. However, the emphasis upon joint activity in the research considered above may have guaranteed the presence of at least some of the other features. In which case, it is probably not difference *per se* that is important, but difference in the service of argumentation and, through this, mutually accepted goals.

Certainly, this contextualised sense of difference squares with other research. For instance, Anderson and colleagues (Anderson, Chinn, Waggoner & Nguyen 1998; Chinn & Anderson 1998) working in the USA have identified a kind of talk that they call *collaborative reasoning*, where 'children actively collaborate on the construction of arguments in complex networks of reasons and supporting evidence' (Kim, Anderson, Nguyen-Jahiel & Archodidou, in press). On the basis of data obtained through interventional studies, the researchers claim that during collaborative reasoning discussions, the quality of children's reasoning is much higher than in usual classroom discussions. Drawing on their own extended work, as well as that of several other cognitive scientists, philosophers and discourse analysts, Keefer, Zeitz, and Resnick (2000) identify the characteristics of the most productive classroom discussions about English literature. Two sets of characteristics resonate strongly with the concept of exploratory talk: a) *critical discussion*, which has the main goal of achieving shared understanding through accommodating divergent viewpoints and reconciling differences of opinion; b) *explanatory enquiry*, which starts from a position of lack of knowledge with the main goal of overcoming and identifying correct knowledge, using cumulative discursive steps. Finally, Berkowitz and colleagues (Berkowitz & Gibbs 1983; Berkowitz, Gibbs & Broughton 1980) have highlighted forms of dialogue that they term *operational transacts*. Operational transacts take reasoning and transform it in some way, as for example with 'I think the bottle will float because it's glass' followed by 'But it's got water in and that will make it sink'. The transformation can involve a justification for disagreement as in the example, but it can also involve a clarification or an elaboration. Operational transacts were shown by Berkowitz and Gibbs (and later Kruger 1992, 1993; Roy & Howe 1990) to promote understanding of moral and legal issues, and they have been found by Miell and MacDonald (2000) to support children's collaborative compositions in music.

There is, then, considerable consensus over the form of talk that supports learning and development at the primary school level. It is a form where children share knowledge, challenge ideas, evaluate evidence and consider options in a reasoned and equitable fashion. Children present their ideas as clearly and as explicitly as necessary for them to become shared, jointly analysed and evaluated. For example, Transcript 2 (below) is an extract from a discussion in which a group of three Year 5 children are engaged in a computer-based activity called *Viking England*. In the roles of Vikings, they are planning a raid on the British coast.

## Transcript 2: Viking England

- Diana: Let's discuss it. Which one shall we go for?
- All: (*inaudible –reading from instructions*)
- Peter: 1 2 3 or 4 (*reading out the number of options available*) Well we've got no other chance of getting more money because
- Adrian: And there's a monastery.
- Diana: And if we take number 2 there's that (*inaudible*).
- Peter: Yeh but because the huts will be guarded.
- All: Yeh.
- Adrian: And that will probably be guarded.
- Diana: It's surrounded by trees.
- Peter: Yeh.
- Adrian: And there's a rock guarding us there.
- Peter: Yes there's some rocks there. So I think I think it should be 1.
- Adrian: Because the monastery might be unguarded
- Diana: Yes 1.
- Adrian: 1 yeh.
- Peter: Yeh but what about 2? That, it might be not guarded. Just because there's huts there it doesn't mean it's not guarded does it? What do you think?
- Diana: Yes, it doesn't mean it's not. It doesn't mean to say its **not** guarded does it. It may well be guarded I think we should go for number 1 because I'm pretty sure its not guarded.
- Adrian: Yeh.
- Peter: Ok, yes, number 1 (*he keys in 1 on keyboard*).

Mercer 1995: p. 102.

As in the example above, children may use talk not only to express different views, but also to resolve their differences. Through resolution they may even find themselves converging upon ideas that go beyond what any of them were capable of achieving individually. However, work by Howe and colleagues (Howe 2006; Howe *et al.*, in press) suggests that the latter, in particular, is exceedingly rare at primary school level, at least in the context of discussions relating to the study of science. For instance, exchanges where two factors are coordinated into a superior account (for example 'I thought the flat box would sink because it's kind of heavy'; 'I know it's heavy, but it's spread across the water so it'll float') occurred only four times in the total of 1887 remarks that were included in the dataset analysed by Howe (2006). Fortunately though, the resolution of differences is not essential for learning. Groups

that do not resolve their differences have been found to be as effective as groups that do resolve (Howe *et al.* 1990, 1992a, in press), and groups that converge on ideas that are inferior to ideas held at pre-test have been found to be as effective as groups that take their participants forwards (Howe *et al.* 1990; Howe, Tolmie, Duchak-Tanner, & Rattray 2000). Further work by Howe and colleagues (for example Howe *et al.* 1992a, 2005; Tolmie *et al.* 1993) indicates that, given dialogue that involves sharing, challenging, evaluating and so on, children will be motivated to reflect on the subject matter long after the group task is completed, perhaps using material that they experience afterwards. Thus, within-group resolution is beside the point. The key thing is that children experience the form of dialogue that we have been highlighting here, a form that from now onwards we shall refer to as *exploratory talk*, while recognising the short-hand nature of the term and its relation to alternative constructs.

#### 4. THE QUALITY OF DIALOGUE AMONGST CHILDREN IN THE CLASSROOM

Unfortunately, one of the strongest messages to emerge from work surveying classroom activity is that, at least in British primary schools, exploratory talk seldom occurs. On the contrary, much classroom-based talk amongst children is of limited educational value, when judged against the yardstick provided by the previous section. This conclusion was the alarming outcome of a large-scale research project carried out in the 1970s called ORACLE (Galton, Simon & Croll 1980). The ORACLE team of researchers, observing everyday practice in a large number of British primary schools, found that just because several children were sitting together at a table (as was common), it did not mean that they were interacting. Typically, the children at any table were simply working, in parallel, on individual tasks. While they might well have talked as they worked, and while they might possibly have talked to each other about their work, they did not typically talk and work together. This problem of children working *in* groups but rarely *as* groups has also been underscored in a number of more recent studies, some of which have shown that even when children are set joint tasks their interactions are rarely productive (Bennett & Cass 1989; Galton, Hargreaves, Comber, Wall, & Pell 1999; Blatchford & Kutnick 2003; Alexander 2006; Kumpulainen & Wray 2002).

A specific example of the problem was detected in the Spoken Language and New Technology (SLANT) project, which was co-directed by one of us in the early 1990s. Here, researchers observed the interaction of children aged 8 to 11 years in 10 primary school classrooms, while they worked together in small groups at the computer (as described in Wegerif & Scrimshaw 1997). Detailed analysis of the joint sessions of work suggested that most of the interactions were not task-focused, productive or equitable. In some groups one child so completely dominated the discussion that the other group members either withdrew from the activity, becoming increasingly quiet and subdued, or else they participated marginally, for example as passive scribes of a dominant child's ideas. In other groups, the children seemed to ignore each other altogether, taking turns at the computer, each pursuing their own particular ideas when 'their turn' came round. Some groups' talk involved them in unproductive, often highly competitive, disagreements, a form of interaction referred to subsequently as *disputational talk* (Fisher 1993; Mercer 1995). From time to time these disagreements escalated, with the children becoming increasingly irritated with each other and engaging in vehement personal criticism. On the other hand, much group talk was relatively brief and somewhat bland. This latter form of interaction was termed *cumulative talk* by Fisher (1993) and Mercer (1995).

While the impoverished nature of classroom interaction can be taken for granted, it is unlikely to reflect a basic incapacity on the part of primary school children to engage in lively dialogue. Observational studies of children's off-task talk in primary school (notably by Maybin 2006) have shown that they use many varied language forms to discuss issues that concern them, to support their views, to report on events and generally make sense of the world (though Maybin did not report the natural incidence of discussion resembling exploratory talk). Further observational studies, this time in homes and in nurseries and playgroups, have demonstrated that even preschool children will justify opinions, suggest alternatives, and reach compromises during free play with their siblings or peers (see, for example, Dunn & Kendrick 1982; Eisenberg & Garvey 1981; Genishi & Di Paolo 1982; Howe & McWilliam 2001; Orsolini 1993). Take, for instance, Transcript 3, which presents a series of exchanges that took place amongst 4-year-olds when recorded playing together at nursery during the study reported in Howe and McWilliam (2001).

### Transcript 3: Football

- Scott: I'm sitting in the Celtic seat.
- David: No, I'm Celtic.
- Scott: But that's a yellow seat. I've got a Celtic seat (*points to green seat*).
- Gerry: Let's swap stickers. I've got Celtic stickers (*moves stickers from seats*).
- Scott: Yes, and we can be the Celtic team if we go outside.
- David: No we're only talking about it, not doing it.
- Gerry: I'm DiCanio; you can be the goalkeeper.
- Scott: No, you can be Jorge Cadete.
- Gerry: Okay.

In Transcript 3, the children justify (for example the mention of the yellow seat), suggest alternatives, and compromise. They even (by movement of stickers) make the otherwise contradictory evidence consistent with their claims. Thus, without doubt, Transcript 3 has many of the features associated in the previous section with exploratory talk, and there is no reason to believe that it is an isolated example. It is true that gender differences in usage of justifications, alternatives and/or compromises has been detected at the preschool level, with girls using the forms more frequently than boys (Hartup, French, Laursen, Johnston & Ogawa 1993; Howe & McWilliam 2001; Miller, Danaher & Forbes 1986; Sheldon 1992). Nevertheless, research shows that the forms are far from unusual in boys' conversations. Similarly, although the frequency with which the features occur is positively correlated with socio-economic status (Bruck & Tucker 1974; Howe & McWilliam 2001; Tough 1973), preschoolers will use the forms on occasion regardless of social class. Transcript 3 comes from boys, who lived in one of the most deprived areas of Glasgow.

In addition to being associated with demographic factors like gender and socio-economic status, the incidence of justifications and other features of exploratory talk during pre-school interaction also varies with the kind of play activity that children are engaged in. In the work of Howe and McWilliam (2001), 82 per cent of the relevant forms occurred during symbolic or construction play, even though this kind of play was no more frequent overall than other

activities, for example sand-and-water play. Similar results have been reported in Ervin-Tripp (1982), Garvey (1991), Orsolini (1993), and Sawyer (1996). As it happens, the effects of play activity turn out to be bound up with those of demography. Symbolic play is preferred by girls relative to boys (Johnson & Ershler 1981), with gender differences over construction activity being less marked. It is preferred by preschoolers of higher socio-economic status compared with preschoolers of lower status (Rubin, Fein & Vandenberg 1983). Nevertheless, the data indicate that play activity has an effect additional to that of demography; and when activity is a factor that teachers could, in principle at least, influence, it is worth asking about its relevance to primary school interaction, as well as to preschool. The activities that children engage in shift from play to more formal tasks at primary level, and they are less focused upon children's needs and wishes. Yet, when the form of activity has been found to exert such a significant influence at preschool level, it seems possible that this is one reason for the impoverished dialogue in primary schools.

## 5. TASK DESIGN AND THE BROADER CLASSROOM CLIMATE

Given our earlier discussion of Piagetian research, it can be anticipated that one requirement of group tasks at primary school level is that they are controversial; that is, amenable to different perspectives. This has been confirmed in research by Cohen (1994), which compares controversial with non-controversial tasks. However, granted the possibilities provided by controversy, further considerations are also relevant. First, research suggests that all group members must believe that both their own *and* their partners' contributions are important. As Meyers (1997) puts it, 'individuals exert less effort in groups when they believe that their work is not critical to the collective'. By contrast when students perceive their contributions to be original and significant, they continue to participate even if their work remains anonymous (Harkins & Petty 1982). In addition, individuals sometimes reduce their efforts to match the level at which they believe other group members are contributing (Chapman, Arenson, Carrigan & Gryckiewicz 1993; Jackson & Harkins 1985). Thus, children may withdraw their participation to avoid the possibility of being exploited by 'social loafers' within the group (Kerr 1983). Second, it is accepted (see Cohen 1994; Slavin 1996) that tasks should be inherently group-based, and not amenable to completion by individuals working independently. What is needed is 'a task that requires resources (information, knowledge, heuristic problem solving strategies, materials and skills) that no single individual possesses, so that no single individual is likely to solve the problem or accomplish the task objectives without at least some input from others' (Cohen 1994). Third, tasks should be challenging relative to children's current level of understanding (Jackson & Williams 1985). With routine tasks, children tend to engage in fairly low-level thinking and interactions (Cohen 1994). Indeed social loafing may increase (and motivation decrease) when tasks are too easy (Harkins & Petty 1982).

While the need for controversy, challenge, mutual value, and group basis can be taken for granted, there is disagreement over the significance of group rewards. Slavin has argued repeatedly (for example 1983, 1987) that achievement is enhanced when group members are rewarded as a group. He believes that group goals and collective outcomes provide incentives for children to help each other and to encourage each other to put forth maximum effort. However, Slavin's research has been criticised on methodological grounds (Bossert 1988; Cohen 1994). It is accepted that reward can help some students, but it is not effective for all. Moreover, as Cohen (1994) points out, 'offering rewards on a competitive basis, although effective in increasing motivation of team members to work together, may have

negative effects on inter-group relations, more specifically on the perceptions that team members have towards other teams'. It has been shown that 'the failure of one's team can have a negative effect on one's individual achievement in a way that is independent of prior achievement and individual outcome' (Chambers & Abrami 1991). Some researchers further believe that, whatever their short-term advantages, the use of rewards may have undermining effects on long-term motivation (Cameron & Pierce 1994). In a study of school children using computer tutorial packages, Fu-Yun (2001) examined the effects of competition between groups and found that co-operation without inter-group competition led to better attitudes to the subject matter and more positive inter-personal relationships than did co-operation with competition. The exchange of ideas and information within and among learning groups was also more effective and efficient when there was no competition. The author therefore concludes that it is preferable not to introduce competition into computer-based collaborative tasks. Slavin (1996) has attempted to address such points. He acknowledges that there are a few cases in which achievement gains (in comparison to control groups) have been found for small group learning interventions that lack group rewards, and suggests that there may be conditions under which such rewards are unnecessary. The tasks he specifies as not requiring rewards are controversial tasks without single answers, voluntary study groups and structured dyadic tasks.

The implication is perhaps that reward should not be seen as a factor additional to controversy, challenge, mutual value, and group basis, but rather as a factor that may be required when the latter have not been achieved. In fact, recent research suggests that insofar as controversy, challenge, mutual value, and group basis need supplementing, it will be via factors that are far more specific than issues like reward. For instance, in each of the four studies with 9- to 12-year olds reported in Howe and Tolmie (2003), Howe *et al.* (1995b, 2000) and Tolmie *et al.* (1993), comparisons were made between four versions of a science group task. All versions used the basic *predict jointly – observe – interpret jointly* format outlined already, and by virtue of this (coupled with the considerable intellectual demand of the material) were challenging, amenable to several approaches, and inherently group-based. However, the versions varied in whether or not problem sequences were ordered by difficulty (i.e. easy first/hard later), whether or not group members were required to reach consensus, and whether and how consensual positions were to be recorded (i.e. multiple-choice versus open-ended). These differences had a significant impact upon both patterns of interaction and learning gain, confirming the relevance of controversy etc., but suggesting that the way in which such factors operate is highly subtle.

Research into the nuances of task design is in its infancy at present, and as it develops it will undoubtedly help to clarify why classroom dialogue remains unproductive and how this can be addressed. However, few scholars believe that the answer lies purely with the specifics of task. Over twenty years ago, Wells (1986) drew attention to difficulties with the overall *climate* of British primary schools, arguing that the *normative environment* for talk in most classrooms is not compatible with children's active and extended engagement in using language to construct knowledge. This characterisation of the classroom environment for talk is also one that emerges from more recent work by Alexander (2006). According to Alexander, classroom discourse is 'overwhelmingly monologic' in form, as teachers typically offer children opportunities for making only brief responses to their questions:

[...] if we are not careful, classrooms may be places where teachers rather than children do most of the talking; where supposedly open questions are really closed; where instead of thinking through a problem children devote their energies to trying to spot the correct answer, where supposed equality of discussion is subverted by [...] the 'unequal communicative rights' of a kind of talk which remains stubbornly unlike the kind of talk that takes place

anywhere else. Clearly if classroom talk is to make a meaningful contribution to children's learning and understanding it must move beyond the acting out of such cognitively restricting rituals.

Alexander 2006: p.9.

It is interesting that Wells was writing at a time when British primary education was still heavily influenced by Plowden philosophy (meaning The Plowden Report 1967), while Alexander was addressing a context that is more curriculum- and assessment-led. It appears that the forces that oppose exploratory talk transcend policy changes.

However, the monologic climate of most classrooms does not fully explain why, when left to work together, children only rarely use talk of an 'exploratory' kind. As demonstrated some years ago now (Edwards & Mercer 1987), the norms or ground rules for generating particular functional ways of using language in primary school – spoken or written – are rarely made explicit. It is often simply assumed that children will pick these sorts of things up as they go along. But while picking up the ground rules and 'fitting in' in a superficial way with the norms of classroom life may be relatively easy, this may mask children's lack of understanding about what they are expected to do in educational activities and why they should do this. What is expected in terms of behaviour may be accepted without really being understood. The distinction between structures for classroom management (for example lining up in pairs or sitting rather than kneeling on chairs) and structures that develop learning (for example listening to a partner or asking a question) may not be apparent to children. Indeed, even when the aim of talk is made explicit – 'Talk together to decide'; 'Discuss this in your groups' – teachers rarely make explicit what kind of interactions they expect to take place, or discuss with their pupils ways of using talk to engage productively in joint activities. There may be no real understanding, on the part of at least some children, of how to talk together or for what purpose. Many children may not appreciate the significance and educational importance of their talk with one another. Moreover, in the 'monologic' environments described by Alexander (2006), they may frequently assume that the implicit ground rules in play in the classroom are such that teachers want 'right answers', rather than discussion.

## 6. THE SIGNIFICANCE OF CHILDREN'S SOCIAL HISTORIES FOR LEARNING IN CLASS

In general then, an anti-dialogic atmosphere pervades many British classrooms. This results in inappropriate task structures and confusing messages, and means that young children's formidable communicative competence is seldom on display. Change here is not going to happen overnight, but suppose change is wanted. Would it be merely a question of creating the requisite amount of classroom 'space', and providing appropriate tasks? Our socio-cultural perspective leads us to think not. As emphasised by Pollard and Filer (1996), children come to social encounters with histories, and there is evidence to suggest that these histories will influence how they respond. For instance, a series of studies have compared the manner in which children interact when working with *friends* with how they interact when working with other classmates. Examples include Azmitia and Montgomery's (1993) work with 11 year olds solving a science reasoning task, Hartup *et al.*'s (1993) research with 9 to 10 year olds using a board game, and Miell and MacDonald's (2000) study of 11 to 12 year olds engaged in musical composition. Typically, children were asked to nominate their friends, and using these nominations, dyads were formed comprising friends (meaning mutually nominated individuals) or non-friends (that is, children who did not nominate each other).

The studies are mainly couched in frameworks that emphasise *operational transacts* (for example Berkowitz and Gibbs 1983, as summarised earlier), rather than exploratory talk. Nevertheless, the message is clear: friends are more likely than non-friends to engage in interaction where knowledge is shared, ideas are challenged, evidence is evaluated, and options are reasoned about. As a result, friends are more likely than non-friends to succeed with the task.

Although the message from the above research is consistent, there are a number of ambiguities surrounding its interpretation. First, research has revealed significant (albeit imperfect) positive correlations between the number of times that children are nominated as friends and: a) their centrality in broader classroom networks, as perceived by their peers; b) their popularity with their classmates, as revealed by the number of classmates nominating/rating them as liked, and not nominating/rating them as disliked (see, for example, Gest, Graham-Bermann & Hartup 2001; Lease, Kennedy & Axelrod 2002). Since the logistics of pairing mean that children who are frequently nominated as friends are more likely to be assigned to the friend dyads than the non-friend dyads in the above research, the results are as likely to be effects of centrality or popularity as friendship. The distinction is important, because centrality and popularity are matters of status, while friendship is a form of relationship. Certainly the dialogic features we are focusing upon have been found to be associated with popularity as well as friendship (see for example Cowie, Smith, Boulton & Laver 1994; Markell & Asher 1984; Murphy & Faulkner 2000, 2006). Second, the meaning of the link between friendship/centrality/popularity and social interaction is unclear. One possibility is that working with friends (and/or being central/popular) promotes exploratory talk. Another is that the ability to engage in exploratory talk promotes friendship (and/or centrality/popularity), and as a result the children who had relatively large numbers of friends (and/or were central/popular) and were therefore relatively likely to be assigned to friendship dyads in the above studies, were already predisposed towards exploratory talk. Popularity has been shown to *predict* use of the relevant dialogue features (Hay, Payne & Chadwick 2004), as opposed to being merely associated with this, and a predictive relation has yet to be demonstrated for friendship. However, longitudinal studies that allow effects to be teased out with any of these factors are currently few and far between.

Research also suggests that factors such as gender and temperament affect how children respond to activities designed to encourage exploratory talk and productive interaction at primary school level. As reported in Howe and McWilliam (2006), children from the first and third years of primary school were videotaped, while they engaged in groups of three in free play and three structured activities. The latter were designed to promote the expression and resolution of differences in problem-solving contexts, for example how to activate a robot, how to sequence a series of pictures so that they tell a story. The activities may therefore be relevant to the kind of tasks flagged in the previous section, and on one level, they were successful. In particular, there was no doubt that the focus upon difference promoted features that are associated with exploratory talk: for instance, justifications were used with about 25 per cent of oppositional responses, and only 5 per cent of non-oppositional. However, the focus also promoted physical aggression, with about 12 per cent of oppositional responses being accompanied with hitting, pushing, pinching etc. as in Transcript 4 (below), and only 1 per cent of non-oppositional. Verbal aggression also occurred, for example name calling, abusive remarks, but not to an analysable extent. Importantly, the children who responded productively were not the children who responded aggressively, i.e. the tasks elicited both kinds of responses, but not by the same children. Gender helped to differentiate: consistent with a vast literature (reviewed in Archer & Lloyd

1985; Maccoby & Jacklin 1980), boys were more aggressive than girls. However, the most important factor was temperament, defined by Rothbart, Ahadi & Hershey (1994) as 'constitutionally based individual differences in reactivity and self regulation'. Self-regulation (and particularly *inhibitory control* as assessed via Rothbart *et al.*'s *Child Behavior Questionnaire*) proved crucial: use of justifications was associated with high inhibitory control, and use of aggression was associated with low inhibitory control.

#### **Transcript 4: Opposition and aggression**

*(Leanne stabs Andrew in the back with a toy drill)*

Andrew: Ow. Ow.

Leanne: Did that hurt? *(laughs sadistically and stabs again)*

Andrew: Ouch, give me that. You're done. *(tries to grab drill)*

Leanne: No. *(pulls drill away)*

At present, there is little additional research on the association between temperament and productive forms of interaction, although a doctoral thesis by Schroeter (2006) provides evidence that complements the above. However, the temperamental basis of aggression is well established (for example Caspi *et al.* 1995; Eisenberg *et al.* 1997; Rothbart *et al.* 1994), as is the association between aggression and opposition during peer interaction (Arsenio & Lover, 1997; Calkins *et al.* 1999; Shantz 1986). Moreover, aggression displayed during peer interaction has serious long-term consequences. It is probably the single most important predictor of peer *rejection* (for reviews see Deater-Deckard 2001; Newcomb, Bukowski, & Pattee 1993). Rejection is usually operationalised as being disliked by many classmates and liked by few, and therefore is conceptually the opposite of popularity as discussed above. Defined in this way, rejection (especially when coupled with aggression) has proved to have negative implications for long-term adjustment. Apart from its known association with delinquency, criminality and mental illness (Bierman 2004; Deater-Deckard 2001), peer rejection has consistently emerged as a strong predictor of eventual school failure (Buhs & Ladd 2001; Coie *et al.* 1992; Gifford-Smith & Brownell 2002; Parker & Asher 1987).

An additional possible factor in children's social histories which might influence the quality of their discussion during collaborative activity in the classroom is a controversial one: the oral culture of their homes and communities. To be more precise, the issue is the extent to which their social experience outside school provides them with suitable guidance for using language as a tool for reasoning and learning in school. In the 1970s, the educational sociologist Bernstein (1971) argued that habitual patterns of spoken interaction differed between social classes in the UK, with more 'elaborated' forms (in which reasoning was made more explicit) being common only amongst the middle classes. He went on to argue that as those elaborated forms were a prerequisite for educational achievement, the educational opportunities for working class children were thus limited by their language experience. Bernstein was strongly criticised at the time for his views, and especially for his lack of strong observational evidence to support those claims. Some educational researchers have continued to argue, as did Bernstein's critics, that the problem is rather that schools expect children to employ middle class ways of using language, and that those privileged ways have no necessary association with learning and effective collaboration (for example Lambirth 2006). However, studies have identified relevant variation in the extent to which some forms of talk are used in the homes of children of different socio-economic background

in the UK (for example Tizard, Hughes, Carmichael & Pinkerton 1983: see also Section 4 above). Furthermore, in recent research in such different societies as the USA and China, the variability in children's early language experience has been shown to be systematically related to maternal education, and so linked to observable differences in the language performance of pre-school children of different social backgrounds (for example Hoff & Tian 2005). Moreover, in a large-scale longitudinal study in the US, Hart and Risley (1995) found that the amount and quality of the dialogue children experience at home in the pre-school years correlated strongly with their eventual academic attainment. Though direct links have not been shown, it thus may be that children's social background influences the likelihood that they will spontaneously engage in reasoned discussion resembling exploratory talk in primary school, and this may impact on the benefit they gain from collaborative learning activity in class.

Overall then, a complex relationship seems to be emerging between children's social histories and exploratory talk. On the one hand, these histories will affect how children respond to attempts to promote exploratory interaction, albeit through the influence of some currently poorly understood combination of *relational* factors like friendship, and what might be called *status* factors like popularity and centrality in networks. Social class may also be relevant. On the other hand, it looks from the relation between opposition, aggression and rejection as if social histories could themselves be affected by promoting exploratory talk. Without sufficient care, promotional attempts may draw out aggression in those children who are temperamentally inclined, and increase the prospects of such children being eventually rejected. Obviously, we must be cautious about overplaying the significance of classroom experiences as contributors to rejection. Experiences in the playground and out of school are also important, for the forms of aggression that are typically referred to as 'bullying' are, surely, predominantly out-of-class phenomena. Nevertheless, classroom experiences are relevant, and it would be paradoxical indeed if, by virtue of prioritising activities that promoted exploratory talk in some children, contexts that contributed to rejection and eventual school failure were created for others.

## 7. IMPLICATIONS FOR INTERVENTION

The complexities sketched in the preceding section imply that great care needs to be taken about the design of interventions for promoting exploratory talk. Social histories need to be taken into account, but in a manner that recognises their complex nature (relations and status), and their bi-directional association (cause and effect) with social interaction. For this reason, we believe that more may be needed than improving social relations amongst members of a class, as for instance Kutnick and colleagues have attempted (see Kutnick 2005 and elsewhere in *The Primary Review*). This is not to say that relational interventions cannot be effective. Apart from Kutnick's own positive results, the successful interventions of Howe *et al.* (in press) and Tolmie *et al.* (2007) that were outlined earlier, were embedded in a broader programme that involved relational training. Specifically, attempts were made to promote empathy and trust amongst classmates. Nevertheless, we suspect that to optimise impact, it may also be necessary to address social interaction directly, in a fashion that promotes exploratory talk yet is responsive to its wider historical context. We believe, in short, that something that takes account of Edwards and Mercer's (1987) notion of 'ground rules' is what is required.

A series of classroom-based research projects involving one of this report's authors (Mercer) and colleagues has in recent years adopted a ground rules perspective to seek to improve the quality of collaborative activity in the classroom. The main aim has been to increase children's use of exploratory talk and then evaluate the effects of doing so on the quality of their talk, reasoning and learning. Children aged between 6 and 13 years have been involved, but we will here concentrate on the research with the age group 8-11 years, which has been the most substantial (as described in Wegerif, Mercer & Dawes 1999; Mercer, Dawes, Wegerif & Sams 2004; Wegerif & Dawes 2004; Mercer & Littleton 2007). An intervention programme called *Thinking Together* was designed in which teacher-led whole class dialogue and group activity were integrated. Within the programme, teachers worked with children to develop a shared conception of how they could talk and think together effectively (as set out in Dawes, Mercer & Wegerif 2003; Dawes & Sams 2004). The complete programme included activities related to specific curriculum subjects. It was implemented and evaluated using a quasi-experimental method in which children in intervention schools (those who followed the programme) were matched with children of the same age in 'control' schools with similar catchments (who pursued their normal curriculum activities). In order to evaluate changes in the quality of talk in groups, children were video-recorded carrying out activities in both the target classes and in the control classes. Effects of the intervention, over time, on children's curriculum learning and individual reasoning were also assessed. This research has produced three main findings. First, children in intervention classes came to use much more exploratory talk than those in control classes. Secondly, groups who began to use more exploratory talk also became better at solving reasoning problems together. The third main finding was that the children in intervention classes made gains in their *individual* scores on tests of reasoning and of curriculum attainment (in mathematics and science) which were significantly greater than those made by the children in control classes.

To illustrate the changes in the children's talk, below are two sequences from the group activity of children (aged 10 and 11 years) in the same target group. In both they are completing a test item from the Raven's Progressive Matrices test of nonverbal reasoning (Raven, Court & Raven 1995: this was the test used in the study to assess changes in both collective and individual reasoning). Transcript 5 was recorded before they were involved in the intervention programme, while Transcript 6 was recorded after they had completed it.

**Transcript 5: Graham, Suzie and Tess doing Raven's test item D9 (before the Thinking Together lessons)**

- Tess: It's that
- Graham: It's that, 2
- Tess: 2 is there
- Graham: It's 2
- Tess: 2 is there Graham
- Graham: It's 2
- Tess: 2 is there
- Graham: What number do you want then?

Tess: It's that because there ain't two of them

Graham: It's number 2, look one, two

Tess: I can count, are we all in agree on it?

*(Suzie rings number 2 - an incorrect choice - on the answer sheet)*

Suzie: No

Graham: Oh, after she's circled it!

**Transcript 6: Graham, Suzie and Tess doing Raven's test item D9 (after the Thinking Together lessons)**

Suzie: D9 now, that's a bit complicated it's got to be

Graham: A line like that, a line like that and it ain't got a line with that

Tess: It's got to be that one

Graham: It's going to be that don't you think? Because look all the rest have got a line like that and like that, I think it's going to be that because ...

Tess: I think it's number 6

Suzie: No I think it's number 1

Graham: Wait no, we've got number 6, wait stop, do you agree that it's number 1? Because look that one there is blank, that one there has got them, that one there has to be number 1, because that is the one like that. Yes. Do you agree?

*(Tess nods in agreement)*

Suzie: D9 number 1

*(Suzie writes '1', which is the correct answer)*

In Transcript 5, the talk is not 'exploratory' but more aptly described as 'disputational' (as defined earlier), with cycles of assertion and counter assertion, forming sequences of short utterances which rarely include explicit reasoning. Tess does offer a reason - a good reason - for her view, but Graham ignores it. Suzie has taken the role of writer and she says little. At the end, having ringed the answer Graham wanted, she disagrees with it. It is not the right answer; but they all move on to the next problem anyway. In Transcript 6, the children's language clearly shows characteristics of exploratory talk. Graham responds to opposition from Tess by giving an elaborated explanation of why he thinks 'number 1' is the correct choice. This clear articulation of reasons leads the group to agree on the right answer. Such explanations involve a series of linked clauses and so lead to longer utterances. All three children are now more equally involved in the discussion. Compared with their earlier attempt, language is being used more effectively by the group as a tool for thinking together about the task they are engaged in. Significantly, there is no sign of aggression, despite the difference of opinions.

Overall the results of this research suggest that the intervention not only helped children learn more effective strategies for using language to think collectively (and so become better at collaborative working), but also the group experience of explicit, rational, collaborative problem-solving improved their *individual* reasoning capabilities. However, it not clear what children learned from their experience that made the difference. It may be that some picked up new, successful problem-solving strategies explained to them by their partners, while others may have benefited from having to justify and make explicit their own reasons. But a more radical and intriguing possibility is that children may have improved their reasoning skills by internalising or appropriating the ground rules of exploratory talk, so that they become able to carry on a kind of silent rational dialogue with themselves. That is, the *Thinking Together* lessons may have helped them become more able to generate the kind of rational thinking which depends on the explicit, dispassionate consideration of evidence and competing options. That interpretation is consistent with the claims of Vygotsky (1978, as discussed earlier) about the role of social activity in the development of children's thinking.

## 8. SUMMARY AND CONCLUSIONS

Research has shown that, under certain conditions, interaction with peers helps children's learning and development. This is consistent with both a Piagetian and Vygotskian perspective. The expression of different views, such as alternative explanations or possible solutions to problems amongst children working together, seems to be particularly useful in stimulating learning and development: and it does not seem necessarily to matter if those differences are always resolved (or resolved productively) through discussion. Children can also develop important communicative skills through interaction with their peers, which again they would not learn through only taking part in conversations with adults. But, paradoxically, observational studies have shown that collaborative talk in classrooms is often unproductive and inequitable. There is no reason to believe that even young primary school children are incapable of using exploratory talk (as they have been observed to do this in informal contexts), but they often seem not to use their skills during classroom activities. Some studies have suggested that the design of tasks can promote the use of exploratory talk, and hence more productive interaction; but changing task design does not seem to be sufficient in itself. Others suggest that the quality of collaboration can be improved if attention is given to developing an atmosphere of trust and mutual respect. There is evidence from intervention studies that this does lead to improved interaction and to improved learning, but the complexities of children's social histories suggest that it may not be sufficient. Other intervention studies support the view that the quality of interaction is significantly improved if children are helped to become more aware of how they use language as a tool for thinking together and taught some specific strategies for carrying on productive discussions. That research has recorded gains not only in children's use of exploratory talk and improved collaboration, but also in their individual skills in reasoning and academic attainment. Overall, it seems that children's social histories affect how they engage in collaborative learning activities, and those histories will embody their social learning both in and out of school. Although collaborative interactions and discussions are potentially very valuable for children's learning and development, that potential may only be realised if children are given structured guidance by their teachers on how to make the most of the opportunities that those activities offer.

In summary, then, our survey has the following main implications for primary education:

- The educational value of collaborative learning has been clearly demonstrated by research from more than one line of enquiry. In particular, encouraging children to pursue joint goals, explain their understanding, express different points of view and attempt to reach consensus through discussion have all been found to help learning and understanding. The evidence relates to a range of curriculum subjects, across the arts, science and mathematics. Research supports the view that joint activity amongst pupils should be an intrinsic, integrated aspect of classroom life.
- However, observations in primary classrooms suggest that children commonly interact unproductively. It seems that group- and pair-based activity is rarely organised in ways that will best achieve productive interaction. For collaborative activity to be useful (and to be recognised as such by pupils), teachers need to do more than provide opportunities for children to work and talk together. They need to help children develop the necessary communicative skills for engaging intellectually with each other.
- For collaborative activity to be productive, children also need to be offered suitable activities. Some features of good task design have been identified. Generally speaking, tasks should be designed to encourage cooperation and group cohesion, rather than competitiveness.
- Factors such as gender, temperament and the social relations between members of class can affect the ways in which children engage in joint activity, as can situational factors like the existence of a competitive or cooperative environment.
- Social experience outside school may prepare children more or less well for the kinds of ways they are expected to talk and interact in joint educational activity. Some children may therefore need more guidance than others on how to engage productively in classroom dialogue.
- Research has helped identify some key qualities of successful collaboration and dialogue during problem-solving and similar activities. Research has also shown that children can be helped to interact more productively, and that this leads to more inclusive activity and to individual learning gains. This information could be used by teachers, to a greater extent than is presently common, to develop children's awareness of how they can use talk effectively as a tool for learning.

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## APPENDIX 1

### THE PRIMARY REVIEW PERSPECTIVES, THEMES AND SUB-THEMES

The Primary Review's enquiries are framed by three broad perspectives, the third of which, primary education, breaks down into ten themes and 23 sub-themes. Each of the latter then generates a number of questions. The full framework of review perspectives, themes and questions is at [www.primaryreview.org.uk](http://www.primaryreview.org.uk)

#### The Review Perspectives

- P1 Children and childhood
- P2 Culture, society and the global context
- P3 Primary education

#### The Review Themes and Sub-themes

- T1 Purposes and values**
  - T1a Values, beliefs and principles
  - T1b Aims
- T2 Learning and teaching**
  - T2a Children's development and learning
  - T2b Teaching
- T3 Curriculum and assessment**
  - T3a Curriculum
  - T3b Assessment
- T4 Quality and standards**
  - T4a Standards
  - T4b Quality assurance and inspection
- T5 Diversity and inclusion**
  - T5a Culture, gender, race, faith
  - T5b Special educational needs
- T6 Settings and professionals**
  - T6a Buildings and resources
  - T6b Teacher supply, training, deployment & development
  - T6c Other professionals
  - T6d School organisation, management & leadership
  - T6e School culture and ethos
- T7 Parenting, caring and educating**
  - T7a Parents and carers
  - T7b Home and school
- T8 Beyond the school**
  - T8a Children's lives beyond the school
  - T8b Schools and other agencies
- T9 Structures and phases**
  - T9a Within-school structures, stages, classes & groups
  - T9b System-level structures, phases & transitions
- T10 Funding and governance**
  - T10a Funding
  - T10b Governance

## APPENDIX 2

### THE EVIDENTIAL BASIS OF THE PRIMARY REVIEW

The Review has four evidential strands. These seek to balance opinion seeking with empirical data; non-interactive expressions of opinion with face-to-face discussion; official data with independent research; and material from England with that from other parts of the UK and from international sources. This enquiry, unlike some of its predecessors, looks outwards from primary schools to the wider society, and makes full though judicious use of international data and ideas from other countries.

#### Submissions

Following the convention in enquiries of this kind, submissions have been invited from all who wish to contribute. By June 2007, nearly 550 submissions had been received and more were arriving daily. The submissions range from brief single-issue expressions of opinion to substantial documents covering several or all of the themes and comprising both detailed evidence and recommendations for the future. A report on the submissions will be published in late 2007.

#### Soundings

This strand has two parts. The *Community Soundings* are a series of nine regionally based one to two day events, each comprising a sequence of meetings with representatives from schools and the communities they serve. The Community Soundings took place between January and March 2007, and entailed 87 witness sessions with groups of pupils, parents, governors, teachers, teaching assistants and heads, and with educational and community representatives from the areas in which the soundings took place. In all, there were over 700 witnesses. The *National Soundings* are a programme of more formal meetings with national organisations both inside and outside education. National Soundings A are for representatives of non-statutory national organisations, and they focus on educational policy. National Soundings B are for outstanding school practitioners; they focus on school and classroom practice. National Soundings C are variably-structured meetings with statutory and other bodies. National Soundings A and B will take place between January and March 2008. National Soundings C are outlined at 'other meetings' below.

#### Surveys

30 surveys of published research relating to the Review's ten themes have been commissioned from 70 academic consultants in universities in Britain and other countries. The surveys relate closely to the ten Review themes and the complete list appears in Appendix 3. Taken together, they will provide the most comprehensive review of research relating to primary education yet undertaken. They are being published in thematic groups from October 2007 onwards.

#### Searches

With the co-operation of DfES/DCSF, QCA, Ofsted, TDA and OECD, the Review is re-assessing a range of official data bearing on the primary phase. This will provide the necessary demographic, financial and statistical background to the Review and an important resource for its later consideration of policy options.

#### Other meetings (now designated National Soundings C)

In addition to the formal evidence-gathering procedures, the Review team meets members of various national bodies for the exchange of information and ideas: government and opposition representatives; officials at DfES/DCSF, QCA, Ofsted, TDA, GTC, NCSL and IRU; representatives of the teaching unions; and umbrella groups representing organisations involved in early years, primary education and teacher education. The first of three sessions with the House of Commons Education and Skills Committee took place in March 2007. Following the replacement of DfES by two separate departments, DCSF and DIUS, it is anticipated that there will be further meetings with this committee's successor.

## APPENDIX 3

### THE PRIMARY REVIEW INTERIM REPORTS

The interim reports, which will be released in stages from October 2007, include the 30 research surveys commissioned from external consultants together with reports on the Review's two main consultation exercises: the community soundings (87 witness sessions with teachers, heads, parents, children and a wide range of community representatives, held in different parts of the country during 2007) and the submissions received from large numbers of organisations and individuals in response to the invitation issued when the Review was launched in October 2006.

The list below starts with the community soundings and submissions reports, which have been written by the Review team. Then follow the 30 research surveys commissioned from the Review's consultants. They are arranged by Review theme, not by the order of their publication. Report titles may be subject to minor amendment.

Once published, each interim report, together with a briefing summarising its findings, may be downloaded from the Review website, [www.primaryreview.org.uk](http://www.primaryreview.org.uk).

#### REPORTS ON PUBLIC CONSULTATIONS

1. *Community Soundings: the Primary Review regional witness sessions* (Robin Alexander and Linda Hargreaves)
2. *Submissions received by the Primary Review*

#### PURPOSES AND VALUES

3. *Aims and values in primary education*. Research survey 1/1 (John White)
4. *The aims of primary education: England and other countries*. Research survey 1/2 (Maha Shuayb and Sharon O'Donnell)
5. *The changing national context of primary education*. Research survey 1/3 (Stephen Machin and Sandra McNally)
6. *The changing global context of primary education*. Research survey 1/4 (Hugh Lauder, John Lowe and Rita Chawla-Duggan)

#### LEARNING AND TEACHING

7. *Children's cognitive development and learning*. Research survey 2/1a (Usha Goswami and Peter Bryant)
8. *Children's social development, peer interaction and classroom*. Research survey 2/1b (Christine Howe and Neil Mercer)
9. *Teaching in primary schools*. Research survey 2/2 (Robin Alexander and Maurice Galton)
10. *Learning and teaching in primary schools: the curriculum dimension*. Research survey 2/3 (Bob McCormick and Bob Moon)
11. *Learning and teaching in primary schools: evidence from TLRP*. Research survey 2/4 (Mary James and Andrew Pollard)

#### CURRICULUM AND ASSESSMENT

12. *Curriculum and assessment policy: England and other countries*. Research survey 3/1 (Kathy Hall and Kamil Øzerk)
13. *The trajectory and impact of national curriculum and assessment reform*. Research survey 3/2 (Harry Torrance, Dominic Wyse, Elaine McCreery and Russell Jones)
14. *Curriculum alternatives for primary education*. Research survey 3/3 (James Conroy and Ian Menter)
15. *Assessment alternatives for primary education*. Research survey 3/4 (Wynne Harlen)

## QUALITY AND STANDARDS

16. *Quality and standards in primary education: national evidence*. Research survey 4/1 (Peter Tymms and Christine Merrell)
17. *Quality and standards in primary education: international evidence*. Research survey 4/2 (Chris Whetton, Graham Ruddock and Liz Twist)
18. *Monitoring, assuring and maintaining quality in primary education*. Research survey 4/1 (Peter Cunningham and Philip Raymont)

## DIVERSITY AND INCLUSION

19. *Children in primary education: demography, culture, diversity and inclusion*. Research survey 5/1 (Mel Ainscow, Alan Dyson and Jean Conteh)
20. *Learning needs and difficulties among children of primary school age: definition, identification, provision and issues*. Research survey 5/2 (Harry Daniels and Jill Porter)
21. *Children and their primary schools: pupils' voices*. Research survey 5/3 (Carol Robinson and Michael Fielding)

## SETTINGS AND PROFESSIONALS

22. *Primary education: the physical environment*. Research survey 6/1 (Karl Wall, Julie Dockrell and Nick Peacey)
23. *Primary education: the professional environment*. Research survey 6/2 (Ian Stronach, Andy Pickard and Elizabeth Jones)
24. *Teachers and other professionals: training, induction and development*. Research survey 6/3 (Olwen McNamara, Rosemary Webb and Mark Brundrett)
25. *Teachers and other professionals: workforce management and reform*. Research survey 6/4 (Hilary Burgess)

## PARENTING, CARING AND EDUCATING

26. *Parenting, caring and educating*. Research survey 7/1 (Yolande Muschamp, Felicity Wikeley, Tess Ridge and Maria Balarin)

## BEYOND THE SCHOOL

27. *Children's lives outside school and their educational impact*. Research survey 8/1 (Berry Mayall)
28. *Primary schools and other agencies*. Research survey 8/2 (Ian Barron, Rachel Holmes, Maggie MacLure and Katherine Runswick-Cole)

## STRUCTURES AND PHASES

29. *The structure and phasing of primary education: England and other countries*. Research survey 9/1 (Anna Eames and Caroline Sharp)
30. *Organising learning and teaching in primary schools: structure, grouping and transition*. Research survey 9/2 (Peter Blatchford, Judith Ireson, Susan Hallam, Peter Kutnick and Andrea Creech)

## FUNDING AND GOVERNANCE

31. *The financing of primary education*. Research survey 10/1 (Philip Noden and Anne West)
32. *The governance, administration and control of primary education*. Research survey 10/2 (Maria Balarin and Hugh Lauder).





... children, their world, their education

The Primary Review is a wide-ranging independent enquiry into the condition and future of primary education in England. It is supported by Esmée Fairbairn Foundation, based at the University of Cambridge and directed by Robin Alexander. The Review was launched in October 2006 and aims to publish its final report in autumn 2008.

#### **FURTHER INFORMATION**

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