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TOWARD DIALOGUE IN THE CLASSROOM: LEARNING AND TEACHING THROUGH INQUIRY

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ABSTRACT

There is increasing agreement among those who study classrooms that learning is likely to be most effective when students are actively involved in the co-construction of meaning through discussion of topics that are of significance to them. This paper reports the results of an extended collaborative action research project in which teachers attempted to create the conditions for such discussion by adopting an inquiry approach to the curriculum. A quantitative comparison between observations made early and late in the teachers' involvement in the project showed a number of significant changes in the characteristics of teacher-whole class discourse, with a shift toward a more dialogic mode of interaction. Nevertheless, the frequency of stretches of "true discussion", as defined by Nystrand *et al.* (2002), remained low. When the same observations were examined qualitatively, however, there was clear evidence of an increase over time in the teachers' success in engaging students in co-constructing accounts and explanations. The paper concludes with a reconsideration of the purpose of "dialogue" in the classroom and of teachers' goals and strategies in trying to achieve it.

KEYWORDS: Classroom discourse - Activity theory - Teacher research

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It is now generally agreed among those who study classroom learning and teaching that the nature of the interaction that takes place in class is one of the most significant influences on the quality of student learning. On the other hand, as surveys continue to show, interaction in most classrooms continues to be teacher-dominated, with lecture and 'recitation script' as the predominant means through which teaching is accomplished (Galton, Simon *et al.*, 1980; Goodlad, 1984; Nystrand and Gamoran, 1991). There are, nevertheless, documented exceptions, which demonstrate that, even when the prevailing discourse structure is built on the traditional I-R-F exchange, as is the recitation script, classrooms can be places in which knowledge is dialogically co-constructed (Gibbons, 2002; Nystrand, 1997; Wells, 1999). The questions underlying the research to be addressed in this paper, therefore, are whether this shift toward dialogic interaction can be deliberately and systematically brought about, and if so, how?

In order to address these questions in both practice and theory, we draw upon our understanding of cultural historical activity theory (CHAT) and, in particular, on Vygotsky's premise that it is joint activity that is the organizing principle of human action, both material and symbolic. Motivated by the drive to sustain and improve the human condition, joint activity has been and continues to be the arena in which knowledge is constructed and reconstructed, as both outcome of, and mediating means for, the solving of the problems that inevitably arise in the course of goal-oriented actions. In this process, discourse provides the means for coordinating action and also for thinking together, both prospectively and retrospectively, about goals and possible means for achieving them. Viewed from this perspective, we propose, schools and classrooms can helpfully be conceived as communities in which participants engage in a variety of joint activities that are both of present significance to the participants and that also provide an apprenticeship into valued activity systems that are of importance in the wider community beyond the school. In this context, the knowledgeable skills that constitute the school curriculum are not ends in themselves so much as products of, and tools for, engaging in these activities; and discourse, both spoken and written, is the mediating means that enables knowledge to be collaboratively constructed and individually appropriated (Wells, 1999).

In this paper, we report an attempt, through collaborative action research, to create such classroom communities and describe, both quantitatively and qualitatively, the characteristics of the discourse that resulted. However, it is important to make clear that, during the action research phase of the study, the emphasis was on adopting an inquiry approach to learning and teaching; while changing the nature of the mediating discourse might prove to be a necessary concomitant, this was not the main focus of our collaborative research. Each of the participating teachers undertook to investigate how inquiry could be made the motive for learning in one or more curricular

areas and what activities best realized this intention in their own particular classrooms. The investigation of the patterns of discourse that occurred in these teachers' classrooms, which is the focus of the research reported here, was carried out post hoc, and was based on the videorecordings of classroom activities made during the earlier study.

APPROACHES TO LEARNING AND TEACHING

Historians of education have tended to emphasize the unchanging characteristics of public education. From the earliest times, they suggest, schooling has been concerned with transmitting to successive generations the knowledgeable skills - particularly the 'three Rs' - that are socially valued (Cole, 1996), and has done so through instructional practices that - at least in each time and place - were intended to be universal in their realization. In practice however, there has always been substantial variation between individual schools and classrooms, most unintended, but some resulting from efforts to enact quite different conceptions of education, based on the ideas of thinkers and researchers such as Rousseau, Pestalozzi, Montessori, Dewey, Piaget, and Vygotsky. In their emphasis on the active role of learners, all these theorists were opposed to the traditional 'transmissionary' mode of teaching; however, they varied quite considerably in the role they envisaged for the 'teacher'.

In actual practice, these various theoretical approaches have tended to be grouped together in terms of their opposition to the dominant "teacher-run" approach. However, as Rogoff (1994; Rogoff *et al.*, 1996) points out, it is necessary to make a three-way distinction between approaches to learning and teaching as follows:

> *Transmissionary* - adult-run, with students expected to absorb and memorize what is presented by the adult instructor;
> *Acquisitional* - learner-run, with the adult creating a rich learning environment and leaving it to the learners to choose how to engage with it;
> *Guided Participatory* - involving collaboration between teacher and learner in the selection of topics to be investigated and the manner in which these are approached.

Learner-run approaches, often claiming to derive from Piaget's constructionist theory of learning, were quite widely adopted in the 1960s, particularly in early childhood education; during the same period, Dewey was also frequently misinterpreted by "progressive" educators as advocating an approach through inquiry learning that would be largely learner-run. However, attempts to adopt the learner-run approach have not in most time-periods proved compatible with the prevailing ideology, which has consistently emphasized systematic teacher-led instruction in a common curriculum; so, with a few exceptions, most of these experiments have been short-lived. More important, perhaps, in explaining their limited success is

the fact that, by severely limiting the role of the teacher, learner-run approaches deprive children of the guidance and assistance from teachers that would help them more successfully to achieve their chosen goals.

By contrast, most recent alternatives to adult-run transmission have adopted what Rogoff (1994) calls a guided participation approach, often appealing to a Vygotsky-inspired emphasis on "working in the zone of proximal development" (Vygotsky, 1987). Prominent among these approaches in North America are, first, reform efforts in math and science (e.g. Cobb and Bowers, 1999; Driver, 1983; Lampert, 1990; Roseberry *et al.*, 1992) and, second, a number of university-led attempts to reorganize classrooms as "communities of learners" (e.g. Brown and Campione, 1994; Palinscar *et al.*, 1998; Scardamalia *et al.*, 1994). Although differing in their realizations, all these latter attempts to change classroom practices of learning and teaching place an emphasis on students' active engagement with problems that arise in the course of engaging with the topics under investigation, and all give a central place to dialogic "knowledge building" (Bereiter and Scardamalia, 1996). In every case, they also cast the teacher as an active organizer and coordinator of student activities and as a co-participant in the search for meaning and understanding.

From our perspective, however, although much is being learned from these studies - particularly about students' abilities to engage in systematic sense-making and knowledge building in collaboration with peers and teachers - they do not, for the most part, adequately involve teachers as agents in the conceptualizing and planning of the approaches that they are asked to adopt in their classrooms. In other words, these studies test and refine the ideas of university researchers with a view to creating classroom procedures that can subsequently be implemented by many teachers in other classrooms. There is another approach, however, which treats teachers as equally important sources of worthwhile innovation. This is the approach adopted in the study reported here, where an attempt was made to bring together a community of teachers committed to exploring the approaches to creating communities of inquiry that they themselves were trying to introduce in their classrooms.

TEACHERS AS INQUIRERS AND AGENTS OF CHANGE

There are a number of reasons for placing the emphasis on *communities of inquiry*. The first has to do with the change in stance that most if not all "guided participation" approaches to learning and teaching are trying to achieve. Describing the goal of these change efforts in terms of "communities of *learners*" may, in our view, fail to convey the radical change in "ways of being in the classroom" that guided participation entails. For students as for teachers, school has typically been a place in which a banking conception of learning (Freire, 1970) has dominated, where the topics for study were

selected by the distant others who constructed the curriculum, and where the purpose for learning was defined largely in terms of completing the set assignments and obtaining good grades. The goal of inquiry, by contrast, is to increase one's understanding of topics and procedures that are of importance because they contribute to one's developing identity as a member of a particular community. Ideally, therefore, the learning that occurs in a community of inquiry is not in itself the object of activity but an intrinsic aspect of working to achieve the goals of understanding and of effective action in the context of activities that transcend the prescribed curriculum (Lave and Wenger, 1991).

One of the most important reasons for encouraging teachers to become inquirers in and about their own practice, therefore, is that it gives them first hand experience of what it means to engage in inquiry learning. Just as it would be difficult to be a football coach without ever having participated in the moves and strategies that one is trying to teach, so teachers who wish their students to be inquirers need to have similar experiences themselves. Yet, for the majority, such experiences have been noticeably absent from their own education. However, when they themselves begin to ask questions about what is going on in their own classrooms and systematically try to make answers to them, they become far better equipped to understand and support their students as, together, they embark on what is often a new and unfamiliar way of learning. That is to say, they are able to be both co-participants with their students and at the same time models of what it means to be a learner through inquiry (Wells, 2001).

A further reason has to do with the diversity that exists both between and within classrooms and over time in the same classroom. Teachers intuitively know that any approach has to be adjusted to fit the affordances and constraints presented by any group of students in the particular time and place in which they come together. But when these adjustments are deliberately planned, observed and reflected on rather than simply being made intuitively, the resulting information can do much to enrich understanding of the situated nature of learning and teaching. Furthermore, the sharing of their personal discoveries with other teachers provides an incentive to colleagues to adopt a similar approach to their own practice that is far more powerful than injunctions to change that come from "above" (Newman, 1987).

Finally, inquiry in all fields is a collaborative enterprise, since, at minimum, it involves drawing on the ideas and work of others as well as on one's own unaided efforts. In many fields, therefore, an important part of supporting inquiry is facilitating the formation of working communities who meet to exchange ideas and to report and receive feedback on their progress. This applies equally to teacher researchers. As many have reported, membership of a community of like-minded colleagues is critical for their own development, in terms both of the support they receive in taking on a new identity, and of feedback and suggestions with respect to the specifics of

their own inquiries. Furthermore, by working together as a community rather than as solitary individuals, they have much greater potential to function as agents of change within the wider educational community.

On the basis of these beliefs, one of the aims of the action research project reported here was to bring these different levels of inquiry together with the overarching goal of the "Developing Inquiring Communities in Education Project" (DICEP). At the first level, members undertook to attempt to create communities of inquiry in their individual classrooms and, at the second level, to form a community of teacher inquirers who would research their classroom-based attempts - the means they employed and the results achieved - in order to be able to share their work with other educators. Now, some ten years later, the teacher community so formed is still active and its members continue to publish accounts of their work, which have also included evaluations of the benefits of membership in the group (McGlynn-Stewart, 2001, 2003). This paper, on the other hand, will report on the changes that occurred in their classrooms in the earlier phase of the project from the perspective of the classroom discourse that mediated their attempts to adopt an inquiry orientation to the curriculum.

THE RELATIONSHIP BETWEEN DISCOURSE AND ACTIVITY

Given the pervasiveness of talk in the majority of classrooms, it would be easy to imagine that much of this talk occurs as an end in itself. And, in the recitation script, this does indeed seem to be the case, as it is the production of "correct answers" that is generally assumed to be the goal to be achieved[1]. Such an assumption would seem to be further supported by the habit, in informal as well as ethnographic descriptions of classroom activities, of referring to stretches of "discussion" between the teacher and the whole class group as if the purpose of such talk were self-evident. Seen from a CHAT perspective, however, the talk almost always occurs as a means of achieving some particular goal beyond itself, such as solving a problem or considering and selecting between alternative explanations of some phenomenon - or, in transmissionary classrooms, testing and evaluating students' ability to reproduce the information that the teacher had previously dispensed to them.

However, when considered in terms of Leont'ev's (1981) tri-stratal account of activity, talk is an "operation", that is to say, a means selected in the situation, together with other operations such as non-verbal modes of communication and the use of material and symbolic tools (e.g. knives, computers, Newton's laws, the procedures of long division), to mediate the achievement of the goal of the activity or of one of its constituent actions. From this latter perspective, language can thus be seen as a "toolkit" of meaning-making resources from which speakers select in order to carry out

the action required according to their construal of the particular situation in which they find themselves.

Halliday (1978, 1993) refers to the linguistic resources available to an individual speaker as his or her "meaning potential" and, as with Vygotsky (1978), he sees this meaning potential as being built up through innumerable occasions of interaction with other speakers of the language, in which the functional connection between the situation and the forms of language used are enacted in the co-construction of the "text" of conversation. Halliday proposes the construct of "register" to describe these connections: Situation types map on to different selections from the meaning potential in terms of "field" (what is going on), "tenor" (the participants and their roles and statuses), and "mode" (the role language plays in the activity). A related construct is that of "genre", which accounts for the organization of the resulting text in terms of the culturally expected selection and sequencing of meanings to achieve the participant(s)' purpose (Halliday and Hasan, 1985).

Putting these two conceptions together, it can be seen that discourse is a form of social action that is used by participants engaged in joint activity as a means (operation) to advance toward the goal of the activity. Given its organization in terms of three semantic metafunctions (ideational, interpersonal and textual) that map on to the three dimensions in terms of which situation types are categorized (field, tenor and mode), discourse enables the participants simultaneously to manage their interpersonal relationships and to calibrate their construal of the situation that is the focus of their joint attention, thus enabling them both to act together and to think together. By learning their first language through participating in interaction with others in the course of joint activity, children construct their potential to mean in interaction with others; at the same time they also construct a model of the way in which their experience of the material and social world, as well as the internal world of thinking, willing and feeling, is construed in words and grammatical structures by the users of that language. Moreover, since this process of learning through interaction continues throughout the life-span, every occasion of interaction is both instrumental in advancing the joint activity and also an occasion for further learning to mean (Halliday, 1978; Wells, 1981).

It follows naturally from this account that, through the coordination of verbal and non-verbal actions, the enactment of different shared activities will afford different opportunities for meaningful learning. It also follows that different ways of engaging in these activities, and particularly in the verbal interaction that occurs within them, will be equally consequential for learning. These opportunities include learning to make sense of the different fields that are activated, of different ways of relating to co-participants, and of different ways of coordinating the constituent acts that produce the outcome, which typically brings about some transformation of the situation as well as of the understanding of the participants.

From a sociological perspective, similar arguments have been developed in detail in the theoretical work of Basil Bernstein (1971, 1982), who sought to explain how differences in family styles of interaction that are associated with the parents' mode of participation in the economy of material and symbolic production have consequences for their children's educational attainment. In addition, considerable evidence has been amassed in support of this line of argument from studies of interaction in the homes of pre-school children (Hasan, 2002, Hasan and Cloran, 1990; Heath, 1983; Pontecorvo and Fasulo, 1997; Wells, 1985). In the school years, too, there has been a growing body of work that addresses the consequences for students' learning that arise from different ways of enacting the curriculum through different types of activity and through the different modes of classroom interaction that realize or comment on these activities.

DISCOURSE AND LEARNING IN THE CLASSROOM

One of the seminal works in the field of classroom discourse was Barnes's (1976) *From communication to curriculum*, in which he drew the distinction between "final draft" and "exploratory" talk about the curricular topics being studied. Unlike the former sort of answers that students gave in response to teacher questions that have a "correct" answer in (the teacher's) mind, exploratory talk is tentative and emergent, with each student contribution calling for a response of a similar kind rather than an evaluation. Barnes hypothesized that, whereas practice in giving final draft answers might lead to students being successful on tests that called for recall, exploratory talk was a much more effective genre for the type of learning that aimed for understanding and for the conversion of "school knowledge" into "action knowledge." Since then, inspired also by Bakhtin's (1986) concept of "dialogue", a number of scholars have developed Barnes's ideas, both theoretically and empirically. In the latter category, we have found the work of two researchers to be particularly significant.

Explicitly picking up on Barnes's positive evaluation of exploratory talk, Mercer and his colleagues (Mercer, 1995; Wegerif and Mercer, 1997) have focused on the kinds of talk that occur in collaborative small group activities. Finding that the genres of "disputational" and "cooperative" talk occupied a substantial proportion of small group interaction at the expense of "exploratory talk", they decided to design and teach a short program of "talk lessons" (Dawes *et al.*, 2000) and to investigate the consequences of this intervention for students' abilities to solve problems in both group and individual mode. The results of this experiment provided significant evidence that learning to engage in small group exploratory talk was clearly beneficial for their ability to solve problems on Raven's Progressive Matrices test, both in small group and individual modes. The same benefits for learning, they hypothesized, would also apply in teacher-led large group discussions.

At about the same time that Mercer et al. were investigating the value of coaching students in exploratory talk, Nystrand and his colleagues were carrying out a study of the patterns of interaction that occurred in a large sample of middle and high school classes in the U.S.A. in the subjects of English and social studies (Nystrand and Gamoran, 1991). The results of this survey provided overwhelming evidence of the continuing prevalence of the "recitation script": only a very small proportion of the observed lessons included episodes of the kind of talk that Barnes (1976) described as exploratory.

While Mercer and colleagues' findings were encouraging with respect to what might be achieved if teachers deliberately fostered exploratory talk, those of Nystrand and colleagues were definitely depressing. In particular, they reported that, in the middle and high school classroom they observed, "true discussion", in which several students exchanged ideas and opinions about a topic under consideration, was almost non-existent. However, we wondered whether their results were typical only of classes at the middle and early high school level, or whether they represented the whole gamut from grade one onwards.

The data collected during the DICEP project seemed to provide an ideal way to investigate this question. Furthermore, since the teachers who had been involved in that project had, for the most part, spent several years attempting to adopt an inquiry approach to learning and teaching, it seemed very likely that their increasing success in this respect would be reflected in the data we had collected over the years of their participation. By comparing the patterns of discourse that they were using early in their involvement in the project with those that they were using in the later stages, we believed, it should prove possible to investigate the relationship between an inquiry approach to curriculum and the interaction through which this was accomplished. Our hypothesis was that the interaction in the later stages would be more truly dialogic and contain a higher proportion of "true discussion".

THE METHOD OF ANALYZING CLASSROOM DISCOURSE

Some years ago, Chi (1997) argued the advantages for cognitive science and educational research of "quantifying qualitative analyses of verbal data." From her point of view, recorded observations of verbal interaction, such as those obtained from ongoing classroom activities, very clearly yield qualitative data. However, because verbal utterances involve tokens of culturally recognizable semantic, lexical and grammatical categories and occur in easily recognizable sequential structures, such as the adjacency-pair, question-answer (Sacks, Schegloff and Jafferson, 1974), it is also possible to carry out systematic analyses of verbal texts that yield quantitative data on the differential frequency of individual categories and of their co-occurrence in different situations. Such quantitative analyses have,

in fact, been the norm in the field known as "classroom discourse analysis" (e.g. Mehan, 1979; Sinclair and Coulthard, 1975; Wells, 1993; for a review, see Cazden 1986/2000).

Prior to reading the report by Nystrand *et al.* (2002), the data from the DICEP teachers' classrooms had already been quantitatively analyzed using a coding scheme that drew on Halliday's (1984) schematic description of the organization of linguistic interaction and on the rank scale proposed by Sinclair and Coulthard (1975). The basic unit in both consisted of an "exchange" that itself consisted of a number of "moves". In Halliday's scheme, interaction involves the exchange either of "goods and services" or of "information"[2]. In either case, the exchange can either begin with a "Demand", to which the expected response is a "Give-on-Demand", or with an unsolicited "Give", to which the expected response is "Accept/Acknowledge". Wells (1981) suggested that these three types of move form a scale of "prospectiveness" with respect to the expectations they set up for a further contribution. In their study of classroom discourse, Sinclair and Coulthard found that a combination of the two types of exchange proposed by Halliday (1984) was particularly prevalent, giving rise to the pattern: Demand - Give - Acknowledge (which they named Initiation - Response - Follow-up). In addition to the basic unit of exchange, Sinclair and Coulthard also recognized units both higher and lower on the scale. Exchanges could be grouped together as constituents of the higher level unit of lesson, and the moves that made up an exchange could themselves consist of more than one act.

Building on these analytic principles and relating them to Leont'ev's (1981) tristratal analysis of activity (Wells, 1993), the scheme that was used in the earlier analysis (Nassaji and Wells, 2000) consists of a rank scale with four levels: Episode, Sequence, Exchange and Move. An *episode* includes all the talk that takes place in carrying out one task and consists of an indefinite number of sequences. A *sequence* corresponds to a step in a task and consists of a *nuclear exchange* and as many *bound exchanges* as are judged necessary by the participants to complete what was initiated in the nuclear exchange. Bound exchanges of three kinds regularly occur. *Preparatory* exchanges are used to establish communication or to select a designated speaker; *dependent* exchanges are used, for example, to give or seek additional information ('comment') or justification for the information already supplied ('justification'); while *embedded* exchanges are used to confirm agreement or to repair various types of breakdown (e.g. clear specification of the intended referent 'clarification'). In principle, either participant can initiate a bound exchange at any point and, as a result, sequences can extend over many exchanges (Eggins and Slade, 1997).

Finally, an exchange consists of an *initiating* and a *responding move*, and may also contain a *follow-up* move. In the classroom, as numerous studies

have shown, the dominant pattern of interaction - particularly when the teacher is interacting with the whole class - is based on a three part exchange: Teacher Initiation, Student Response, Teacher Follow-up. The teacher's initiation in this pattern is typically some form of Demand, usually a question, and the teacher follow-up in the third move frequently takes the form of an evaluation[3]. However, as Wells (1993) has shown, the follow-up move can perform a variety of functions and, when it takes the form of a demand for further information, it has the effect of sustaining the sequence in which it occurs. In fact, some sequences in our data contain as many as eight or nine bound exchanges, as the question posed by the teacher in initiating the nuclear exchange leads to an extended attempt to arrive at an answer satisfying to all those involved. The following is a fairly short example.

An Example of a Complex Discourse Sequence[*]

#	Sp	Text	Ex	Mv	Pros	Func
1	T	Alright, what do you think would be the main idea of YOUR story, Kaitlin?	N	I	D	N.Conj
2	Ka	Um, - a case -	N	R	G	N.Conj
3	T	A mystery?	E1	F/I	D	C.Conf
4	Ka	Yeah	E1	R	G	C.Conf
5	T	Alright.	N	F	A	Ack
		But what is the mystery?	D1	I	D	N.Expl
6	Ka	Um, the musical note	D1	R	G	N.Expl
7	T	Nate the Great solve-	E2	F/I	G+	C.Conf
8	Ka	Yeah	E2	R	G	C.Conf
9	T	Trying to solve the case of a musical note?	E3	F/I	G+	C.Conf
10	Ju	Um, and his parents went away, that's what the story said, and they go away so she -	D(1)/ D2	R	G	N.Expl
11	T	But is that the main idea? you see-	D2	F/I	D	E.Counter
		what's- the main idea is the- the theme of the book, what's-, what the book is mainly about, what it tells you.	D3		G	K.Expl

*. In this and all subsequent example, CAPS are used to indicate emphasis; underlining to indicate overlapping speech; < > to indicate uncertainty about transcription; * to indicate an unintelligible word-like segment; - to indicate an interruption; and . to indicate a noticeable pause, with the number of periods corresponding to the duration of the pause in seconds. In the above table, Sp = Speaker; Ex = Exchange Type; Mv = Move Type; Pros = Prospectiveness; Func = Function. The full set of Function categories is defined in Appendix 1.

This sequence contains seven exchanges. In turn 1, the teacher asks Kaitlin to offer an idea as to what the main idea of the book she had been reading might be. In 3, the teacher follows up on K's answer by initiating an embedded exchange to check that she has understood what K means by "case". This embedded exchange is concluded by K's answer, and so the sequence reverts back to the nuclear exchange, with T acknowledging K's idea (5). However, in the same follow-up move T now initiates a dependent exchange by asking K to elaborate on her previous answer, which she does. But again T checks and in the second of the two embedded exchanges that

this takes she provides an extended version of what she thinks K means with the intention that K confirm whether her version is correct. However it is Julie who responds (10) with a move that both implicitly responds to T's question and initiates a further dependent exchange. Following up on J's response, T indirectly rejects her answer by asking a question (and thus starting a new exchange), which she then goes on to answer herself with an explanation of what is meant by "the main idea".

This example also contains codings of two further categories at the level of move: the Prospectiveness of the move, whether Demand, Give or Acknowledge, and its Function. Both categories require further explanation. First, in turns 7 and 9, prospectiveness is coded as G+, which indicates that the Give move is uttered in a way (either rising intonation or the addition of a tag question) that raises the expectation for a response, so that it now functions like a question. Similarly, where only an Acknowledge is called for, speakers frequently step up the prospectiveness by making an (unsolicited) Give move, which has the effect of initiating a further exchange.

Further explanation is also required for the coding of function. It became clear early on in the coding that questions, especially those asked by a teacher, varied in the kind of information that was being requested. Sometimes the question called for information that all were expected to know (Known Information); sometimes it called for information about personal experience that only the respondent could know (Experiential Information); and sometimes it called for information that was open for discussion (Information for Negotiation). Functions that concerned the exchange of information were grouped under these three sub-category headings. Two further groupings of function codings were those involving Clarification (occurring only within embedded exchanges) and those involving Evaluation, which occurred only in follow-up moves.

Finally, in the original scheme, codings were also made for the type of curricular activity that the episode of discourse was mediating. First, the Activity itself was coded and then the Orientation to the activity that was taken during the episode, for example, Planning, Constituting (e.g. co-constructing an explanation), Reviewing, etc. Figure 1 shows the hierarchy of levels and the categories coded at each level.
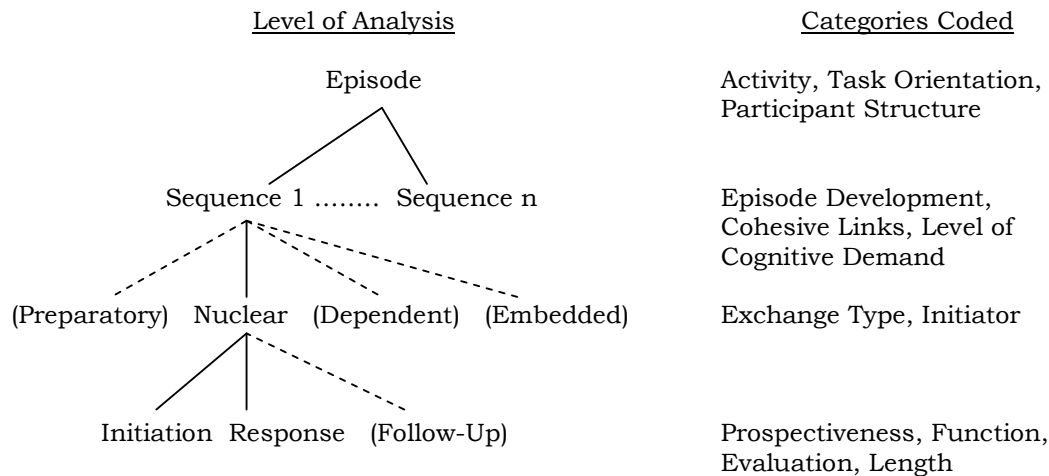
Level of Analysis	Categories Coded

Episode — Activity, Task Orientation, Participant Structure

Sequence 1 .... Sequence n — Episode Development, Cohesive Links, Level of Cognitive Demand

(Preparatory) Nuclear (Dependent) (Embedded) — Exchange Type, Initiator

Initiation Response (Follow-Up) — Prospectiveness, Function, Evaluation, Length

Figure 1. Overall Structure of the Coding Scheme

The analysis published in Nassaji and Wells (2000) was mainly concerned to investigate the relationships among the Activity, the Activity Orientation and, in sequences initiated by a teacher question, the type of information requested and the type of follow-up that occurred. Of particular interest were, first the different distribution of types of question asked in science-based as opposed to arts-based activities and, second, the relationship between student responses and the type of teacher question to which they were responding - whether the question called for known information or information for negotiation. The latter, we found, typically elicited responses of greater length and complexity. We also found a significant negative correlation between length and complexity of student responses in an episode and the frequency of teacher evaluation of responses to known information questions.

LOOKING FOR THE EMERGENCE OF DIALOGUE

Shortly after the paper just referred to was accepted, we read the report by Nystrand *et al.* (2002), in which they described their coding scheme in some detail. We were particularly interested in three categories that they considered to be implicated in the occurrence of what they called "dialogic spells", that is to say, moments when the interaction shifted from implementation of a "recitation script" to what Tharp and Gallimore (1988) called an "instructional conversation". The three categories were Level of Cognitive Demand, Level of Evaluation, and the occurrence of Student Questions of a substantive kind. The first two of these categories involved a binary distinction between "High" and "Low", with further distinctions within each.

Our interest in Nystrand et al's coding scheme arose from our impression that the episodes of discourse recorded in the grades one through eight classrooms of the Toronto teachers referred to earlier was considerably more "dialogic" than those these researchers had observed in middle and high school classrooms, and we were interested to discover whether the additional coding using the relevant categories from their coding scheme would explain why this appeared to be the case. But a further reason for making use of their scheme was that the two binary distinctions referred to above seemed to us to complement those in the scheme that we had been using. Accordingly, we added a modified version of these two categories to the former scheme, to create the one used in the present study.

Cognitive Demand, which identifies the process and source required for the student(s) addressed to answer the initiating question, retained Nystrand et al.'s binary distinction between high and low, but with the addition of further distinctions as follows. Low demand was coded when the answer could be constructed from Memory/Prior Knowledge, on the basis of Rote recall, or from the Previous Conversation; High was coded when the answer required Generalization from available information, Analysis/Explanation, or informed Speculation (not guessing). We also added a third Category to deal with information assumed to be well-known, such as the day's date or the name of the current president.

With respect to *Evaluation* of responses, again the binary distinction was retained, but we found it useful to incorporate two further subcategories: Initiation of Dependent Exchange, and Null; the latter was recorded when an evaluation might have been expected but none occurred. The resulting possible codes were as follows. Low was coded when the evaluation was a simple Accept/Reject, Accept with Praise, or Reject with Justification for the rejection. High was coded when the evaluation involved Accept with Uptake, or a further Question initiating a Dependent exchange. Nystrand *et al.* (2002) define uptake as follows:

> We coded teachers' evaluation of student responses as high when the student contributed something new (i.e., new information) that changed or modified the topic of discourse in some way, and was acknowledged as such by the teacher. In other words, when a teacher's evaluation is high-level, the student really "gets the floor." Specifically, we operationalized high-level evaluation using two criteria: (a) the teacher's certification of the response ("Good," "Interesting," etc.) and (b) the teacher's incorporation of the response usually in the form of either an elaboration (or commentary, e.g., "That's important because . . .") or a followup question (e.g., "Can you say more about that?" or "Why do you say that?"). That is, for level of evaluation to be coded as high, the evaluation had to be more than "Good," "Good

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idea," or a mere repeat of a student's answer. In all instances of high-level evaluation, the teacher validated the student's answer so that it affected the subsequent course of the discussion.

Following Nystrand et al., we also identified all sequences which contained a stretch of "true" discussion. This they defined operationally as "the free exchange of information among at least three students and the teacher that lasted at least a half minute during a classroom instructional episode. [It] tends to be marked by the absence of questions, either by the teacher or student, except for purposes of clarification." For reasons that will be explained later, we modified this definition slightly to read "a free exchange of information among at least three students, with or without the participation of the teacher ..."

One final qualification needs to be made. Although Nystrand et al.'s largest unit, "an instructional episode", corresponds almost exactly to the "episodes" that form the macro units of our analysis, their coding of ongoing discourse included only sequence-like units that were initiated by a question; sequences were defined as all the moves that followed a question until another question was asked. In our coding, on the other hand, we coded all the discourse, whether the sequence or exchange was initiated by a question (Demand) or by a move that gave unsolicited information (Give). In the analysis to follow, however, as far as teacher initiations were concerned, we focused - as did they - on teachers' questions as their initiating give moves rarely gave rise to substantive responses from the students. (The complete set of coding categories used in the analysis presented here can be found in Appendix 1.)

CODING AND ANALYSIS OF THE DATA FOR THE PRESENT STUDY

As described earlier, the study reported here grew out of a multi-year collaborative action research project in which a group of volunteer teachers undertook to attempt to create communities of inquiry in their classrooms and also to carry out research on their attempts. The precise questions they chose to investigate emerged from their own practice and it was they who decided when to invite the university member(s) of the group to observe and record particular lessons. In practice, they would engage once or twice a year in intense investigations of whole curricular units and the whole of such units were video-recorded. However, only extended episodes were fully transcribed and it is the subset of these that involved teacher-whole class discourse that constitute the data for the present investigation.

The eight teachers did not contribute equally to the database as not all participated for the full duration of the project. However, all contributed at least two episodes. It was therefore possible to divide the relevant episodes into those that occurred Early in the teachers' participation and those that occurred Late in their participation. In all, 43 episodes were analyzed, 24

"early" and 19 "late", and their distribution by grade level, curricular subject, activity orientation, and number of sequences involved is shown in Table 1.

Each of these observations had already been coded for the study reported in Nassaji and Wells (2000). For the present study, the necessary additional coding of the data was carried out by the authors with the assistance of a graduate student, using a custom made program in *FileMaker Pro 4*[4]. In the small number of cases where there was disagreement, the senior author made the final decision in order to ensure consistency of coding[5].

RESULTS AND DISCUSSION

The presentation and discussion of results will be carried out in three stages. First the results of quantitative analyses of the data will be presented. Then, in the following section, a qualitative approach will be adopted to the discussion of a number of illustrative episodes[6]. Finally, we shall address the issues raised by the relative rarity of sequences involving "true" discussion.

First, we report the results of the comparison of the episodes recorded early in teachers' participation in DICEP with those recorded later. Because the duration of individual teacher's participation in the project varied, in some cases, the within-teacher comparison involves an episode at the beginning of the year and one recorded at the end of the same year; in other cases, there are several episodes from early in the project and others from two or more years later. In other cases, only one or two recorded episodes were available from the early stage of a teacher's participation while several were available from the later stage. The important point of the comparison, however, is that, in the episodes designated as 'late', the teacher concerned had made changes in her/his teaching on the basis of reflection on the characteristics of the interaction(s) that were recorded early in his or her participation. The results of this comparison are displayed in Figure 2. The values in each column are the means of the scores computed over the relevant episodes. The significance level of observed differences was computed using the Wilcoxon-Mann-Whitney U test.

Table 1. Distribution of Episodes Constituting the Database by Grade Level and Curricular Topic

	Science Practical	Science Discussion		Literature Discussion	History Discussion
Grade 1/2				VM 2 Launch (42)	
Grade 2	VM1 Prob-Solv (14)	VM 2 Prob-Solv (38) VM 3 Review (62)			
Grade 3				VM 1 Launch (14)	
Grade 3/4		WG 1 Construct (40) WG 2 Construct (23)			
Grade 4		GD 1 Launch (25) GD 2 Construct (30)		DZ 8 Generate (18) DZ 9 Construct (30) DZ 10 Construct (40) DZ 11 Generate (21) DZ 12 Review (28)	
Grade 4/5	WG 3 Report (5)	WG 4 Construct (18) DZ 1 Generate (50) DZ 3 Report (16) DZ 5 Organize (14) DZ 7 Construct (60)	WG 5 Construct (7) DZ 2 Plan (4) DZ 4 Generate (26) DZ 6 Plan (18)		
Grade 6	AJ 1 Plan (13) AJ 8 Generate (36)	AJ 2 Construct (16) AJ 4 Monitor (9) AJ 6 Construct (28) BJ 1 Prob-Solv (6) BJ 3 Construct (10) BJ 5 Monitor (5)	AJ 3 Review (8) AJ 5 Generate (25) AJ 7 Construct (22) BJ 2 Generate (11) BJ 4 Generate (20) BJ 6 Plan (30)		
Grade 6/7					KM 1 Launch (41) KM 2 Review (52)
Grade 7		NS 1 Monitor (12)	NS 2 Construct (11)		
Grade 8		HK 1 Monitor (74)			HK 2 Formulate (8)

[In the above table, the two initial letters identify the teacher involved; the following number indicates the sequential order of the recorded episode in that teacher's classroom; the final number in parentheses gives the number of sequences in the recorded episode.]

Figure 2. Comparison of Selected Variables (Mean Scores) in Early v Late Episodes
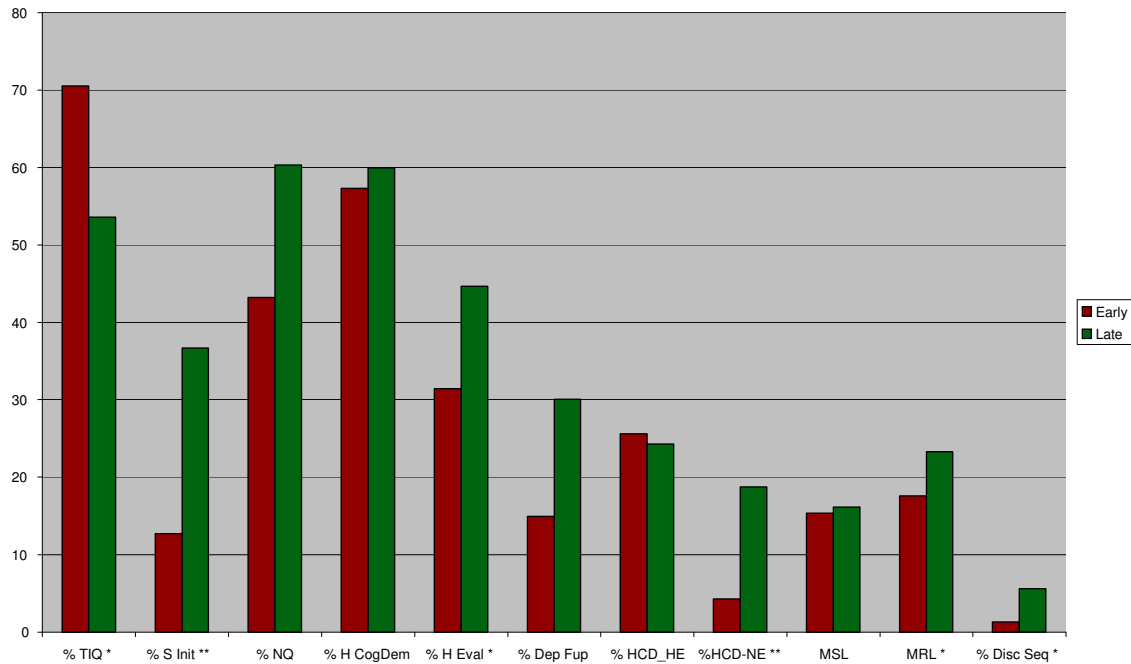
KEY

TIQ	Teacher Initiating Question	S Init	Student Initiation
NQ	Negotiatory Question	H CogDem	High Cognitive Demand
H Eval	High Level Evaluation	Dep Fup	High Eval. Includes Negot. Questio
HCD-HE	High Cog. Demand High Eval.	HCD-NE	High Cog. Demand, No Evaluation
MSL	Mean Sequence Length	MRL	Mean (Student) Response Length
Disc Seq	Sequence Including True Discussion		

* p< .05   ** p< .01   *** p<.001

A clear overall pattern emerges from this comparison. In later episodes there was a significant tendency for a smaller proportion of sequences to be initiated by a teacher question (%TIQ; p< .05) and, when the teacher did initiate with a question, there was a trend for a greater proportion of such questions to be requests for information for negotiation (%NQ; n.s.). Conversely there was a significant increase in the proportion of sequences initiated by students (%S Init; p< .01). When student responses received an evaluation, there was a significant increase in later episodes in the proportion of evaluations that were at a high level (%H Eval; p< .05). However, such high evaluations in later episodes were significantly more likely to take the form of a question that initiated a dependent exchange (%Dep Fup; p< .001). At the same time, there was a significant likelihood in later episodes of teachers providing no evaluation at all to responses to

questions that made a high level of cognitive demand (%HCD-NE; p< .01). Associated with these time-related differences, was a significant tendency in the "late" episodes for students to produce longer responses (MRL; p<. 05) and for the occurrence of a greater proportion of sequences involving "true" discussion, as defined above (% Disc Seq; p<.05).   Mean sequence length (MSL), on the other hand, showed no significant change over time.

Since sequences involving true discussion occurred relatively rarely, even in the late episodes, we were interested to discover what other features were associated with, and therefore predictors of, such discussion episodes. To ascertain the strength of the relationship between predictor and dependent variables, a correlation matrix was constructed (see Table 2).

As this table shows, the occurrence of a sequence involving discussion was highly likely to be found in an episode in which a higher than average proportion of sequences was initiated by students (r = .543, p< .001), where teacher initiating questions tended to involve information for negotiation (r= .260, p< .05), and where a greater proportion of student responses to questions involving a high level of cognitive demand received a 'null' evaluation (r= .575, p< .001). These latter findings were generally in accord with those of Nystrand et al., (2002), although those researchers did not explicitly mention the non-occurrence of evaluation where such might have been expected.   What did surprise us, however, was the overall low frequency of sequences involving discussion, even in the later episodes (proportional frequencies were: early = 1.31%, late = 5.62%).   Apparently, "true discussion", as defined by Nystrand et al. appears almost as infrequently in the elementary grades as in middle and high schools.

Table 2. Correlation Matrix: Indices of Teacher-Whole Class Interaction

	%TIQ	%S Init	%NQ	%HEval	%Dep Fup	%HCD-NE	MSL	MRL	%DiscSeq
% TIQ	-								
% S Init	-.892***	-							
% NQ	-.073	.201	-						
% H Eval	-.112	.097	393**	-					
% Dep Fup	.063	.050	.259	828***	-				
% HCD-NE	-.223	.263*	.357*	.005	.063	-			
MSL	.113	-.101	.150	.527***	.616***	-.123	-		
MRL	-.660***	.810***	.244	.093	.077	.310*	.071	-	
% DiscSeq	-.437**	.543***	.260*	-.022	-.049	.575***	-.140	.554***	-

For key, see Figure 2   * p < .05,   ** p < .01,   *** p < .001

However, from our viewing of the video-recordings of these episodes, we had formed a rather different impression. In several episodes, it seemed to us, there were occasions - albeit brief - when the discourse developed into discussion, particularly when the class was planning for, or making sense of, practical activities undertaken, or responding to a story or other aesthetic experience. So, in order to try to resolve this apparent contradiction, we decided to take a qualitative look at the data. In the following section we shall briefly present five episodes in an attempt to give a flavor of the range of settings and discursive contexts in which such a move toward discussion occurred. Then, on the basis of these examples, we shall return to a consideration of the relative infrequency of "true discussion".

Disagreement and Discussion

As Matusov (1996) points out, it is not necessary for participants to agree substantively for them to achieve intersubjectivity. In fact, as he argues, there is little to talk about if there is already agreement about the topic. It is not surprising, therefore, that discussion most frequently arises out of a difference of opinion or of intention. This was certainly the case in the extracts to be discussed below.

Extract 1. Planning to Study Weather (DZ1, Grades 4/5)

The first extract comes from one of the earliest episodes in the database, in which the teacher and students were planning how to organize the unit on which they were embarking. Drawing on the students' written questions, the teacher invited suggestions for aspects of "weather" they might investigate. She then asked for suggestions as to how they might organize their work together. It was in this context that the following sequence occurred, as students took up positions on whether working with a friend would be a good idea or not.

> T: Any other ideas?
>   [Several students raise their hands]
> T: Colin?
> Co: You could pick one person who could pick- like we skip
>   people and you pick one person and they get their own group
> T: So I would pick somebody and then they would pick who
>   they wanted to work with?
> Co: And then- .yeah- see how much group xxxx with another person
> Pa: I don't think that's the best because some people might-
>   if they pick all their friends they- they might get um- ..
>   they might get too crazy and then they won't get any work done.
> To: Yeah, but with people that you don't like or anything then you
>   don't xx or- then you won't get any work done either
> Ma: But see there's a limit! . and then um you got all your friends
>   you want and then you've got one friend and you ask them-
> T: OK . that can be a problem
> Pa: But like sometimes if they're really comfortable <then> they
>   get a lot done

> T: Yes . and I know that when I take courses at night and I get to work
>   with people- I like to work with my friends in the course . I
>   wouldn't like it if the professor told me I had to work with someone
>   that I didn't get along with- I prefer to work with my friends .
>   But I agree completely with you Tom . and that is that sometimes
>   when you're working with friends it's harder to focus and concentrate
>   so- there are two sides to that
> Ka: But then you usually get along with people in the class . OK like
>   you're solving the problems- you're only working with them you're
>   not discussing your personal life
> T: That's right .and you do have a focus that's the work . so it shouldn't
>   be a big problem to work with other people . you're right

Here, the spur to discussion was the very important issue of which other students they would get to work with in carrying out their inquiries. At issue were two criteria: interpersonal relations and academic productivity. The students were clearly aware of their frequent incompatibility, but also wise enough to know that there is not a single best solution. As she makes clear, the teacher also recognized this to be an important issue and in her contributions she showed strong uptake and supported their alternative points of view by describing her own contemporaneous experience as a student.

When this class was later engaged in making and interpreting observations, however, there were few such spontaneous expressions of conflicting points of view. In fact, in our recordings from this unit, there was only one sequence, in which a student was justifying his claim that volcanoes "count as" weather:

> Sa: 'cause it [the volcano] affects the weather- the sun.
> Sb: What?
> Sa: Remember- I think it was in the Phillipines- um the
>   volcano erupted-
> Sb: Yeah
> Sa: - and the cloud ****
>   [Several other students speak at once, drowning Sa]
> T: They say that volcanoes affect the weather

For the majority of the time, when talking about the substantive content of the unit, sequences were in IRF format, though often including one or more dependent exchanges; they also typically involved a single student in the interchange. Possible reasons for this will be considered below.

Extract 2. The Ethics of Scientific Investigations (AJ7,Grade 6)

The next example occurred during a biology unit in a grade six class, in which the students had been observing the development of painted lady caterpillars. Most of the caterpillars had reached the stage at which they had attached themselves to the gauze covering of the plastic cups in which they were kept and had spun the cocoons within which they would metamorphose into butterflies. Earlier in the lesson the teacher had asked students to propose investigatory questions for this phase in the cycle and Nir, a second language speaker of English who had joined the class while his parents were visiting from Israel for

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one year, had proposed to carry out a series of dissections to establish the nature of the changes taking place inside the cocoon. At the point at which this extract begins, Nir is trying to persuade the teacher and his classmates that his plan is truly scientific.

T: Any other ideas? [if] you have a feeling either for or against this
        Nir (calling on him to speak)
Ni: I don't agree with Jennifer because what I said at the beginning is
        that we want to go like from the beginning and to see how they change ..
        like let's wait (= if we wait) until the end and then we'll not know in
        which part of their life they- they died . like . 'cause if they died from
        the beginning . so we'll- we wouldn't know . like we wouldn't know
        when they died if we will do it in the end
T: OK, so you want to see day one what they were at . then day four what
        stage it was at inside . then what's developed- if it developed ears or
        legs on day eight_ and so on
Ni: Yeah . that's- and I don't think that people . even if it will be a majority . like
        that the class will want to open them . and so I think that just the people who
        would like to give theirs to science will like <u>give theirs</u>
T: <u>I'm not going</u>
        to stop you from doing this if you want to do that

Up to this point, the format is very similar to that observed in the grade four class, as the teacher interacts with individual students sequentially. However, not all the students are as apparently open-minded as the teacher about the acceptability of Nir's proposed investigation. A little later the strength of the disagreement becomes clear when Eve is called on to give her opinion.

T: Eve . do you have any ideas?
Ev: Yeah . OK, Nir, how would you feel if you were a newborn
        baby . another baby . and someone wanted to cut you up and
        see what's happened with you . how would you feel?
Ni: OK . like- (temporarily nonplussed)
Ev: That's how the caterpillar feels
Ni: - if you'll suffer for one minute, it's no big deal .
        like we can open them and- what I think is that the- the- . I think
        that they live just inside the chrysalis and the chrysalis isn't part of
        their body . it's just a part that protects them .. I think that they will
        still die if we open it but they will not like suffer .. in the end like
        we can kill them . we can like smash them
SS: Ohh! [many students express horror]
Ni: Yeah but why should we leave them to be like cold . we have to
        finish with them fast . without hurting them . like the guillotine .
        it sounds ugly but it's- it's killing it fast
Es: I'm not against him or anything . I would give mine up
T: So it's just regarding the feelings of the caterpillar that you think
        it might have <greater>- the value to science would be greater?
Es: No (apparently agreeing) . I'm not giving it to him though
T: But you would?
Es: Yeah.

The to and fro of opposing points of view continued for several more minutes with the teacher making few substantive contributions. Finally, it became

clear that the majority was opposed to the proposed dissections, mainly on ethical grounds. Nir gracefully accepted the majority opinion.

However, he was not deflected from his scientific inquiry. Perhaps due to rough handling, some of the cocoons had become detached from their hanging position and were lying inert at the bottom of their containers. Nir speculated that they might, in fact, be dead and so there would be no ethical problem to following his plan. The following day, with general consent, he and several other students prepared to carry out an autopsy on a deemed-to-be-dead chrysalis. With another student holding the chrysalis with forceps, Nir made the first delicate cut. The tail end of the chrysalis vibrated violently. Consternation. It was still alive. The discussion that followed was impassioned and prolonged, as almost every student in the class had an opinion as to what was the best thing to do (Wells, 1993). Unfortunately, the recording was not available to be included in the present database. If it had been, it would certainly have significantly augmented the proportional frequency of "true discussion."

Extending the Contexts and Forms of Discussion

The two preceding extracts came from the start of the project, when the teachers were in the early stages of their attempts to create classroom communities of inquiry[7]. As will have been noted, both these extracts involved topics in science. This was because we found that science was an area of the curriculum that particularly lent itself to an inquiry approach (Wells, 1995). At this stage in the project, however, when stretches of discussion occurred they tended to arise almost by chance, because the students felt strongly about the immediate issue under consideration, rather than because the scientific topic itself was approached dialogically. The challenge thus became one of finding ways of organizing activities so that they would generate more occasions of this kind and in a wider range of curricular areas. Indeed, as the quantitative results above make clear, considerable changes did occur over the duration of the project, though not always such as to increase the occurrence of discussion as Nystrand *et al.* (2002) defined it.

The following three extracts illustrate some of the ways in which the discourse changed as the teachers and students became more involved in inquiry. The first occurs in the context of responding to a literary text.

Extract 3. Making Sense of a Complex Narrative (DZ10, Grade 4)

The teacher in the first extract above made a practice of reading aloud every day to her grade four class and of encouraging the students to "discuss" the story after each daily read-aloud. In the December of the fourth year of her participation in the project, she decided to read Mrs Frisby and the Rats of Nimh. She also decided to videotape the follow-up discussions. Following the first two recordings, she spent some time viewing the videotapes and was dismayed at what she discovered. Far from having captured free-flowing discussion, as she had hoped, the videorecordings showed that a version of the IRF

structure still dominated the interaction. As teacher, she called sequentially on children who had their hands up, they expressed their thoughts about the story, and she provided some form of positive follow-up. She then moved on to the next volunteer. Given this discourse structure, children's remarks were always addressed to her and so, not surprisingly, there was little or no interchange among the students themselves.

The next day, the teacher talked to the children about what she had seen and proposed a new discourse format. As manager of the discussion, she would nominate a child from among those who wanted to speak and, following his or her turn, any other child who wished to speak to the same topic could do so without waiting to be nominated. She also emphasized that, in a good discussion, people link what they say to previous contributions and make clear how their contribution relates to what went before. Although unfamiliar as a way of conversing in the formal context of "a lesson", the children had little difficulty in adjusting to the new format. Following the read-alouds of the remaining chapters, the frequency of true discussion increased dramatically, averaging almost 30% of all sequences as opposed to less than 2% on the first two occasions. The following extract is taken from the first discussion in the new format.

The narrative structure of Mrs Frisby does not follow the chronological sequence of events but starts in the middle and, through flashbacks, gradually reveals what has led up to the narrative present. It thus presents real challenges of comprehension and interpretation. At the point reached at the end of the chapter that they have just heard, the children know that some rats escaped and set up a home under a large rose bush, but they do not yet know how they made their escape. Many conflicting suggestions are voiced and, as a result, the transcript of their talk is not easy to follow. However, there is little doubt that they themselves knew what they were talking about. The extract starts about five minutes into the discussion, as Sandra introduces a new possibility.

Sa:	Listen I think that Justin is going to escape out of that air hole . and then he can come back and take them out - let the A group and the G (coughing) * group OUT . And some are going to come and then they're going to go back to the city and they're going to get all the other rats and tell them it's not safe to go there . and then that's how they got that <wire>
Wi:	OK, I got two things . Was- did Justin get CAUGHT?
Va:	Yeah
Wi:	OK
Ev:	No Justin didn't get caught THEN.
Va:	But they know he's there
Ev:	* * *<just got him back>
W1:	OK, was * staring at the window trying to <help them> to get out?
Ev:	No . that was JUSTIN
Wi:	OK
T:	It's good that you were checking.
Ca:	I sort of agree with Jessie and disagree with Taylor but I'm a little different than Jessie . I- it didn't- Taylor it didn't SAY like they were the smart rats or not smart rats
Ta:	I said that they thought- I thought- that the not smart rats- they came back then they left again then they got wires . and then they came back again . and the smart rats built the radio
Va:	Yeah and then Taylor said they were ALL smart so- ...
Ev:	And then Taylor said that they were not friends
Wi:	It said that they never wanted to go back to the rats of Nimh

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Ca: There are LOTS of different street rats in Nimh
Va: Nimh is a laboratory I think
Sa: Maybe all the rats ran off right . and then they got stupid
        because they (coughing) * * * . and then -
No: Excuse me .. I think that Justin is - ummmmmm what's the-
        yeah, Justin is going to see a way out and he's going to try to
        get out . BUT like they JUST stopped it and then he's going
        to go back to the cage and say he saw a way out and then he's
        going to - they're all going to PASS it on right? .. and they're
        going to say that- like through the corner of the cage they're
        going to pass it on . and then they're going to like say <tell
        them like>- the time when they are the sleepiest- like they're
        having a bad day or something the people, so they'd be a little
        more CARELESS and they'd all JUMP when they got their
        injections and they'd all run for the spot and most of them
        would make it but some wouldn't .. and the ones that made it
        were the stupid ones and smart ones but still some of them didn't
        make it . like some smart ones didn't make it or stupid ones ..
        and I agree that - with Jessie - that I think that there were the
        stupid ones that did all the strong work but some smart ones did
        it too . and they brought it back and that's how they made the
        radios- the smart ones
Ca: Yeah I think they- they injected the steroids <into the stupid ones>
Wi: Except it said that- Justin said that THEY brought it back . THEY
        as in the people that are THERE
Je: What do you mean?
Wi: The people that live in the rose bush are the A group
S?:   No . how do you know the A group? it could be part of the
        B group
Va: How d'you know they'd be SMART ENOUGH to bring back the wire?
S?:   The smart ones could have taught them.. . . .
T: I really like the way that you're talking back and forth to each other .
        that's great . in a discussion it's best if you can try to respond to what
        the person who just talked said . I know it's not always possible but it's
        great when you're going back and forth

Clearly, given the opportunity to voice their opinions, these children are at
no loss for words and, although they do not agree on exactly which rats
escaped, they are able to make plausible predictions and back them up with
information gleaned from the story so far. They are also able to listen to each
other and respond to what others have said.

At the same time it could be argued that they make little progress toward an
agreed account of what (might have) happened. This is probably not
important in a discussion of this kind, where the purpose is to consider
predictions about the way in which the story will unfold in the future
(Donoahue, 1998). However there are many other activity contexts in which
the lack of progress toward an agreed conclusion – or at least toward a set of
alternative possible conclusions -- would be seen by most educators as a
serious limitation of free discussion. In the following extracts, we see
alternative teacher strategies, which involve a greater degree of teacher
structuring.

Extract 4. Estimating, Predicting and Guessing (WG2, Grades 3/4)

This extract comes from a lesson in a unit on mass in a split grades three/four class in a multi-ethnic, inner-city neighborhood (WG2). In the previous lesson, a number of groups had forgotten or failed to predict the outcome, prior to experimenting with different materials to find out whether mass changes when matter changes state. The teacher had emphasized the importance of this step, as she believed it to be critical for the scientific nature of the activity. In order to predict the outcome, one needs to consider what one already knows about the situation and how the experimental intervention is likely to change it. Predicting thus calls for a theoretical stance to the actions to be performed, which is crucial for the 'scientific' as opposed to the purely 'hands-on' approach to practical work in the classroom (Driver, 1983). In the same lesson, she had also drawn attention, at one point, to the need for the current speaker to take account of the contributions of previous speakers in framing his or her own contribution.

In the following extract the teacher revisits the issue of predicting by asking the class to consider the relationship between predicting, estimating and guessing: Are they essentially the same activity or are there important differences between them? The extract starts a few turns into the discussion, which continues for some thirty minutes, as different students consider various scenarios in their attempt to clarify the differences and similarities between the three "mental activities". By the end, as the teacher commented later, there was really nothing further for her to add; between them, the students had made all the distinctions that were found when they subsequently consulted the Concise Oxford Dictionary.

T:	You heard somebody who says they're not the same . now there's a whole bunch of \<you\> who say they're two different mental activities . What do YOU think, Emma?
Em:	I think that- well I don't agree with Peter because I think that they are two different things .. 'predict' is sort of like guess what will happen . and then 'estimate' is like you estimate the mass using a form of weight, centimeters . and it's not just with mass, you estimate other things .
T:	OK (nominating Arthur)
Ar:	I don't agree with Peter either because `predict' sort of means like what WILL happen and `estimate' is the er- do it- estimating something that's already there, but taking it further
T:	Now, listen to both answers . none of the answers are right or wrong . Will someone make a distinction? Arthur has made a little- even a more- greater distinction . OK?
Je:	I don't agree with Peter (laughs) because he said that 'estimate' is guessing .and 'predicting' is ALSO guessing but . um- actually guessing is also different from those two because when you guess you don't have very much information about the object or the thing
T:	uh-huh
Je:	- and so you're just making a- like a wild guess . but when you predict you're- you're actually you're maybe doing an experiment . and you are trying- using the information, you are trying to find out what would happen-
T:	mm
Je:	- and estimating is um different from guess because . you have um certain information, for instance if you estimate the mass, you get the object in your hand and you . you have the weights in the other hand and you can sort of . like estimate the . mass, so it's not guessing
T:	OK . Brian?
Br:	Um- I-I don't agree with Peter . um as well and I think that 'predicting' . is . if you predict then you're saying that . um . I'm predicting what's going to

happen to me tomorrow - what I'm going to do tomorrow and with 'estimating' you would- it would just be something like um . if . um . you would- you would est- you would estimate um . um .. estimate how heavy er something is

T: OK, that's a good attempt again
     Emma?

Em: I'd really like to revise it a little . but I started by <changing a little>and so we get a little information and then you go further, see what will happen next . I think it's true and . for estimating we also . like- . <for anything> you look at the object . and then you guess- well you DON'T guess but then you try to like you have a- some weights and then you . like try to feel the um- see what it weighs or that's how I think it is (trailing off)

T: OK .William?

Wi: I don't agree with um . Peter because . um in our math book it says estimate to the nearest tenth but it didn't- it doesn't say PREDICT to the nearest tenth

T: That's right . so what's the distinction?
     Good, you're using your experience in math . to help you make a distinction

     [Several more sequences of the same kind follow, in the last of which Brian makes a lengthy contribution in which he uses a tennis ball as example. In what follows, others work with his example]

T: Yes . so what happens is- Brian was saying if I say 'estimate' . 'estimate the mass of a tennis ball' . you're talking about a feature of the object . but if I say 'predict what will happen to the tennis ball if I threw it at a speed of ten kilometers' I'm asking you to tell about what HAPPENS . to the tennis ball . not something ABOUT the tennis ball .. and that ties back to right at the beginning Arthur says . 'predict' is what WILL happen .

Em: I think <Brian> was right and so in a sort of way his answer was right . but then . like I'm going to say . like I'm going to estimate it and predict- well 'estimate' is usually asking . something where you like already learned or have some information about the- like, say we use the tennis ball again, but then 'predict' is . what will happen AFTER you do something to a tennis ball or like maybe you might . bounce it and say how- what will happen

T: OK. (points to Brian)

Br: Um . if- . 'estimated' would be . that um- if- if you estimate the ball- the ball's . um . mass . and then you would predict whether it would be the same weight . after you- (trails away)

T: OK, you can say- . OK .. he- er Brian is trying to bring in a closer distinction .. he was saying estimating the mass of a tennis ball . now predict what would the mass of the tennis ball be if I put- if I attach, say, .. two feathers to the tennis ball-

Br: uh-huh

T: -would you say 'predict' or 'estimate'?

Ca: And also I agree with Brian because um 'predict' can be used like in two ways, like um- Brian said also . like you can- you can predict a weight or something . but it won't be so accurate, or you can ADD something to a weight and predict . what it will be . **

T: OK

Em: You know . when . Brian said like . it will be 'predict' . what the weight is if you added feathers, I sort of agree and sort of don't . because . it's also um . estimating the weight or the mass because . you're <just adding> something but you still have to estimate the mass, you're not really predicting what will happen

T: Yes, she picked- your example is not a very good example- (to Brian)

Br: Um . I- I-

T: - because she says it's still ABOUT the tennis ball it's not about what will
        HAPPEN to the tennis ball.
Br: Yes, but I'm saying that 'predicting' is not predicting the MASS that it will be,
        I'm saying that- PREDICT whether it will be the same . mass or will it change?
T: OK

Perhaps the most striking feature of this extract is the extent to which the nine-year-old students are able to contribute extended statements of their understanding of the relationship between the three abstract terms. They are also able to anchor their positions in relation to Peter's - unacceptable - claim that the three terms are essentially synonymous. Then, as the discussion develops, other students' contributions also provide building blocks for the collaborative attempt to refine the distinction. Having listened to Frances, for example, Emma sees the issue they are considering in a new light and, without waiting to be nominated, she initiates a new sequence:

> I sort of agree with Frances that before I would have estimated,
> it would have been ABOUT the object, like, for example, the ball -
> about the ball - but then 'predict' is like what will HAPPEN .
> if you do something to the ball, so I will now use 'predict'

Nevertheless, this extract clearly falls short of Nystrand et al's defintion of "true discussion", since it still shows the key features of triadic dialogue: the teacher initiates many of the sequences and frequently contributes a follow-up move. However, the difference between this extract and the traditional recitation script is that, here, the role of primary knower (Berry, 1981) does not reside in a single individual but is distributed among all participants as successive speakers each offer their contributions. In this context, the teacher's role is essentially that of manager or facilitator, selecting the next speaker when several are bidding, and trying to bring additional students into the discussion. In this role, her follow-up moves often merely acknowledge or summarize what has just been said and, when she does evaluate, it is to recognize the significance of the contribution to the joint enterprise rather than to evaluate its "correctness".

Bereiter (1994) calls this kind of collaborative talk "progressive discourse", which he defines as discourse that attempts to reach "a new understanding that everyone involved agrees is superior to their own previous understanding" (p.6). As we know from the previous lesson, this was exactly what the teacher was trying to encourage.

Finally, we consider an extract from an episode in which students were asked to consider the arguments that likely preceded a key historical decision.

Extract 5. Strategic Planning in World War Two (HK2, Grade 8)

In this example, a grade eight class is studying the second world war and, in the episode from which this extract is taken (HK2), they are considering the factors that would have had to be taken into account by the allied commanders in deciding how to launch what came to be known as the Normandy landing. The class has already read some relevant material and discussed it in small groups. Now, in a whole-class forum, they are drawing up the pros and cons for alternative ways of proceeding. At this point, the teacher is recording arguments on the blackboard as a formulation of each is agreed upon. She subsequently hands this task over to a student.

> T: OK. Can anyone respond to Neil's point of not enough troops?
> .. people who think that we should raid- how do we get past
> the problem of not enough troops? Omar?
>
> Om: Uhm- it's because they're fighting for their country so it doesn't
> really matter how many people die in the opposition . so- I guess
> that they are taking a chance when they are going to the air force
>
> T: OK- so so Neil has said that there are not enough troops- and your
> response....can you consolidate that? What are you saying in
> response to that?
>
> Om: People come to war to fight . and ** for their country . because it
> means **
>
> T: So- is it fair to say that you said that people come to fight- so you
> have to expect to lose men?
> [Several seconds of silence. David is holding up his hand]
>
> T: OK? David?
>
> Da: Uhm- I agree with him more although in a war you have to like think-
> go into a battle- like smartly . like you can't just go out and like commit
> suicide- like because it basically what you would do if you didn't have any
> troops . and like- although you wouldn't have enough troops- as well- uhm-
> we have the advantage- because they don't know that we are planning this
> surprise attack . so- it would be all of a sudden by surprise and they would
> be in some manner taken by surprise
>
> T: OK- do you want that listed as an original reason to attack?
> [Several indicate 'yes' and T writes]
>
> T: OK- see our connections? Neil is saying that we don't have enough troops, so
> we shouldn't be attacking . Omar just thought that people
> come to fight, we're going to lose men anyway, so you know, the number of
> troops really doesn't matter to us because we need to attack . David is
> supporting and saying well it's a surprise attack anyway, so even if we don't
> have enough troops, we may be OK because we are catching them off guard .
> [T continues to write]
> See if you can link, OK? Uhm Winnie
>
> Wi: If we wait to attack- then the Germans will take over more places and
> then they'll just become undefeatable- and we'll have no choice against them
>
> T: [writes] . Sareeka.
>
> Sa: Uhm- going back to the beginning . er- they said that you're endangering lives
> of troops . but like- what you have to think about is billions of people in the
> world that are like going to die from this . so . it's like you can't just like
> think of the troops who are going to die . you like have to think of the
> outcome of this . like our decision .. and you have to think of all those billions
> of innocent people that are going to die . so ..then you should- ..

In this extract the teacher clearly takes a more dominant role in the structuring of the discourse. However, she does not assume the role of

primary knower with respect to the arguments for and against the attack. These arguments are contributed by the students in their roles as strategic planners. Nevertheless, the teacher is more than simply assigning speaking turns. Here she acts as primary knower with respect to the form of the debate, in which positions are stated for or against the issue under consideration. However, this role is not realized through direct instruction in sequence initiating moves but through her follow-up moves, which acknowledge each contribution and, through further questions, seek to obtain clearly stated arguments to be written in the decision chart. In many sequences, her final follow-up takes the form of a summary of the point that has been made or a review of several points and the relationship between them. In making these responsive contributions, she also implicitly models the genre of formal argument, which is part of what she wants her students to learn in this curricular unit.

DISCUSSION

Before moving into a discussion of the issues raised by the preceding extracts, it may be useful to summarize the findings of the two types of analysis.

Over the duration of the project, there was a sustained and successful attempt in these classrooms to adopt an inquiry approach to curriculum and this, in turn, led to a more negotiatory and dialogic style of interaction.

More specifically, there was a significant increase in student initiation of sequences and, correlatively, a decrease in the proportion of sequences initiated by a teacher question. Furthermore, when the teacher did initiate with a question s/he was more likely to request information for negotiation rather than known information; there was also a significant increase in the frequency of follow-up moves realized as requests for further (negotiatory) information. Also in the follow-up slot, there was a significant increase in the frequency of null evaluations, thereby allowing the discourse to proceed in a more conversational style.

Despite these departures from the 'recitation' mode of teacher-whole class interaction, there were very few sequences that developed into 'true discussion', as defined by Nystrand et al. (2002). When such events occurred, they tended to arise from the expression of conflicting points of view with respect to issues about which students felt strongly.

Nevertheless, as illustrated by Extracts 4 and 5, there were, in addition, a number of quite lengthy episodes in which teacher-led

> extended stretches of interaction enabled participants to systematically explore an issue and work toward some form of conclusion.

These findings raise a number of questions of pedagogical significance. However, for reasons of space, we shall consider only two:

1. What is it about 'dialogue' that is important for student learning?

2. Why did dialogue (defined as 'true discussion') occur so rarely in the classroom of these inquiry-oriented teachers?

Learning through Dialogue

The arguments for the enactment of learning and teaching through purposeful, dialogic knowledge building have been developed at length in a number of recent works (Barnes, 1986; Mercer, 1996; Nystrand, 1997; Wells, 1999) and can be aptly summarized in the aphoristic statement that "knowledge is constructed and reconstructed in the discourse between people doing things together" (Franklin, 1996, quoted in Wells, 1999). In such discourse, there is the potential for three important features to work together synergistically.

First, when students are given the opportunity to participate in the cumulative construction of community decisions they recognize that their contributions are consequential for the decision that is jointly constructed over successive turns. Where this affects their control over future actions, as in Extracts 1 and 2, it is easy to see why they are keen to express their opinions. But, as in Extracts 4 and 5, this motivation can be extended to decisions about topics of a more impersonal and abstract nature (Davis, 2001). What seems to be important in either case is, first, that they are invested in the outcome of the discourse and, second, that the outcome is not predetermined in advance.

The second feature is the collaborative nature of the enterprise. While competition can certainly be a motivator for cooperation (Hatano and Inagaki, 1991), it seems that there is an equal, if not greater, satisfaction to be gained through working with peers toward a jointly achieved outcome. Not only does this harness the social orientation of students' interests, but it also enables them to achieve together more than any of them individually could have achieved alone. This is particularly clearly evident in Extract 4.

But, in the long term, the greatest benefit of collaborative knowledge building is the development of understanding reciprocally between individuals and the group. As Vygotsky noted, "the individual develops into what he/she is through what he/she produces for others" (Vygotsky, 1981, p. 162) and it is in the effort to formulate our ideas for others that we most effectively clarify them for ourselves. This can be seen happening in all the extracts above.

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But, as Bakhtin (1986) argued, the effort to fully comprehend the utterance of another also involves uptake and an active, if only incipient, movement toward a response. In both the act of 'saying' and that of responding to 'what is said' (that is to say, the text produced in the act of saying), therefore, individuals actively participate in the building of a common understanding and simultaneously extend and refine their own (Wells, 1999).

All these features characterize the "progressive discourse" of productive intellectual communities, where, as Bereiter (1994) expounds the concept, the ideal is that participants are willing to revise their own opinions as they open-mindedly consider the proposals and arguments of others and that, over successive contributions, the common understanding thus jointly created is superior to that with which the participants started. In the same article, Bereiter goes on to argue that this ideal can also be adopted in the classroom, for the knowledge that is jointly constructed does not have to be new in any absolute sense; "the important thing is that the [knowledge building] be progressive in the sense that understandings are being generated that are new to the local participants and that the participants recognize as superior to their previous understandings" (Bereiter, 1994, p. 9).

In our opinion, it would not be unreasonable to claim that this sort of progressive discourse is occurring in all the preceding extracts, though only intermittently in the earlier ones, where the motivation is more that of interpersonal competition than that of knowledge building per se. However, as most scholars would agree, the advance of understanding is rarely free of competitive argument as individuals seek to make their own opinions prevail (Hatano and Inagaki, 1991). The important criterion is not a lack of passion, therefore, but a willingness to listen to alternatives and to adopt those that advance the collective understanding, whether this is action-oriented (as in Extracts 1 and 2) or more conjectural or theoretical (as in Extracts 3, 4 and 5). It is in this sense that learning and teaching can aim to be dialogic and, under the right conditions, succeed in achieving this aim.

Contexts and Formats for Dialogue

While the distinction between 'monologic' and 'dialogic' interaction provides a useful way of characterizing the dominant mode in which the discourse in different classrooms is organized, it is clear that this simple binary distinction is not adequate to account for the various ways in which teachers who aim to be 'dialogic' actually attempt to achieve this goal in relation to whole curricular units. Consider the following brief extract from a grade 6 social studies unit on North American history (KM2, Grades 6/7).

T: What did La Salle declare? . Matthew?
Ma: The Mississippi river?
T: What about the Mississippi river?
Ma: All the water that flowed down- .
T: What did he declare about it? .. er- Keith?
Ke: Well um he claimed that it was French um the ***
T: Right, that it now belonged to to France .. Who was the person who gave him
        the power to say that it did in fact belong to France? .. Fazad?
Fa: The king of France?
T: Yes . who was the king of France? Let's see who remembers this- er . Lillia?
Li: King Louis the:: something?
Sa: (whispered) thirteenth
        [Many students mumble at once]
T: OK . its- Irene?- Louis the something?
Ir: Fourteenth?
T: King Louis the fourteenth . OK, good

From this extract alone, one might imagine that the teacher was involved in
a traditional quiz, in which her chief concern was that the students should
produce the correct answers. However, as the continuation of her follow-up
move makes clear, the preceding extract served a very different purpose.

> T: So that's the sort of attitude that the British and the French had. They would
>   come to the area that we now know as Canada and they would say "We claim
>   this territory for our own." And we talked a little bit about some of the battles
>   that went on with Native peoples but we never really looked at it from their
>   perspective- how the Native peoples felt about or reacted to the fact that these
>   British soldiers or these French couriers de bois were coming in and saying
>   'this land now belongs to .. to England or it now belongs to France'. And up
>   until quite recently in .. in historical um- <stuff>- um in historical classes as
>   well- people weren't too interested - or- there weren't a lot of materials around
>   to help people find out about the Native people's point of view in terms of
>   what happens to- um- to the land that they had lived on and occupied for a
>   long long time

In fact the class was preparing to role-play a hearing before the Supreme
Court of Canada, in which an (imaginary) native band, the Wish'ga , were
reclaiming title to their ancestral land from the government of Province West.
Revisiting the French annexation of the land around the lower Mississipi was
intended to help the students to recall the previous study they had made of
the implications for Native peoples of European expansionist policies in order
to better prepare them to construct arguments and counter-arguments for
the cases of the competing parties in the Wish'ga claim. In other words, the
reviewing of factual information already studied was judged by the teacher to
be helpful for the students' forthcoming historical inquiry into Native
peoples' experiences through a dramatic simulation constructed by the
students.

Put differently, the function that a discourse format is serving on a
particular occasion depends on the purpose of the activity in which it occurs
and on how the activity is intended to contribute to the unit as a whole.
Establishing "common knowledge" (Edwards and Mercer, 1987), for example,

whether by eliciting information through "known answer" questions or by sustained exposition of some kind, is often a crucial preliminary step in an inquiry-oriented curricular unit, in order to ensure that students are well prepared to make good use of the open-ended and explicitly dialogic activities that are to be the heart of the unit. But, equally, a review activity may serve as the conclusion to a unit and function simply as a form of evaluation of what students have learned and can recall.

In fact, in the early observations, the small number of episodes that included stretches of dialogue occurred exclusively when the class was planning future activities. In the late observations, by contrast, episodes including stretches of what we consider to be dialogue occurred when making sense of already gathered information, either in speech or in some form of written representation, or in reviewing what had been achieved over the course of previous activities. It would seem, therefore, that – as already suggested – in the early observations, when dialogue occurred, it erupted spontaneously when students felt strongly about proposed actions, whereas, in the later observations, it was more deliberately planned for in the way in which teachers involved students in interpreting and/or commenting on information or experiences arising from preceding activities.

A second factor that plays an important role in determining a teacher's choice of discourse format is the extent to which students are familiar with the dialogue format and willing to take the risk of making a contribution that may not be judged by peers (or teacher) to advance the topic under discussion. In these circumstances, a teacher may choose to act as initiator of most sequences in order to elicit contributions from less vocal or less confident students and to ensure that all those who want to contribute get a turn.

But probably the chief reason for teachers choosing a format in which they retain control of the floor is the same as for the chair of an official meeting: to keep discussion on track and, in Bereiter's (1994) sense, 'progressive'. Evidence for this explanation can be seen in some of the follow-up moves they make, as they summarize - and in some cases reformulate - what has been said in order to establish a clear basis for development or disagreement. Such moves occurred in all the episodes from which the five extracts above were taken and, in the case of the social studies unit on Native peoples' land claims, when asked at the end of the unit, the students said they appreciated the teacher's tight structuring of the review of the material encountered earlier in preparing them to construct the cases they were to present to the Supreme Court (Kowal, 2001).

However, keeping control of the floor, does not necessarily entail also keeping control of the content of the discussion. While it is almost always the teacher who proposes the topic of an episode and brings it to a

conclusion, the topics of individual sequences are often selected by the students as they propose alternative perspectives on the issue that is "on the floor" or react to a preceding contribution by a peer. It is noticeable that, in episodes that have the "feel" of dialogue, the proportion of sequences initiated by a substantive teacher question is lower than in other episodes; instead, the teacher initiation is often limited to selecting the next speaker and implicitly giving him or her the right to select the topic (e.g. as in extract 4). It is also noticeable that many student contributions receive no evaluation by the teacher, but simply an acknowledgement. It is then at the discretion of the next selected student as to whether or not to respond to what has just been said. As can be seen in several of the extracts, students are aware of the expectation that they will connect their contribution to those of others and are doing so very explicitly and sometimes very cogently as well.

In sum, we believe, there are good grounds for arguing that the various teacher-led discourse formats found in the above extracts and in several other episodes amply justify characterization as "dialogue." Not surprisingly, given the inquiry orientation of the project, these formats occurred significantly more frequently in the later observations than in the early ones, as the teachers experimented with ways of making interaction in whole-class settings dialogic in practice as well as intent. Certainly, these formats are different from informal, conversational, discussion in a number of important respects but, as we argued above, spontaneous conversation involving all thirty or so participants in a typical classroom is neither feasible nor educationally desirable. By contrast, the discussion formats that these teachers have developed enable all participants to contribute to the joint construction of knowledge to the extent of their interest and ability and collectively to achieve understandings that are richer and deeper than typically occur in transmissionary classrooms.

We started this discussion by noting the lack of convergence between our impression of frequent stretches of dialogue in our data and the low frequency of sequences of "true discussion" according to the criteria proposed by Nystrand *et al.* (2002). Having now carried out a qualitative analysis of the episodes recorded in the classrooms of DICEP teachers, we believe that Nystrand et al.'s conception of "true discussion" is too mechanistic. The number of adjacent turns by students and the duration of such student-student interaction is not an appropriate way of operationalizing the construct "dialogue". Rather, it is the extent to which the teacher provides opportunity for and encourages what Bakhtin (1986) called "the interanimation of voices" - students' and teacher's together. It is for this reason we have chosen to use the term "dialogue" to refer to sequences of talk in which this interanimation of voices occurs.

However, the purpose of the present study was not to make a direct comparison, since this would not have been feasible given the different conditions under which the data in the two studies were obtained and the

different settings in terms of grade levels. Rather, our purpose has been to investigate the changes that took place in the teacher- whole class discourse that occurred over the course of a collaborative action research project in which the teachers were attempting to create classroom communities with an orientation to inquiry as the dominant mode of learning and teaching. That there were substantial changes in the desired direction in the teachers' practices has been amply demonstrated in their own published accounts[8]. Here, we have attempted to show how these changes in practice were consequential for the discourse formats employed and, in particular, how there was a clear shift over time toward modes of discussion that enacted dialogic inquiry.

CONCLUSION

To some readers, it may be surprising that triadic dialogue is so pervasive throughout the corpus analyzed here. But as discussed above, there are good reasons for teachers to use some variant of this genre. Where large numbers of participants are involved, as in most classrooms from kindergarten to university, it is important to have generic discourse structures to which all participants orient, so that discussion can be orderly and, ideally, progressive. The IRF sequence clearly fits this requirement. What matters for the quality of interaction, it seems, is not so much how the sequence starts, but how it develops and this, as we have argued, depends critically on the teacher's choice of roles and on how he or she utilizes the follow-up slot.

There is also a second probable reason for the persistence of this genre, and one that is quite compatible with the inquiry orientation to which our group is committed. At a macro level, the IRF structure can be seen to aptly characterize the teacher's major responsibilities. As the participant primarily responsible for the classroom community's engagement with the prescribed curriculum, the teacher selects and prepares curriculum units and launches them in ways designed to provide appropriate challenges for each student member. This is the Initiation. Students, in turn, are expected to Respond by taking up some of the challenges presented and by attempting, either alone or in collaboration with others, to go beyond their current understanding or level of skilled performance. The teacher's Follow-up then consists in responding to the students' attempts by providing assistance in a manner that jointly creates a zone of proximal development that enables them to "go beyond themselves" (Vygotsky, 1987) in relation to the challenges that they have taken up and to which they are personally committed. Viewed from this perspective, the IRF discourse genre - when appropriately used - can be seen as playing out the same fundamental responsibilities at the more micro level of the co-construction of meaning in relation to the more macro level activities in which the students are engaged.

However, to recognize the pedagogical effectiveness of particular sub-genres of triadic dialogue is not to positively endorse the use of the genre as a whole, for all purposes and in all situations. As we have argued above, it is important to distinguish between the various forms triadic dialogue can take and to evaluate particular instances in terms of the goals of the activities in which they are used. It is also necessary to ensure that, over longer periods of time, such as complete curricular units, the balance of discourse formats chosen supports the development of an ethos of dialogic inquiry in the classroom and, with this, the development of a disposition of respect for diversity of experience and difference of opinion, and a desire to increase understanding of the topics and issues that are seriously raised, whoever the originator. Thus, rather than inveighing against the persistence of this genre in teacher-whole class interaction, as for example Wood (1992) and Lemke (1990) have done, we suggest that it would be more productive for educators to try to understand the ways in which its underlying structure can be adapted to meet the varied demands of the pedagogical relationship, so that we can more fully exploit its potential to lead to a more exploratory, dialogic mode of knowledge construction.

NOTES

1. In describing the classroom interaction that they observed in this mode, Newman, Griffin and Cole (1989) noted its particular merit of having "a built-in repair structure in the teacher's last turn so that incorrect information can be replaced with the right answers" (p.127).

2. Although for purposes of completeness, all exchanges were coded, it is only with the exchange of information that this report is concerned.

3. It is for this reason that Mehan (1979) dubbed this three part exchange 'IRE', where the E stands for Evaluation.

4. We are very grateful to Erica Camalich for her assistance in coding and tallying the data.

5. Coding of linguistic data cannot be an entirely objective process, since a high proportion of moves are open to more than one interpretation. Rather than carry out and report a test of intercoder reliability, therefore, we chose to have one coder make the final decision in the case of disagreement. The number of such disagreements occurred on less than 5% of the total number of coding judgments made.

6. This presentation of results is the reverse of the order described by Chi (1997). However, in the actual analysis of the data the two approaches proceeded in parallel. As has frequently been observed, it is often in the close scrutiny of a particular episode that is required in order to code it that one becomes qualitatively aware of the fine detail of the interaction involved.

7. In fact, although early in the project, this episode occurred at the end of the teacher's participation and was therefore included in the "late" episodes.

8. See Wells (Ed.), 2001, and references therein.

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Appendix 1. Categories of the Coding Scheme Referred to in This Analysis

Episode Task	M	Math Discussion
	P	Science Practical
	S	Science Discussion
	D	Science Presentation
	O	History Practical
	H	History Discussion
	R	History Role-Play
	L	Literature Discussion
	B	Reading Discussion
	W	Writing Discussion
	T	Show and Tell
Episode Activity Orientation	C	Commenting
	O	Organizing
	P	Planning
	T	Reporting
	S	Problem-Solving
	G	Generating
	L	Launching
	B	Constructing
	F	Formulating
	M	Monitoring
	R	Reviewing
Sequence #	1 - n	
Exchange Type	N	Nuclear
	D	Dependent
	M	Embedded
	P	Preparatory
	&N	Additional Nuclear
Cognitive Demand	R	Rote recall
	P	Previous Conversation
	M	Memory/Prior Knowledge
	G	Generalization
	A	Analysis/Explanation
	S	Speculation
Exchange Initiator	T	Teacher
	S	Same student as in previous exchange
	N	New student
Prospectiveness	D	Demand
	G	Give
	G+	Give Plus
	A	Acknowledge
Initiation Function	Information: Assumed Known	
	F	Fact
	A	Rule-governed answer
	J	Conventional explanation

R	Report of public event
L	Connection

Information: Personal

E	Experience
I	Imagination
N	Personal Opinion
K	Exclamation

Information: For Negotiation

O	Opinion
P	Prediction
X	Explanation
C	Conjecture
B	Connection

Goods & Services: Assumed Known

D	Act

Goods & Services: Personal

G	Intention

Goods & Services: For Negotiation

S	Suggestion
Q	Clarification Request

Response Function	K	Acknowledge
	Y	Confirm/Disconfirm
	U	Stall
	W	Exclamation

Information: Assumed Known

F	Fact
A	Rule-governed answer
R	Report of public event
J	Conventional explanation
L	Connection

Information: Personal

E	Experience
I	Imagination
N	Personal Opinion

Information: For Negotiation

O	Opinion
P	Prediction

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	X	Explanation
	C	Conjecture
	B	Connection

Goods & Services: Assumed Known

	D	Act

Goods & Services: Personal

	G	Intention

Goods & Services: For Negotiation

	S	Suggestion
	Q	Clarification Request
	Z	Give Clarification
	M	Cite text (e.g. cite a question)

Response Length	1	Minimal (less than 1 clause)
	2	Main clause (+ dept. clause)
	3	Three or more clauses

Evaluation Level	H	Accept + Uptake
	Q	Follow-up Question
	L	Accept/Reject
	P	Accept + Praise
	J	Reject + Justification
	N	Null Evaluation

A complete version of the Coding Manual is available on request from the first author.

HACIA EL DIALOGO EN EL SALÓN DE CLASE: APRENDIZAJE Y ENSEÑANZA A TRAVÉS DE LA INDAGACIÓN

RESUMEN

Existe cada vez mayor acuerdo entre aquellos que estudian los salones de clase en que es más probable que el aprendizaje sea más efectivo cuando los estudiantes se involucran activamente en la co-construcción del significado a través de la discusión de los temas que son relevantes para ellos. En este artículo reportamos los resultados de un proyecto de investigación-acción colaborativa a largo plazo, en el que los profesores y profesoras intentaron crear las condiciones para la discusión por medio de la adopción de un enfoque de indagación en el currículo. Los resultados de una comparación cuantitativa entre las observaciones hechas al inicio y posteriormente a la implicación de los maestros en el proyecto, mostró un número significativo de cambios en las características del discurso entre el/la maestro/a y la clase, con un giro hacia un modo más dialógico de interacción. A pesar de ello, la frecuencia de momentos de "verdadera discusión", tal como la definió Nystrand *et al.* (2002), fue baja. Sin embargo, cuando las mismas observaciones se examinaron cualitativamente, se encontró clara evidencia de un incremento a lo largo del tiempo en la habilidad de los maestros/as para facilitar que los estudiantes generaran comentarios y explicaciones en forma co-construida. El artículo concluye con una reconsideración del propósito del "dialogo" en el salón de clases y los objetivos y estrategias de los maestros/as al tratar de lograrla.

PALABRAS CLAVE: Discurso en el aula - Teoría de la Actividad - Docentes investigadores