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Collaboration, creativity and the co-construction of oral and written texts

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ABSTRACT

In this paper we explore how primary school children 'learn to collaborate' and 'collaborate to learn' on creative writing projects by using diverse cultural artefacts—including oracy, literacy and ICT. We begin by reviewing some key sociocultural concepts which serve as a theoretical framework for the research reported. Secondly, we describe the context in which the children talked and worked together to create their projects. This context is a 'learning community' developed as part of an innovative educational programme with the aim of promoting the social construction of knowledge among all participants. We then present microgenetic analyses of the quality of the interaction and dialogues taking place as peers worked together on their projects, and how these collaborative processes and uses of the mediational artefacts were taken up by the children. In order to exemplify these processes, our analyses centre on a selection of examples of dialogues, texts and multimedia products of stories created by groups of fourth grade (9–10 years old) children. Overall, the work reveals the dynamic functioning in educational settings of some central socio-cultural concepts. These include: co-construction; intertextuality and intercontextuality amongst oracy, literacy and uses of ICT; collaborative creativity; development of dialogical and text production strategies and appropriation of diverse cultural artefacts for knowledge construction.

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1. Introduction

In any area of research, ideas develop through collective as well as individual efforts. It is through joint engagement that ideas are argued over, contested, borrowed and shared as our understanding is advanced. Such understanding is a dialogical phenomenon, and its achievement a fundamentally social and collaborative process. To this extent, the work reported here, which focuses on peer collaboration, constitutes an illustration of this thesis.

The study of peer collaboration and collaborative learning has a relatively brief history, yet there have been notable changes in the nature of the research being undertaken in this field. In much of the early work, for example, the primary aim was to determine whether and when collaborative learning was more effective than learning alone and there is a substantial body of empirical evidence demonstrating that, whilst not an educational panacea, there can be positive effects of social interaction for learning and problem-solving. Subsequently, however, interest shifted away from considering just the outcomes and products of collaborative work, towards analysing the interactions themselves. This shift to a more process-oriented account

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of group-work has brought with it an interest in understanding the nature of productive talk and joint activity and our work addresses these issues.

This study is grounded within a sociocultural perspective. This perspective emphasises the role of diverse cultural artefacts as mediators of human activity in general, and interaction in particular. According to Cole (1996): ‘an artefact is an aspect of the material world that has been modified over the history of its incorporation into goal-directed human action. By virtue of the changes wrought in the process of their creation and use, artefacts are simultaneously *ideal* (conceptual) and *material*’ (p. 117). In this broad category Cole includes tools as well as signs and symbols. Among the cultural artefacts which mediate interaction in educational settings are oracy, literacy and technologies. In this paper we provide an account of how oracy and literacy mediate interactions as primary school children learn to collaborate on creative writing projects. Having first reviewed some central sociocultural concepts we focus on the macro level—describing the context in which the children interact to create these team projects. This context corresponds to a ‘learning community’ which has been created as part of an innovative educational programme within some state primary schools in Mexico City. This programme, called ‘Learning Together’, was designed to promote the social construction of knowledge among all participants of the community. The functioning of the programme is dramatically different from that of ordinary classrooms in most primary state schools in Mexico, which typically do not provide a rich social environment to enhance learning (Mercado, Rojas-Drummond, Weber, Mercer, & Huerta, 1998; Paul, 2005; Rojas-Drummond, 2000). We then move on to a micro-analytical level, by providing an account of the quality of the interaction and dialogues taking place as peers work together in their respective team projects. Similarly, we analyse how these collaborative processes and uses of diverse cultural artefacts are taken up by the children. In order to illustrate this micro-level analysis, we discuss examples of dialogues, texts and pictures created by groups of fourth grade children (9–10 years old). These are in turn related to the macro level, namely the specific institutional context in which the collaborations occurred.

2. Antecedents

2.1. *The sociocultural perspective*

The work on collaboration, creativity and the co-construction of oral and written texts reported here is underpinned by our commitment to a sociocultural approach to conceptualizing and studying processes of development, teaching-and-learning and education. Inherent in this approach is the notion that if we are to understand the nature of thinking, learning and development we need to take account of the intrinsically social and communicative nature of human life.

Sociocultural theory posits that intellectual development is achieved through dialogue and that education is enacted through the interactions between students and teachers reflecting the historical development, cultural values and social practices of the societies and communities in which educational institutions exist.

Education and cognitive development are therefore seen as cultural processes, whereby knowledge is not only possessed individually but also shared amongst members of communities—with people constructing knowledge and understandings jointly, through their involvement in events which are shaped by cultural and historical factors.

Seen from a sociocultural perspective, cognitive processes are inextricably interwoven and enmeshed with social and cultural practices, such that cognition and action are inseparable. Learning is thus characterized as a process of participation and engagement in shared activities involving the acquisition, and ultimately the transformation, of: ‘both the organizing conceptual theories and the patterns of discourse used by particular reasoning communities’ (Resnick, Pontecorvo, & Säljö, 1997, p. 4). Students thereby progress from ‘legitimate peripheral participation’ to gradually assuming a more central role as actors and competent participants in their communities of practice over time (Lave & Wenger, 1991). Within this perspective, knowledge and meanings are ‘co-constructed’ as joint interactional accomplishments. In this respect, meanings are negotiated through talk and other non-verbal cues indexing the creation of categories, which are embedded in the situated and dialogical nature of social action (e.g. Makitalo & Säljö, 2002; Roschelle, 1992; Säljö, 1999). Likewise, co-construction occurs when people engage in collective activities and practices mediated by a variety of artefacts, including diverse tools and signs (e.g. Cole, Engeström, & Vasquez, 1997; Rogoff, Turkkanis, & Bartlett, 2001; Wells, 1986, 1999; Wertsch, 1985, 1991). Within such cultural practices, language plays a key role as a mediator of activity, on both the social and psychological planes.

Vygotsky (1978) described language as both a cultural tool (for the development and sharing of knowledge amongst members of a community or society) and as a psychological tool (for structuring the processes and content of individual thought). He proposed that there is a close relationship between these two kinds of use, which can be summed up in the claim that ‘intermental’ (social, interactional) activity forges some of the most important ‘intramental’ (individual) cognitive capabilities, with children’s involvement in joint activities creating new understandings and ways of thinking. The creation of meaning is thus both an interpersonal and intrapersonal process, with ways of thinking being embedded in ways of using language (Wegerif & Mercer, 1997). From a sociocultural perspective: ‘talk and social interaction are not just the means by which people learn to think, but also how they engage in thinking ... discourse is cognition is discourse ... One is unimaginable without the other’ (Resnick et al., 1997, p. 2). It is through discursive interactions that knowledge is co-constructed and meanings are negotiated and re-negotiated, a process which involves the sharing and consideration of multiple perspectives, involving the inter-animation of voices (Wertsch, 1991) and the emergence of ‘heteroglossia’ (Bakhtin,

1981). Such interactions are gradually appropriated and re-constructed as internal speech—so called ‘voices of the mind’ (Wertsch, 1991), which contribute significantly to problem-solving, knowledge construction and self-regulation, among other central psychological functions.

A sociocultural approach therefore presupposes a view of knowledge which is ‘open and processual’ (Alexander, 2004, p. 26) and directs us to both look at the potentialities of interactions for learning (at the micro-level), and also to relate the interactional processes observed to the particular institutional and cultural contexts in which such collaborative interactions occur (at the macro-level). The implication is that educational success, and failure, may be explained partly by the quality of educational dialogues rather than being just the result of the intrinsic capability of individual students or the didactic presentational skills of individual teachers and/or the quality of the educational methods and materials been used (Mercer & Littleton, 2007; Rojas-Drummond, 2000).

2.2. Educational dialogues

Our work has been crucially shaped by the ideas of Vygotsky (1978) and Bakhtin (1981) and draws on, and contributes to, recent developments in ‘dialogic approaches’ to learning and teaching in classroom settings (Alexander, 2004, 2008; Skidmore, 2006; Lyle, 2008). Thus, as well as being inspired by sociocultural theory, our research has also been motivated by practical educational concerns. Basically, we have sought to explore two functional aspects of interaction in classrooms. The first is teachers’ use of spoken interaction with children as a means for promoting guided participation and ‘scaffolding’ the development of their knowledge and understanding by providing the intellectual support of a relative ‘expert’ for the efforts of ‘novices’ in engaging with any learning task (Rogoff, 1990, 2003). The second is the potential value of peer group interaction and dialogue as another means of promoting such development—but in this case by providing a more symmetrical environment for the co-construction of knowledge in which the inevitable power and status differentials between expert and novice are less likely to apply (Mercer, 2000). We will briefly describe the background to the latter field, given the focus of the present paper on peer collaborations.

2.3. The educational value of peer group discussion

As with evaluations of teacher-led discourse, researchers have differed in their assessments of the educational value of putting children into pairs and groups to work and talk together. On the one hand, experimental and observational studies have demonstrated the distinctive value of collaborative talk in problem solving and learning, including curriculum related activities (Littleton & Häkkinen, 1999; Littleton & Light, 1999; Rojas-Drummond, Hernández, Vélez, & Villagrán, 1998; Teasley, 1995). On the other hand, observers of collaborative activity in classrooms have reported that most of the talk observed was off-task, uncooperative and of little educational value (Bennett & Cass, 1989; Galton, Simon, & Croll, 1980). But this is not quite the paradox that it seems.

Closer consideration of relevant evidence suggests that some ways of talking in group activity are indeed of special educational value, but that such ways are relatively uncommon in classrooms. Our explanation for the relatively low educational value of much group talk in classroom contexts has been that children are not commonly taught about ways of talking effectively together, or helped to develop specific dialogic strategies for thinking collectively (Mercer & Littleton, 2007; Rojas-Drummond & Mercer, 2003; Wegerif, Rojas-Drummond, & Mercer, 1999). In contrast, the quality of children’s discussion when engaged effectively in collaborative activities in the classroom can be related to the idea of ‘Exploratory Talk’, a way of using language for reasoning which was first identified by Douglas Barnes (e.g. Barnes & Todd, 1995). According to Mercer (2000, p. 98), ‘Exploratory Talk is that in which partners engage critically but constructively with each other’s ideas. Relevant information is offered for joint consideration. Proposals may be challenged and counter-challenged, but if so reasons are given and alternatives are offered. Agreement is sought as a basis for joint progress. Knowledge is made publicly accountable and reasoning is visible in the talk’. There are good reasons for wanting children to use this kind of talk in group activities, because it represents a distinctive social mode of thinking or ‘interthinking’ (Mercer & Littleton, 2007). This constitutes a valuable kind of ‘co-reasoning’, with speakers following ground rules which help them share knowledge, evaluate evidence and consider options in a reasonable and equitable way.

Exploratory Talk represents a very effective way of using language to think collectively which is involved in some powerful genres, such as those used in science, mathematics, law, business and politics. Therefore, Exploratory Talk embodies qualities that are a vital part of many such educated discourses. It is thus reasonable to expect that education should help students to become aware of its value and become able to use it effectively. Indeed, there is a very solid line of research which has addressed this issue.

In this respect, work by Mercer and colleagues (e.g. Mercer, Wegerif, & Dawes, 1999; Wegerif, Mercer, & Dawes, 1999; Mercer & Littleton, 2007) has enhanced the use of Exploratory Talk by British primary school children. Their results show that this enhancement had a very positive effect on children’s group and individual problem solving, as well as in performance in academic areas such as Mathematics and Social and Natural Sciences (see also Rojas-Drummond & Mercer, 2003). Following these studies, research in Mexico by Rojas-Drummond and her colleagues (e.g. Rojas-Drummond, Gómez, & Vélez, 2008; Rojas-Drummond, Pérez, Vélez, Gómez, & Mendoza, 2003; Rojas-Drummond & Peón, 2004) has confirmed that Exploratory Talk is particularly effective in promoting group and individual reasoning, as well as argumentation abilities in primary school children.

The desire to create effective opportunities for collaborative learning sits at the heart of our work, and is indicative of an important shift in research. Increasingly, in addition to studying how certain modes of peer collaboration may promote learning ('collaborating to learn'), researchers and educators are also asking how collaboration is and can be learned in order to make peer interaction an opportunity for learning ('learning to collaborate') (e.g. Dawes & Sams, 2004; Elbers & Streefland, 2000; Grossen & Bachmann, 2000; Littleton, Miell, & Faulkner, 2004; Mercer & Littleton, 2007; Rojas-Drummond & Mercer, 2003; Rojas-Drummond et al., 1998). This interest in 'learning to collaborate' recognizes that learners not only have to acquire knowledge, they also have to regulate the processes of acquiring this knowledge. It is this need to understand both how learners 'learn to collaborate' and 'collaborate to learn' which drives the work reported here. There is a crucial need for work such as this, for the development of productive ways of talking is rarely given attention or priority in classrooms. As Alexander (2004) notes: 'Talk is arguably the true foundation of learning . . . We may tend to be less reflective about what is said in our classrooms than about what is written' (p. 5). Yet structuring conversations among a community of learners, rather than just imparting expertise or knowledge to students needs to sit at the very heart of the educational experience, not least because: 'when children learn language, they are not simply engaging in one type of learning among many; rather they are learning the foundations of learning itself' (Halliday, 1993, p. 93).

2.4. Creative collaborations

Until fairly recently, research on peer collaboration, such as that described above, had predominantly focused on understanding the nature of effective joint problem-solving as well as group work mainly in the domains of scientific, logical and mathematical reasoning, with less attention being paid to work in other domains. However, contemporary research is now shifting the focus of inquiry from these hitherto predominant fields to creative activities such as joint music making, music composition and creative writing (e.g. Kleine-Staarman, Aarnoutse, & Verhoeven, 2003; Miell & Littleton, 2004; Miell & Littleton, 2008; Vass, 2004, this volume). Such work draws attention to the processes by which learners think and work creatively in classroom (and other more informal educational contexts) and has strong resonances with conceptions of creative processes which stress the importance of questioning and challenging; making connections and seeing relationships; envisaging what might be; exploring ideas; keeping options open and reflecting critically on ideas, actions and outcomes (QCA, 2004). The results of this emerging body of work suggest that whilst very important at times, transparent and explicit reasoning may not be the sole discourse feature that distinguishes productive collaboration from less effective collaborative efforts in creative contexts (see also Rojas-Drummond, Mazón, Fernández, & Wegerif, 2006). The implication here is that accounts of productive peer interaction also need to encompass what constitutes productive talk in these contexts. Recognizing this, the empirical research reported in this paper was designed to address this issue, thereby making a contribution to the work redressing the unevenness in the academic literature on group work by encompassing insights from the study of *collaborative creativity*. A further aim was to contribute to the development of educational practice concerning the use of effective group work in school-based creative writing activities.

2.5. Functional literacy and writing

We define 'functional literacy' broadly to include the competent uses of written language to carry out diverse meaningful social and communicative activities in a variety of cultural contexts (see Goodman, Lillis, Maybin, & Mercer, 2003; Mercer, Fernández, Dawes, Wegerif, & Sams, 2003; Verhoeven, 1994). Although functional literacy involves reading and writing activities, in this section we will centre on the latter, since collaborative writing is the focus of this study.

There are various ways of conceptualizing the processes of writing in general. One of the most influential models to explain these processes is that of Flower & Hayes (1980). Based on verbal reports of writers, they conceived of writing as a problem that experts solve better than novices. According to these authors, this difference is due to the fact that the former plan, compose and revise reflexively, while the latter do so in a more rudimentary way. Another influential model of writing has been the one developed by Scardamalia & Bereiter (1986). They proposed that during writing, novices use a serial strategy, in which the last phrase is the basis for the next one, without a global interconnection of ideas. They engage in writing but without much reflection, using mainly a 'knowledge telling' strategy. On the other hand, expert writers move back and forth from engagement to reflection continuously, and establish new relationships between what they know about the world and about writing. In this sense they use mainly a more sophisticated 'knowledge transforming' strategy.

More recently, Sharples (1999) re-conceptualized the two models reviewed above. He proposed that writing is a process of 'creative design'. He states that design is a conscious and creative communication with and through materials to achieve a human effect. To clarify this idea, Sharples offers the following characteristics of writing as creative design:

- (a) design problems are open-ended and cannot be fully specified;
- (b) the design process is endless;
- (c) there is no infallibly correct process of design;
- (d) the process involves finding as well as solving problems;
- (e) design inevitably involves subjective value judgments;

- (f) design is a prescriptive activity; and
- (g) designers work in the context of a need for action.

This model conceives of writing as a creative process in which the three main activities – planning, composing and revising – take place in a cyclical and iterative fashion that can begin at any point and (theoretically) has no end. Writing lets the writer choose among many courses, and these choices form his or her strategy for designing a text creatively. So far, this brief account of the writing process is centred on the individual writer. But for any revision of writing to be complete we must take into account its sociocultural basis.

2.5.1. *Writing from a sociocultural perspective*

Writing is a sociocultural process given that its learning takes place in specific contexts and institutions designed by society. Furthermore, this learning involves the competent uses of sophisticated communicative strategies where the interaction between experts and novices is crucial. In addition, writing is not a solitary activity, even if it is undertaken by one person. The sociocultural perspective emphasises that writing is embedded in a complex social world, where already existent texts intermingle to create new ones. In other words, when creating a text, there are necessarily references or juxtapositions made by speakers and writers to other texts, including literary genres, TV programs, oral traditions, prior conversations, amongst many others (Bloome & Egan-Robertson, 1993; Kumpulainen, Vasama, & Kangassalo, 2004; Maybin, 2003; Kleine-Staarman et al., 2003). This phenomenon is called intertextuality. If intertextuality is evident when the text is created by a lone writer, it is even more prominent when this writing is collaborative, since a new dimension is added: the referencing to each writer's discourse. Collaborative writing makes even more evident its dialogic and intertextual nature, because 'each utterance is part of a larger whole in which all possible meanings of a word interact, possibly conflict, and affect future meaning' (Dale, 1994). Intertextuality is essential to collaborative writing given that participants are constantly blending their voices for a common purpose. At the same time, collaborative writing informs our understanding of intertextuality because it makes thinking about writing external and explicit. Closely related to intertextuality is the construct of intercontextuality which recognises that: 'part of the creation of any event involves the construction of relationships between the event and other events . . . merely proposing a relationship between one event and another does not of and in itself create a connection. A connection among events has to be ratified by others; the participants have to acknowledge and recognise the connection and the connection has to have some social consequence' (Bloome et al., 2004, p. 44).

An in-depth study of collaborative writing by Vass (2004; see also this volume) showed that discourse among peers varied in the level of collectivity and individualism displayed. These variations could partly be explained by the differences in their relationships, demonstrating the potential affordances of friendship and emotional factors for shared creativity. At the same time, drawing on Sharples' model, she reports the use of different strategies by the children in relation to the phases of writing they were engaged in. She identified phases of 'brain storming', where creativity was very evident, followed by phases of reflection, where uses of co-constructive talk, including exploratory talk, were more prevalent.

More recently, our conceptions of literacy have been greatly extended to incorporate the variety of uses of ICT that have permeated society as a whole and education in particular. In this context, authors now refer to the integration of the functional uses of this variety of psycholinguistic, technological and cultural artefacts as 'information literacy', 'multiliteracies' or 'multimodal literacy' (e.g. Wegerif & Dawes, 2004). The analysis of creativity in the context of multimodal collaborative writing is the object of this study.

Most of the research reviewed so far has been carried out in developed countries and there is much less information on the above processes in developing countries. Research in these areas is particularly necessary in the latter, given that functional and information illiteracy are very wide-spread among the student populations, including in Mexico, as demonstrated by several international and national studies (e.g. Organisation for Economic Co-operation and Development (OECD, 2001, 2004; Mazón, Rojas-Drummond, & Vélez, 2005; Rojas-Drummond et al., 1999). Thus, the programme to be described next was designed to contribute to understanding and tackling these problems for Mexican primary students.

3. The general context for the collaborative activities: the macro level

The collaborative projects children carried out in the research reported were embedded in an innovative educational programme, called '*Learning Together*', which has been implemented in a public primary school in Mexico City over the last 6 years. The purpose of the programme is to form learning communities within schools through the creation of close partnerships among primary students, teachers, administrators, parents as well as university researchers. All members are encouraged to contribute actively to the social construction of knowledge. These communities strive to promote functional social, cognitive, psycholinguistic, technological, academic and creative capabilities in primary students, particularly those which our research (among others) has demonstrated the children do not typically acquire as part of their participation in the regular school activities (see for example Mazón et al., 2005; Rojas-Drummond et al., 1999, 2003, 2008).

Throughout the 6 years of implementation of the programme, numerous quantitative and qualitative longitudinal research projects have been carried out, which have both theoretical and practical applications. In these projects, we have analysed, among other issues, how children appropriate the target abilities under study over time, as well as the success of the program in promoting them (e.g. Fernández, Wegerif, Mercer, & Rojas-Drummond, 2001; Rojas-Drummond & Mercer, 2003; Rojas-

Drummond, Mercer, & Dabrowski, 2001; Rojas-Drummond & Peón, 2004; Wegerif, Perez, Rojas-Drummond, Mercer, & Velez, 2005).

Amongst the mediators that play a central role in our learning community are different genres of oral and written language, as well as ICT for a variety of functional purposes. These mediators help to promote the development of functional and information literacy in students, as well as the co-construction of knowledge among all participants.

The programme is implemented in parallel with the rest of the school activities. However, the functioning of the former is dramatically different from that of ordinary classrooms in most public primary schools in Mexico. Our research (among other studies) has demonstrated that the latter in general do not provide a rich social learning environment, with mainly the text book as a source for carrying out exercises, and where the teacher tends to follow very traditional methods which involve mainly directive-transmissional styles of interaction and discourse (e.g. Mercado et al., 1998; Paul, 2005; Rojas-Drummond, 2000). In contrast, our programme seeks to create learning communities where all members participate actively in pursuing authentic and creative collective projects and solving a variety of problems. These involve competent uses of functional and information literacy and have meaningful applications in a wide variety of contexts inside as well as outside of school.

The programme '*Learning Together*' is carried out in a multipurpose room within the primary school, designed *ex-professo*. It is equipped with modular furniture that allows for a diversity of group activities, as well as a small library and computers connected to the Internet. '*Learning Together*' is implemented with fourth, fifth and sixth grade students (from 9 to 12 years old). Throughout the academic year, the respective participating teachers and students of each classroom come once a week to this setting for a 90-minute session. Each session is coordinated by the respective teacher with the support of several university researchers. Before, during and after implementation of the programme, teachers and researchers work in close collaboration to design, carry out, review and refine all the activities and materials included in the programme.

The sessions are organized in five modules. Each module is designed to develop diverse target general and specific abilities in the students. Among the target abilities strengthened by the first two modules are: (1) collaboration, effective ways of communication, including Exploratory Talk, and problem solving strategies, as well as (2) general psycholinguistic abilities, including strategies for comprehending and producing different text genres.

The promotion of effective ways to collaborate and communicate follows methods developed by Mercer and colleagues for enhancing the use of Exploratory Talk in the U.K. (e.g. Dawes, Mercer, & Wegerif, 2000; Mercer & Littleton, 2007), and adapted for Mexican children by Rojas-Drummond and colleagues in previous studies (e.g. Rojas-Drummond et al., 2003, 2008). Briefly, children are encouraged, guided by the adults, to 'discover' certain 'ground rules' (strategies) for using Exploratory Talk (see Section 2.3 of 'Antecedents'). Then, throughout the programme, children practice using and adapting these strategies to the solution of a wide variety of problems in different domains, with emphasis in the psycholinguistic domain. The promotion of adequate strategies for comprehending and producing texts of different genres follows methods developed by Rojas-Drummond and colleagues in previous studies (e.g. Mazón et al., 2005; Rojas-Drummond et al., 1998, 2006; see also Section 2.5 for relevant models used). Emphasis is placed in the use of organizational strategies for producing texts with local and global coherence, guided by the structure of specific text genres (see Van Dijk & Kintsch, 1983).

The above two initial modules are common to all three grades, and provide the students with general basic abilities necessary to advance in the programme. The remaining three modules involve promotion of more advanced and sophisticated abilities, which enable students to prepare specific creative team projects, adapted to their respective grade. These projects involve the dynamic integration of several functional and creative uses of oral and written language, as well as ICT. These last three modules involve: (3) comprehension and creative production of literary texts in fourth grade, including the joint generation of original multimedia stories; (4) comprehension and creative production of communicative and argumentative texts in fifth grade; and (5) comprehension and creative production of expository texts in sixth grade.

All the products of the team projects are presented at the end of the school year in a 'cultural fair', with the participation of the whole learning community as well as a much broader audience. This is done to render the projects meaningful and functional, given their genuine communicative purposes with the presence of real interlocutors.

Some of the teaching–learning strategies used by teachers and researchers to implement the programme are:

- (a) the creation of learning environments rich in social interaction and effective ways of communication, where the diverse activities carried out are mediated by a variety of cultural artefacts;
- (b) guided participation between experts and novices where adults scaffold children's learning activities; and
- (c) collaborative learning where peers engage in the generation of creative projects and co-constructing knowledge by using effective strategies for oral and written communication.

In order to illustrate how these collaborative activities unfold, we next describe a study carried out specifically with fourth grade children.

4. Description of the study: the micro level

4.1. Method

Fifty-six fourth grade children from two classrooms in a state primary school in Mexico City participated in the study. These children were part of a larger sample of students who took part in the programme '*Learning Together*'.

The programme was implemented in 28 weekly sessions lasting 90 minutes each in the setting described above. However, for this study we report data gathered only in the last module of the program, where children created their team projects corresponding to multimedia stories, as mentioned in the previous section. This module comprised 12 sessions of work.

During these sessions emphasis was placed on promoting children's enjoyment, comprehension and production of literary texts, including stories. Among the abilities strengthened were the recognition of different literary genres and the detection of story structures and styles. At the same time, the children worked together in teams to author their own stories. This creative writing process involved the children in searching together for story ideas, integrating these ideas into a plan and working to construct a coherent text. They also revised, polished and edited their stories in a cyclical fashion. Children were encouraged to include, as part of their texts, vivid descriptions, interesting dialogues, cohesive and creative narratives, as well as the use of humour, suspense and drama. Once the children's stories were written using a word processor, they collaborated to produce multimedia versions of their texts. For this purpose, they enriched their stories using pictures, animation, voice and music, with the help of Power Point, the Internet and shareware such as 'Goldwave'. The stories reflected the work of the team and represented a distinctive opportunity, through creative writing, for learning oracy, multimodal literacy and functional uses of technology in a holistic and meaningful context.

For the creation of these team projects, children were organized into mixed gender and mixed achievement level triads. At the same time, in each classroom, one triad was randomly selected and their working sessions videoed to enable a micro-genetic analysis of their interaction, discourse and successive (draft) texts and multimedia products as they created their story. Both triads were composed of one female and two male children.

From the 12 sessions comprising this module, five alternating sessions were video recorded. These corresponded to session number 1, 2, 4, 6 and 8. These five sessions were selected since they were representative of the consecutive activities carried out for creating the multimedia story as a whole. These activities revealed the cyclical and iterative processes involved in children's planning, writing and revising their stories, as well as those used for transforming their texts into multimodal productions through the use of ICT. Videos were transcribed verbatim together with a description of the context, following procedures developed by Edwards & Mercer (1987). Videos and transcripts were consecutively analysed qualitatively on the basis of the content and structure of the dialogical interactions, as well as the micro and macro contexts surrounding these exchanges. At the same time, our analyses were guided by previous relevant work, including our own (e.g. Mercer & Littleton, 2007; Rojas-Drummond & Mercer, 2003; Rojas-Drummond et al., 2001; Roschelle, 1992; Säljö, 1999; Vass, 2004; Wertsch, 1991). In addition, a series of central sociocultural constructs, reviewed in the Antecedents, were used to frame the analysis.

To exemplify our approach to the in-depth micro-analysis mentioned above, and recognizing the constraints of space, we focus on examples of the processes involved in the production of one fourth grade triad's story. Whilst not reported here, this micro-analytic work was also complemented by an analysis which uses the ethnography of communication (Hymes, 1972) to characterize the interactions of the selected triads throughout the entire process of the creation of their multimedia stories (see also the use of this method in Rojas-Drummond et al., 2006). Interested readers should note that the work of Fernandez-Cardenas (this volume) clearly demonstrates the value of adopting an ethnographic approach to the study of communication for our understanding of the processes of creative collaboration.

5. Results

In Section 1, four segments of dialogue have been selected to illustrate several collaborative processes. (A key criterion for this selection was that the children were working and talking together without the intervention of an adult.) After each segment, comments and interpretations are made concerning both the quality of the dialogues and how they instantiate central sociocultural concepts.

Section 2 presents the entire written text of the story 'Arriving at the Sun'. This was produced by the triad using a word processor in two later sessions. In the text, some segments are underlined and marked with numbers from 1 to 4, to indicate the (indirect) correspondence of these segments with the children's initial dialogues where these ideas were first generated (as presented in Section 1). Again, comments and interpretations of the text and their relation to the dialogues follow this presentation.

Lastly, in Section 3 we include an image taken from the multimedia story created by the triad. This is followed by analytic commentary concerning the interactions between the oral, written and multimedia productions created by the triad.

Section 1: Segments of dialogues of one triad during their discussions to create a story

General context

Three 9-year-old children (Arnold, Diego and Nancy) are sitting around a computer planning, discussing and writing several initial drafts of a story, over two 60-minute sessions. They later re-constructed, augmented and polished their text to create a complete written version of their story using a word processor. This story was eventually transformed into a multimedia product with voice, illustrations, animation and music, using several ICT tools (see Fig. 1). At the end of the school year, the triad presented their multimedia story as part of the cultural fair organized in their school.



Fig. 1. Children creating multimedia story.

Segment 1 (in session 1)

- 1 DIEGO: Let's see, we have agreed we will have these three characters, right?
- 2 ARNOLD: Yea. Eh, let's say that the child of the jungle has to save his friends, the elephant and the giraffe, when they're in trouble.
- 3 NANCY: (*starts writing these ideas on the computer using a word processor*).
- 4 ARNOLD: (*dictating to Nancy*) because the child of the jungle can save them . . .
- 5 DIEGO: No, let's say it's the child of the woods!
- 6 ARNOLD: No, because we have said there were an elephant and a giraffe, and they don't live in the woods . . .
- 7 DIEGO: Oh, you're right . . . (*nods in agreement*).
- 8 ARNOLD: Let's say it was a child who had been abandoned, abandoned in the jungle.
- 9 NANCY: (*Continues writing in the computer*). So, where did we agree that the story takes place?
- 10 DIEGO: In the woods. No, I mean, in the jungle. That's right, in the jungle.
- 11 NANCY: (*Nods in agreement and continues writing*). And shall we add what the characters want to achieve?
- 12 DIEGO: Let's say they want to arrive at, hum . . .
- 13 ARNOLD: Arrive at a . . .
- 14 NANCY: Arrive at a waterfall!
- 15 DIEGO: No, Let's say they want to arrive at the sun!
- 16 ARNOLD: No.
- 17 DIEGO: Yea, arrive at the sun . . .
- 18 NANCY: Yea!
- 19 ARNOLD: No, I know, they want to arrive at the lake that gives magical energy!
- 20 DIEGO: No, look. . . (*speaking at the same time*).
- 21 NANCY: Shhh, let's try to speak one at a time . . .
- 22 DIEGO: Let's try to agree . . . (*addressing Nancy*). Arrive at the lake that gives magical energy or arrive at the sun?
- 23 NANCY: Mmmhh . . .
- 24 ARNOLD: Oh, why don't we try and combine these ideas?
- 25 NANCY: Yea!
- 26 All together: (*They all keep quiet while they seem to think for a few seconds*).
- 27 DIEGO: I know! Let's say they first want to pass along the lake that produces magical energy so they can reach the sun!
- 28 ARNOLD: Yea! In order to . . .
- 29 DIEGO: . . . to reach the sun. That's right; they have to manage to pass the energy lake to reach the sun.
- 30 ARNOLD: That's right.
- 31 DIEGO: Yea!
- 32 NANCY: OK. (*She writes down the information they have discussed so far*).

Comments. The dialogue reproduced above reflects the triad's collaborative orientation to their work. They offer and explore various ideas and negotiate their multiple perspectives and contributions to achieve the joint creation of their story. For example, in turns 1–7 we can see how Arnold and Diego propose two alternatives for the setting (i.e. jungle vs. woods), which creates some tension. This is resolved by Arnold offering an argument to support his position which makes Diego change his original perspective. These exchanges reflect the use of Exploratory Talk, which is emphasized as part of the 'Learning

Together programme. In turn 8, Arnold proposes that the child was abandoned in the jungle. This intervention reflects an interanimation of other voices originating from his knowledge of the world. In particular, his idea has a slight resonance with the 'Jungle Book' story, which he may have read and/or seen as a film (although their story is original and very different to the latter, as will be shown in the next section). Other examples of the interanimation of voices, this time originating from our larger learning community, are illustrated in turns 9, 11, 21 and 22. These examples also reflect several implicit intertextual references to the discourses which had taken place in the setting where our *'Learning Together'* programme took place. These discourses seem to have been appropriated by the children and used to regulate and coordinate their interactions to achieve their goals. In particular, in turns 9, 21 and 22, Nancy and Diego evoke some of the 'ground rules' for effective communication, (namely trying to reach consensus and taking turns), which were emphasized throughout the programme. Furthermore, in turn 11 Nancy invokes understanding acquired within our learning community; this time in relation to the need to include, as part of the plot of a story, one or more goals set by the characters (promoted as part of the organizational strategies for this genre).

All the examples given above reflect dynamic interactions between the specific setting in which the children are collaborating, which represents the micro-analytical level, and the larger setting in which these interactions take place, corresponding to our larger learning community at a more macro-analytical level. Thus, the relations between these micro and macro levels need to be taken into consideration for a fuller account of the dialogical interactions observed.

A further interesting example of the collaborative orientation of the triad can be seen in turns 12–32. In particular, in turns 14, 15 and 19 each child proposes a different goal for the characters, putting forward three different perspectives through a 'brain-storming' process reflecting different creative proposals. These different perspectives create a tension which is eventually resolved by the children exhibiting a disposition to negotiate instead of each child trying to impose his or her own point of view (for in turn 24 Arnold suggests they can combine the ideas). This suggestion is followed by a very creative solution proposed by Diego in turn 27, where he synthesises two perspectives when he proposes the following: 'I know! Let's say they first want to pass along the lake that produces magical energy so they can reach the sun!'. This creative solution is accepted by the triad and allows them to eventually break the tension and reach a consensus. This whole episode represents an example of collaborative creativity. In particular, the participants make constant connections between their own ideas and those of the others.

Segment 2 (later on in session 1)

33 NANCY: Shall we add another character?

34 ARNOLD: How about a gorilla?

35 DIEGO: Yea, a gorilla who does not allow them to go through the energy lake!

36 ARNOLD: Look (to Nancy), they want to cross the lake but a bad gorilla does not allow them to cross.

37 NANCY O.K. (*Writes while reading aloud*): 'A gorilla who does not allow them to cross ...'

38 ARNOLD: A grumpy gorilla.

39 DIEGO: No, ... O.K., yes! A very grumpy and bad gorilla.

40 NANCY (*Keeps writing and reading aloud*): 'They want to pass the lake but ...'

41 DIEGO: (*Dictating to Nancy*) ... but they can't because there's a very bad and grumpy gorilla that doesn't let them cross.

Comments. This segment also illustrates the children's orientation to explore and contribute their various ideas in a collaborative and creative fashion, in this case to make the plot of the story more intricate. This is done by adding a new character (a gorilla) who poses a problem for the main characters which potentially complicates the achievement of their goal. However, in contrast with the first segment, the children's interactional style might at first glance be characterized as more cumulative (Mercer, 2005). For example, in turns 33–41 children accept each other's ideas without challenges. However, a closer analysis of the sequencing of ideas reveals that, instead of a simple accumulation and acceptance of each other's suggestions, the children, through each turn, are also actively proposing a chaining of new ideas which enrich the ones offered previously (i.e. an undefined character becomes a gorilla, who in turn becomes grumpy, and then also bad, etc.). In addition, the analysis of the video reveals the enthusiasm and engagement of the children as they offer their respective contributions to developing further the plot of the story. In this way, the apparent accumulation of ideas turns out to be fruitful, thereby playing a pivotal role in their collaborative writing. Also, the data points to the need to include emotional aspects of collaboration for a more comprehensive account of the processes involved (Vass, 2004; see also Vass et al., this volume).

Segment 3 (in session 2)

Context. (The children are reading parts of their text and go back to the beginning of the story where they had first introduced the jungle boy and re-write that part, deciding to introduce the boy later on in the plot.)

42 ARNOLD: Let's add: 'And suddenly they heard some crying' ...

43 NANCY: ... and the elephant and the giraffe went to see ...

44 ARNOLD: ... and they found, Oh, a baby!

45 NANCY: ... and they said: 'What a lovely baby!'

46 ARNOLD: And they decided to take care of him for many, many months

- 47 NANCY . . . until he turned . . .
 48 DIEGO: Mmmm . . .; eight years old.
 49 NANCY: No, nine.
 50 DIEGO: No, let's say until he turned eight.
 51 NANCY O.K. (*writes down part of the information*) 'until he turned . . . How old?'
 52 DIEGO: Eight years old.
 53 NANCY: Fine. (*writes down the information*).

Comments. This segment also illustrates another episode of the fruitful chaining of ideas which enrich further the plot of the story, through collective 'brain storming'. This process provides further evidence of creative collaboration. In turns 46–53 there is also an instance of two perspectives being put forward by Diego and Nancy. However, in contrast with Segment 1, in this case the tension is not resolved through Exploratory Talk but by Nancy eventually accepting Diego's original proposal. This gesture also reflects the children's disposition to collaborate in order to move forward towards achieving their goal. In addition, the sequencing of the turns also reveals intertextual references children make to other parts of the text (i.e. within Segment 4 and between this and Segment 1). These intertextual juxtapositions contribute importantly to ensure not only local but also global coherence for the story as a whole.

Segment 4 (later on in session 2)

- 54 DIEGO: And then all the friends decided to go to the sun.
 55 NANCY: And the child asked: 'How can we reach the sun?'
 56 DIEGO: Then the child stared at the sun for a long time.
 57 NANCY (*Writes the information down*).
 58 DIEGO: And the child asked himself in his mind: 'How can we reach the sun?'
 59 NANCY (*Writes the information down*). What else did he ask himself?
 60 DIEGO: In his mind he asked himself: 'I wonder what the sun might be like?'
 61 NANCY And then they started to make plans on how to get to the sun!

Comments. This segment provides further evidence of the coordination of ideas for creative collaboration. In addition, it suggests that there is intersubjectivity amongst the participants so that they can use each other's contributions as mutual scaffolds to create 'Intermental Development Zones' (Mercer, 2000; Fernández et al., 2001). This enables them to co-construct meanings, enrich each other's contributions and advance further in the development of the plot of the story.

These micro-analyses of some selected videos and transcribed segments of dialogues represent just a few exemplars of the children's interactive processes. However, results of a more comprehensive analysis of all the videos and transcripts obtained throughout the study, using the ethnography of communication, revealed both some heterogeneity as well as homogeneity in the type of the communicative acts exhibited by all the cohort of children during their discussions. Among the common acts present in all the data were: joint planning; taking turns; asking for and providing opinions; sharing, chaining and integrating of ideas; arguing their points of view; negotiating and coordinating perspectives; adding, revising, reformulating and elaborating on the information under discussion and seeking of agreements. These data, taken together, suggest that the children engaged in diverse processes of 'co-construction' of meaning and knowledge to achieve their goals, as studied by authors such as Goodwin (1995), Roschelle (1992) and Säljö (1999). This concept corresponds to an inclusive characterisation of the efforts made by individuals when collaborating and coordinating their activities and dialogues in a variety of educational and social contexts (see also Rojas-Drummond et al., 2006).

The final version of the story written using a word processor (before it was turned into a multimedia version) is presented in the next section.

Section 2: Written version of the story created by the triad

In Fig. 2 we present the written version of the story created by the triad using a word processor, before it was turned into a multimedia version. The numbers on the right-hand column correspond to the segments of the dialogues where the ideas were originally discussed. (These ideas, presented in Section 1, are underlined in the text.)

The four segments of dialogues presented in Section 1 reflect how the children collaborated to co-construct some of the central ideas which gave rise to the development of the plot of their story. These central ideas can be summarized as follows:

- (1) The elephant and the giraffe decided that in order to arrive at the paradise of the sun they would first have to go through the energy lake.
- (2) In the lake there was a bad and grumpy gorilla that did not allow them to cross the lake.
- (3) The elephant and the giraffe found a lovely baby abandoned in the jungle and decided to take care of him until he was 8 years old.
- (4) The child wondered what the sun would be like and wanted to reach it, so all the friends made plans on how to arrive at the sun.

'Arriving at the sun'	Segment number:
<p>One very warm and lovely morning, while the sun was shining bright, <u>there were a giraffe and an elephant chatting in the middle of the jungle.</u></p>	1
<p>The giraffe was very tall and thin, so thin that her legs were like a straw. In contrast, the elephant was so fat, so fat, that he looked as if he had eaten the whole world in one gulp.</p> <p><u>Suddenly, they heard some crying sounds coming from somewhere in the jungle, and they went to search where the sounds came from.</u></p> <p><u>– What a lovely baby, the elephant said!</u></p> <p><u>And then the giraffe added: what shall we do with him?</u></p> <p>– How about eating him, said the elephant?</p> <p>– No, that's a very bad idea, answered the giraffe, he is very beautiful.</p> <p><u>O.K., let's keep him, said the elephant. And so they decided to keep him.</u> The baby was quite thin but had big cheeks, with a round nose and dark hair. He was so small that they could just barely see one of his teeth. <u>And they took very good care of him for a long, long time, until he turned eight years old.</u></p>	3
<p><u>And one day the child stared at the sun for a long, long time, and he asked himself in his mind: I wonder what the sun might be like? Then he said to the elephant: - Hey, pal; could you take me to the sun?</u></p>	4
<p><u>And the elephant answered: - I'm afraid we can't go. In order to get to the paradise of the sun we would first have to go pass the lake that produces magical energy.</u></p>	1
<p><u>which is protected by a bad gorilla that would not allow us to cross. It is a very big and grumpy gorilla ...</u> But maybe we can distract him and give him a tranquillizer to put him to sleep! Though it might not last very long ...</p> <p>– I think this is a great idea. But, how are we going to put it in him? – , Said the giraffe ... I know! Why don't we use your trunk to through the tranquilliser from a distance? –</p> <p>– What a good idea! – , said the elephant.</p> <p>– Well, let's get going since we have to arrive before sunrise to put the tranquilliser in the gorilla. – Said the giraffe.</p>	2
<p>So before sunset they set their way. When they arrived in the lake, the giraffe put the tranquilliser in the elephant's trunk and he shot it as if he had sneezed very hard. The tranquilliser flew up in the air like darts and reached right in the gorilla's belly and arm. The gorilla fell down like a tree trunk and the animals could even walk on top of him to pass across the lake. <u>And they eventually made it all the way to the sun, so they could admire the beautiful landscape of this marvellous heavenly body.</u></p>	4

Fig. 2. Final version of written text 'Arriving at the Sun'. (The underlined sentences correspond to the segments of the oral dialogues where these ideas were originally discussed, as marked by the respective number.)

These ideas were gradually revised, reconstructed, polished and embellished in subsequent sessions until children eventually produced jointly the written text of the story presented above.

When we relate the above four sets of ideas (numbered on the right-hand column of Fig. 2) to the corresponding written versions (underlined in the text), we can observe that the interactions between the oral discussions and the written productions are not linear. Instead, they are distributed throughout different parts of the written text and interwoven with other segments of text (which are not underlined). This distribution and linking of ideas is not random but quite strategic, given that it provides the text with local and global coherence, as well conforming to the typical structure and genre of a written story (see Van Dijk & Kintsch, 1983). In addition, the correspondences marked in Fig. 2 reflect complex and dynamic intertextual relations between the oral dialogues and the written text (Maybin, 2003). At the same time, they reveal that the ideas discussed are not simply 'transcribed' in a written format, but rather re-constructed, enriched and integrated with other parts of the text (e.g. contrast the correspondences between the dialogue in Segment 1 and the transformations, re-distributions and integrations of the ideas made in the written version, marked with number 1 in two very different parts of the text). Thus, the ideas that 'germinate' in the oral discussions 'ripen' in the written production. These enrichments suggest that the children were using not only 'knowledge telling' but also more elaborated 'knowledge transformation' writing strategies to create their text (e.g. Scardamalia & Bereiter, 1987; Sharples, 1999). These achievements were partly promoted directly by teachers' support, but also partly a result of spontaneous revisions and contributions by the children, suggesting self-regulation of their learning processes. They are also indicative of appropriation of effective writing strategies promoted as part of the *Learning Together* programme.

Section 3. Visual illustration of the multimedia story

Fig. 3 presents one of the series of pictures created by the triad when they converted their text into a multimedia product (the pictures were animated).



Fig. 3. Image from multimedia story.

Comments

An analysis of this figure reveals that, in addition to the intertextual relations between the oral discussions and the written text illustrated above, there are also complex 'intercontextual' relations between these texts and the visual representations created in the multimedia version of the story. In particular, when we relate this picture to Segment 3 of the oral discussion and the written version of the text which is marked with this number, we can find juxtapositions between the ideas discussed about the elephant and the giraffe finding a baby lost in the jungle, the corresponding written narration and dialogues about how this finding took place and what the characters decided to do, and the picture where the baby appears hanging from a branch of a tree and the two characters are looking at the baby after discovering him.

All the examples presented in the previous sections illustrate the dynamic and complex intertextual and intercontextual interactions among oracy, literacy and the multimodal productions created by the children using ICT. These interactions also reveal the creative collaborations the children engaged in during the entire process of constructing their multimedia story.

The final text presented in Fig. 2 is composed of embellished descriptions, dialogues and a coherent narrative which includes reported speech. This text, as well as the multimedia production by the children using ICT are quite sophisticated for children of this age and socio-economic level. These achievements can be considered mainly a result of children's participation in the *Learning Together* programme since our research shows that children who did not participate in this programme produced much more primitive texts of different genres, including narrative ones (see Mazón et al., 2005; Rojas-Drummond & Peón, 2004; Ibarra & Guzmán, 2003).

6. General discussion

The overall analyses of the collaborative activities by the children over time presented in the previous sections reflect processes related to central sociocultural concepts. Among these are:

- (1) Co-construction (e.g. Goodwin, 1995; Rojas-Drummond et al., 2006; Roschelle, 1992; Säljö, 1999). This includes interactions and shared communicative acts such as those mentioned at the end of Section 1 of Results. Examples of these co-constructive processes, including the corresponding communicative acts, are illustrated in segments 1–4 of Section 1.
- (2) Intertextuality and intercontextuality, involving interanimation of other's voices as well as the children's. These processes include referencing, weaving, juxtaposing, re-formulating and re-constructing different oral and written texts and contexts, including ICT uses to produce a coherent multimedia story (e.g. Maybin, 2003; Kumpulainen et al., 2004; Kleine-Staarman et al., 2003; Wertsch, 1991). Examples of interanimation of voices can be found in comments of Segment 1 of Section 1. See also examples of intertextuality and intercontextuality between the oral, the written and the multimedia versions of the story, in comments at the end of Sections 1, 2 and 3.
- (3) Several processes of collaborative creativity, where children's interactions and discourses reflect processes of brainstorming and intersubjectivity. In these ways, their actions, dialogues and written texts are coordinated and support each others' to gradually produce jointly an original, coherent and creative multimedia story in agreement with the criteria proposed by QCA (2004) (see also Miell & Littleton, 2004). Several examples of these creative processes and products can be found in Segments 1 and 2 of Section 1, as well as throughout the written text shown in Fig. 2 and the multimedia product depicted in Fig. 3.
- (4) Use of not only primitive text production strategies of 'knowledge telling', but also of more sophisticated ones reflecting processes of 'knowledge transformation' (Scardamalia & Bereiter, 1987; Sharples, 1999; Vass, 2004). See for example evidence of the use of 'knowledge transformation' strategies in the correspondences between the oral discussion in Segment 1 and the transformation of these ideas in the two written parts of the text marked with number 1.

- (5) The constant interrelations between the micro and the macro-analytical levels. The consideration of these interrelations are essential in order to provide a full account of the processes by which children learn to collaborate given that these processes are framed by the social and institutional settings in which the children participate (Lave & Wenger, 1991; Rogoff, 1990, 2003). Some evidence of these interrelations is provided in the comments of the oral discussions of Segment 1 in Section 1.
- (6) The dynamic use, coordination and gradual appropriation of various mediational means in the form of cultural artefacts for knowledge construction by the children, including oral and written language, as well as several ICT tools (e.g. Cole, 1996; Cole et al., 1997; Mercer, 2000; Mercer et al., 2003; Vygotsky, 1978; Wertsch, 1991). Evidence of these appropriations derives partly from results of a previous study. In it, Ibarra & Guzmán (2003) found that an equivalent group of fourth grade children of the same school exhibited significant difficulties for engaging in productive discussions to solve problems. Similarly, the written stories they produced were very short, lacking in dialogues and descriptions and with narratives with very poor local and global coherence. At the same time, the children showed very limited capacity for handling ICT tools in general and no capacity for creating multimedia productions. In contrast, in the results presented here we see evidence of quite dramatic differences in these abilities. For example, in Segments 1–4 of the selected triad's discussions we see examples of Exploratory Talk and other co-constructive dialogical interactions. Also, their written text is quite sophisticated and creative, exhibiting both local and global coherence as well as a complex narrative with rich vocabulary, including vivid descriptions and interesting dialogues combined with reported speech. Lastly, the multimedia stories produced by the children showed evidence of their incipient appropriation of cultural tools such as technologies for functional and creative uses. All these processes and abilities were promoted as part of their participation in the programme 'Learning Together' during the academic year. In addition, several other studies carried out throughout the 6 years of implementation of this programme have demonstrated that children participating in it, in contrast with peers matched on a wide range of characteristics, develop significantly better social, cognitive, psycholinguistic and technological abilities (see for example Rojas-Drummond & Mercer, 2003; Rojas-Drummond & Peón, 2004; Rojas-Drummond et al., 1998, 1999, 2001, 2003, 2008; Wegerif et al., 2005).

7. Conclusions

By invoking the notion of learning as fundamentally interpersonal and sociocultural, in this paper we emphasize the need to understand processes of dialogical interaction, collaboration and joint knowledge construction, through in-depth analyses of discourse which focus on the continual, subtle, evolutionary process of negotiation and re-negotiation of meanings. At the same time, the study emphasises the need to establish relationships between this micro-analytical level, centred on the quality of the interaction and discourse among children, to more macro-analytical levels, corresponding to the institutional and social contexts in which these interactions are situated.

The work reported here suggests that the notion of Exploratory Talk can take us some way to understanding and conceptualizing the quality of peer collaboration, but is insufficient for characterizing productive peer collaboration in all circumstances. The emphasis on describing and characterizing the quality of interaction and collaboration in terms of explicit, publicly visible and accountable reasoning is thus put into perspective here. The suggestion is that transparent and explicit reasoning in talk may not be the sole discourse feature that distinguishes productive collaboration from less effective collaborative efforts in all contexts and for all types of tasks and knowledge domains.

In this respect, a related recent study by Rojas-Drummond et al. (2006) showed that engaging in explicit and accountable reasoning, with claims, challenges and warrants, was useful for effectiveness in the joint solving of a reasoning test where the aim was to find a single correct answer underlying an essentially mathematical pattern that united a series of pictures. In contrast, explicit reasoning was not found to be so necessary to solve successfully a more open ended and creative task of discussing and constructing together an integrated summary after reading three texts of different genres. That said, the talk used in these two contexts shared many communicative acts—such as taking turns, asking for and providing opinions, generating alternatives, negotiating meanings, building on previous contributions, seeking agreement and so on, similar to the communicative acts found in this study. The suggestion emerging from these two papers is that one can use a single overarching framework for characterizing effective collaborative talk in education, but it is one which draws on conceptions of 'creativity' and 'co-construction' as inclusive notions to account for the joint efforts of children when collaborating in small groups (e.g. Miell & Littleton, 2004; Roschelle, 1992; Säljö, 1999).

What is being emphasized in these studies is the need for researchers to consider the importance of students having an open and exploratory orientation towards their joint activities. This involves shared commitment to collectivity, creativity and the co-construction of knowledge, as well as engagement in verbally explicit forms of reasoning in talk. The data presented also emphasise the need to include emotional aspects of creative and dialogic collaborations for a more comprehensive account of the phenomena, as suggested by Skidmore (2006) and Vass (2004) (see also Vass et al., this volume). It is also possible that our own interpretations of what counts as a good, correct or appropriate way of relating in particular settings mean that we often fail to recognise the creative responses children make in such settings: 'All too often we treat children as *objects of concern*, rather than people *with concerns*' (Prout, 1998).

The complex interrelationship between the macro and the micro-analytical levels is given prominence in this paper. In this respect, this study suggests that understanding contexts for collaborative creativity involves more than understanding how the immediate joint activity is resourced at the micro level. Learners' interactions are framed by, and therefore can be

more fully understood within, the broader context of particular institutional structures and cultural settings, as highlighted by a sociocultural perspective. Thus, through the micro-level analyses presented in this paper, with their specific focus on intertextuality, intercontextuality and intersubjectivity, we shed light on the processes by which children participate and coordinate efforts in the co-construction of creative texts, as well as knowledge and understanding. At the same time, through the description of the broader macro-level we also came to understand how the creation of learning communities provides appropriate contexts for children's joining efforts in the co-construction of this knowledge.

By studying interactions conducted in school settings we as researchers are studying interactions in a particular 'niche'. The children we study engage in heavily contextualized discourse. Their interactions are influenced by a complex contextual system which is inseparable from how education is defined in particular cultural settings and the educational programmes and communities in which they participate. Furthermore, whilst collaborative interactions are framed by the institutional, cultural and historical contexts within which they are located and positioned, contexts for collaboration are also partly constituted and recreated within situated interactions and through the effects of participants' interactional work, mediated by diverse cultural artefacts, including a variety of tools and signs.

We have come some distance in understanding how and when peer interaction facilitates children's learning. To get much further, we shall need to integrate a fuller account of the cultural context of peer-interactions and learners' social perceptions, emotional responses and identity work, in conjunction with the predominantly cognitive explanations of 'how group-work works' (Littleton & Häkkinen, 1999). Learning is a process of engagement with culturally elaborated and socially mediated reality. The social processes which shape such learning are, on the evidence presented in this study, potentially powerful in their effects. The harnessing of these processes to support children's learning holds a crucial key to enhancing the effectiveness of their education, in the widest sense.

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