WRITING IN KNOWLEDGE BUILDING COMMUNITIES

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Abstract

Despite the increasing technologization of our society - or perhaps, indeed, because of it - literacy continues to be one of the principal goals of education. Yet the way in which the goal of literacy development is interpreted in classroom practice too easily becomes reduced to the mastering of ‘basic skills’, as students engage in routine exercises in reading and writing, drawn from textbooks that they have no part in choosing. However, ‘full literacy’ - the disposition to engage appropriately with texts of different types in order to empower action, thinking, and feeling in the context of purposeful social activity (Wells, 1990) - will never be achieved until students’ interests and purposes become the driving force for the literacy curriculum. This is even more true for students discovering how writing can be an occasion for learning. In this position paper, therefore, we focus on some of the roles that writing can play in developing literacy and learning when it takes place within classroom knowledge building communities. To illustrate our argument, we draw on examples from the classrooms of teacher researcher colleagues.

The Background in Recent Research

It has become a cause of considerable concern that writing is still not playing as full a role as it might in students’ literacy and intellectual development. The alert was sounded a quarter of a century ago by James Britton and his colleagues (Britton et al., 1975) when, based on their
survey of the writing carried out by students in English secondary schools, they discovered that
the majority of the written texts that students produced were of a ‘transactional’ kind,
reproducing the information they had been taught, and written for a teacher reading in the role of
examiner. Similar findings were reported a decade later in the United States by Applebee,
Langer and Mullis (1987). As a result of these findings, considerable efforts were made to give
much greater attention to ‘writing across the curriculum’ (Martin, 1984) but, as Langer and
Applebee (1987) point out, they had little impact on teaching beyond the English classroom.

In the meantime, writing had become a major focus in literacy research, with models of the
writing process proposed and further elaborated by such scholars as Flower & Hayes (1981), de
Beaugrande (1984), and Bereiter and Scardamalia (1987). However, with the exception of the
latter, this research did not have much connection with classrooms and was premised very
largely on a conception of writing as a cognitive-linguistic activity carried out by individuals in
isolation from a discourse community of other readers and writers.1

A reaction was not slow to develop, however, pointing out the importance of considering the
community in which reading and writing takes place (Street, 1984). An important impetus for
this perspective came from a variety of more ethnographic studies, ranging from Heath’s (1983)
research in three communities in the Piedmont Carolinas to the crosscultural research of Scribner
and Cole (1981), who focused on the use of the syllabic script by the Vai people of Liberia.
What these investigations demonstrated was, first, that literacy practices vary very considerably
from one community to another and, second, that the intellectual and social consequences of
learning to read and write depend crucially on the range and frequency of community activities
in which written texts play a critical role.

This more socially oriented interest in writing has also been seen in classroom-based research,
particularly in elementary classrooms. Dyson (1989,1993), for example, has documented the
strong social influences at work around the texts that primary students write and, more recently,
others have explored some of the less positive aspects, for example when writing is used to
jockey for social position (Lensmire, 1994). Writing workshop activities have also been explored
by a number of teacher researchers and, in their work too, the importance of the social purposes
for writing are strongly emphasized, as are some of the tensions that can arise around issues of
gender and ethnicity (Gallas, 1998; Gianotti, 1994).

A clear feature of these classroom studies, connecting them to much writing undertaken outside
educational contexts, is the primary concern with meaning and purposeful communication.
Where writing takes place because the author has something to communicate to other interested
readers - as is particularly evident in the recent explosion of email and chat room writing - it is
concerned first and foremost with making and discovering meaning, as this occurs in the act of
writing. This point was clearly made by Smith (1982), in his insightful exploration of the act of
writing; as he argued, composing takes precedence, both logically and temporally, over
transcription into conventional surface form, and too great a concern with the latter in the first
draft stage can seriously impede the generation and connection of the meanings to be
communicated. Similarly, Murray (1982) claimed that the meaning of a text needs to be
discovered from a re-visionary reading of the first draft before the author fine-tunes the text for its
conformity to conventions of correctness.

From these various kinds of research, both cognitive and social, a number of conclusions can be
drawn:

• The process of becoming literate is inherently social in nature, even though it is
individuals who read and write. Literacy events do not take place in isolation, but in
relation to a discourse community of which the reader or writer is, or wishes to become, a
member.

• Writing is first and foremost concerned with developing a structure of meaning; the
specification of what one wants to say becomes clearer and more complete in the actual
writing and revising of the text for a particular purpose and audience.

• It follows, therefore, that the literate practices and values that individuals develop depend
on the purposes for reading and writing that they encounter in home, school and
community activities; where these differ, or even more when they are in conflict, the process of becoming literate is rendered increasingly difficult.

**Why Focus on Writing?**

As all the researchers mentioned above would agree, writing involves much more than the transcription of speech. Both in cultural history and in ontogenetic development, it is writing that brings speech to conscious awareness (Vygotsky, 1987) and, in so doing, provides a perspective from which to construct a conscious ‘theory of speech’ (Olson, 1994). A first reason for focusing on writing, therefore, is that it is in attempting to communicate in this new mode that children most effectively discover and master the relationship between speech and written text. This point has been forcefully made by Marie Clay (1983), who argues that because of the demands that writing makes to represent deliberately and explicitly the features that in speech are produced without need for conscious attention, writing is a surer way than reading into mastering the written code; for this reason, writing is a key component of her ‘Reading Recovery’ program (Clay & Cazden, 1990). Writing also contributes significantly to the development of metalinguistic awareness (Adams, 1989; Ehri, 1985); indeed, as Olson (1994) points out, phonemic awareness is more a consequence of learning to write than a necessary prerequisite, as proponents of phonic training have recently argued.

Writing is more than speech written down in another sense. Although saying it first and then writing it down may be the way in which children first learn to write, they very quickly discover that the two modes of communication are organized on different principles. This is partly because, unlike face-to-face oral interaction, writing is monologic in its production; it is also because what can be taken to be shared information among co-present interlocutors must be made more fully explicit for readers distant in time and space, particularly if those readers are unknown to the writer. This leads to the second main reason for focusing on writing: In order to make one’s meaning clear for others, one must first make it clear for oneself. Writing is thus potentially a powerful means of developing one’s own understanding of the topic about which one is writing.
However, as emphasized above, writing is also social and dialogic - in ways that are not so
dissimilar from speech. As Bakhtin (1986) pointed out, all utterances, whether spoken or
written, are links in a chain of dialogue, both responding to preceding utterances and anticipating
further response. To comprehend another’s utterance, he argued, is already to make an incipient
response to it. Furthermore, no utterance comes out of the void; it always builds on what has
gone before by revoicing what has been heard or read, or by exemplifying, adding to, or
qualifying what has already been said or written. Writing thus encourages one to interrogate
one’s interpretations of others’ utterances as well as of one’s own personal experiences and
beliefs in order to add to the ongoing dialogue in some way that enriches the community’s
understanding of the relevant area of experience (Wells, 1999).

Stated in these rather abstract terms, these latter beneficial effects of writing may seem to apply
only to those on the ‘cutting edge’ of the field in which they work, whether this be as scientists,
or historians, or as creators of ‘original’ literary works, such as novels, plays or poems.
However, as Bereiter points out, in arguing the value of what he calls ‘progressive discourse’ for
the classroom:

... classroom discussions may be thought of as part of the larger ongoing
discourse, not as preparation for it or as after-the-fact examination of the results of
the larger discourse. The fact that classroom discourse is unlikely to come up
with ideas that advance the larger discourse in no way disqualifies it ... The
important thing is that the local discourses 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)

The same, we would argue, applies to written discourse. In fact, the reference to ‘discussion’ in
the previous quotation brings us to the final reason for focusing on writing. Writing creates a
permanent representation of meaning, whatever the field or discipline concerned. As such, the
text can become the focus of discussion within the community, in an effort to understand it,
 improve it, or respond to it in some way that gives voice to the community’s interests and
concerns. It is particularly on this function of a written text as an ‘improvable object’ that we wish to focus in the second part of this paper. But first, it is appropriate to recognize two developments that have occurred since Britton et al. (1975) published their report.

Changing Approaches to Writing in the Classroom

There certainly have been significant changes, in the last twenty-five years, in the way in which the learning and teaching of writing is approached in the English-speaking world. Emig’s (1971) seminal work on the composing processes of twelfth graders opened a new door for writing researchers. In place of traditional product analysis, they began to explore what goes on in individual writers’ heads while composing. (e.g., Flower & Hayes, 1981, 1984; Bereiter & Scardamalia, 1987), and this, in turn, led to a shift in perspective from a view of writing as a linear process to a recognition of its recursive nature, involving pre-planning and revising as ongoing component activities. Reflecting this view of writing as process, writing instruction in North American schools has, over the past two decades, gradually changed from the traditional teacher-directed, product-oriented practice to a more process-oriented approach.

This theoretical emphasis on process-oriented writing instruction has, in general, brought about positive changes in teaching practice. The writing assessment report in American schools, compiled by Applebee et al. (1994), notes that process-oriented writing instruction comes in many different forms and that, in contrast to the findings of their 1988 study, the number of teachers who put more emphasis on process-oriented instruction now outnumbers those who put a primary focus on skill-based instruction. Furthermore, their report shows that students’ writing achievement increases when teachers, using process-oriented instruction, emphasize planning and writing multiple drafts. Similarly, in the 90's, the writing process approach has become widely accepted in Canadian schools although, as in the United States, the interpretation and implementation of the process approach varies considerably from teacher to teacher and from school to school.

In elementary schools, it is ‘process writing’, the version of process-oriented writing pedagogy proposed by Graves and his colleagues (Calkins, 1983, 1986; Graves, 1983), that has become
most influential. The principles of process writing include the notion of writing as a process of discovery, the importance of students engaging in planning, pre-writing, and revision to improve their texts, producing and working on multiple drafts, and the use of writing conferences. Nevertheless, although the emphasis on process writing has brought about significant, and mainly beneficial, changes in teachers’ orientations to writing, some concerns have been expressed about the ways in which this approach is actually practised in schools. One of the criticisms has been that, despite the theoretical recognition of writing as a recursive process, it is still the case that, in many classrooms, writing continues to be presented as a linear sequence of planning, pre-writing, writing, revising and publishing.

A second criticism has emerged from the focus on the social purposes of writing. In part in reaction to the strongly cognitive emphasis in research on writing processes, there has been a growing emphasis, in North America, on the different genres of writing, conceived as socially constructed, typical ways of responding to recurrent rhetorical situations (Miller, 1984). In place of the previous conception of writing as a single generic process, this work has led to a recognition that the different genres of writing required for different social-rhetorical purposes require different strategies to accomplish their goals. In this context, a criticism made of many ‘process writing’ classrooms is that students mostly engage in expressive writing, based on personal experience, and fail to develop strategies appropriate for other written genres, particularly those that are required for success in high school. As a result, greater emphasis is now being given to exploring ways in which the process-oriented approach can be more effectively integrated with instruction that takes account of the functions and forms of the genres that are important in school and society (e.g., Applebee, 1986; Langer & Applebee, 1984).

However, in Australia, where process writing had a strong impact on the teaching of early writing (Walshe, 1981), a more negative reaction occurred. Alarmed by the evidence of research on student writing that showed a lack of appropriate development and a predominant focus on a very few genres, Martin and his colleagues (Martin, 1985; Wignell, Martin & Eggins, 1989) started to examine the range of genres that students need to master to succeed in school. Based on their research, they subsequently proposed an influential genre-based theory of writing
and writing pedagogy with a view to displacing the dominant process-writing approach (e.g., Cope & Kalantzis, 1993; Gray, 1987; Martin, Christie, & Rothery, 1987).

At the heart of this genre-based pedagogy is the belief that, in order to master the written genres of schooling, students need direct instruction; genre forms should therefore be explicitly taught through the analytic study of models, the learning of genre elements and their sequencing, and the collaborative then solo production of exemplars. On grounds similar to those advanced by Delpit (1988), proponents of this approach also argue that such explicit, teacher-directed pedagogy is particularly important for minority students for, they claim, it is through the explicit teaching of the socially powerful genres that the powerless and the disadvantaged in society will gain their rightful access to power (Martin, 1993).

Genre-based pedagogy has not been without its critics, however - as is evidenced by the so-called ‘genre debate’ in Australia (Reid, 1987) and by the reactions of many educators in Britain and North America. Much of the criticism has been centered on “the disjuncture between the claim that meaning is encapsulated in textual objects, genres as autonomous systems, and the avowal of a social constructionist functional model of language” (Freedman & Richardson, 1997). From a theoretical perspective, the objection is to the overemphasis on the formal features of genres and the consequent downplaying of the socially situated nature of writing, with its dynamic selection and deployment of a range of generic features to meet the demands of the particular rhetorical context. And from a pedagogical perspective, the objection is somewhat similar: Although in presenting the rationale for their approach, the advocates of genre-based pedagogy argue that text construction is embedded in, and responsive to, social context, in classroom practice the study and use of specific genres tends to be approached predominantly from a linguistic point of view; instead of genuine interest and communicative purpose being the basis for working with a particular genre, the genre is assigned by the teacher and students are instructed in the relevant linguistic features and then required to use them in the construction of their own written texts.

As this brief review shows, both process writing and genre-based pedagogy have attempted, in their different ways, to take the learning and teaching of writing into new territory. Both seek to
empower student writers by making their writing more relevant and meaningful. But, as these approaches are enacted in classroom practice, both have been criticized for separating writing from the full range of activities in which students are engaged and for a tendency to make writing an end in itself rather than seeing it as a means of achieving larger social and intellectual goals that are of genuine interest to the writers.

If these criticisms do apply, however, it is not to the writing pedagogies we should first look, for the problem is likely to be much more deep-rooted. How new pedagogical approaches to writing are enacted cannot be separated from the teacher’s overall “vision” of education and from the roles that discourse of all kinds plays in the life of the classroom community. To attempt to “implement” a new form of writing pedagogy, however sound it is in itself, is unlikely to achieve the desired results if all other aspects of curricular activity remain unchanged. In other words, decisions about how to help students master the ‘technology’ of writing cannot usefully be taken on their own for, as with reading and talking, what students learn about writing will depend upon what they use writing to do.

**Learning and Knowledge Building**

Schooling serves many functions in contemporary society, one of which is undoubtedly to prepare students to participate in the wider society by equipping them with the skills and knowledge necessary for productive employment. However, when this is treated as the preeminent function, and still more when it is interpreted in terms of transmitting a syllabus of pre-specified, decontextualized knowledge and skills in a climate of competitive individualism, it is both ineffective in achieving its objectives and, what is worse, it is a travesty of education in its fullest sense.

The arguments against this form of schooling have been cogently set forth by a wide variety of practitioners as well as theorists.² The most salient objections can be briefly restated in positive form as follows:
• Learning is not a separate form of activity, but an inherent aspect of engaging with others in purposeful actions that have significance beyond themselves for all the participants. It involves an ongoing transformation of the learner/participant and, as such, typically occurs not on a single occasion but incrementally over time.

• Engagement occurs most fully when each participant has a personal interest in achieving the goals of the activity and in making solutions to the problems encountered en route.

• In working together, participants make use of their existing resources and draw on assistance from multiple others; these include peers and other adults as well as the teacher, and electronic and library sources of information as well as the official textbook.

• Teaching certainly involves advance planning, introducing new areas for exploration, presenting challenges appropriate to the students’ interests and capabilities, and evaluating both individual achievements and the effectiveness of the activities in which participants have been involved. But just as important, it involves sharing these responsibilities with students. It also involves providing contingently responsive assistance to individuals and groups as they engage in particular tasks, the aim of which is to enable them not only to complete the task but also to develop the ability to do so on their own on future occasions.

In our own work and with the school-based members of DICEP, our collaborative action research group, we have attempted to honor these principles by creating ‘communities of inquiry’ in our classrooms. Within the constraints imposed by externally mandated curriculum guidelines and demands for standardized assessments, we attempt to select themes that allow a variety of related topics to be explored, from which students choose according to their interests. Where possible, we encourage a range of modes of inquiry, including empirical observation and experiment, surveys, model making, as well as library-based research. We also place considerable emphasis on class discussions, in which work in progress or completed is reflectively reviewed, both in order to make connections between the topics researched and to
encourage a ‘meta’ stance to the choice of goals and strategies so that students can take greater responsibility for their own learning.

At the heart of our approach to learning through inquiry is the notion of ‘the spiral of knowing’ (figure 1), which posits understanding as the goal of learning. Understanding not only provides the basis on which one construes one’s moment-by-moment experience but it also guides one’s future actions. All learning starts from personal experience, as one is currently able to understand it; to this is added information, whether sought out, deliberately provided by others, or picked up incidentally. However, new information does not automatically lead to enhanced understanding; for this to occur, the information needs to be articulated with what is already understood, often involving a degree of transformation in the process. This is achieved through knowledge building, sometimes undertaken solo in ‘inner speech’, but more often in dialogue with others.

![Figure 1. The Spiral of Knowing](image)

Adapted from Wells (1990)

Viewed from this perspective, knowledge is not something that is imparted by teachers or by books. Indeed, knowledge is not a thing at all; the term is simply an abstraction that is
sometimes useful for referring to the knowing that is manifested by individuals in particular situations of action and discourse. Teachers and authors of books can certainly be valuable sources of information, but what they know cannot be unilaterally transferred; each learner has to construct his or her own understanding. However, this is usually most effectively achieved through interaction with others in the course of some purposeful joint activity, where each gives and receives assistance, as appropriate. Thus, knowledge building is the process through which, by purposefully knowing together, we increase both our individual and our common understanding (Wells, 1999).

It is easy to see how this schematic model fits many practical situations. Where our current understanding (i.e. ability to interpret experience and act effectively) is inadequate to solve a problem that arises, we are likely to seek help. In these circumstances, new information often takes the form of implicit demonstration by the person who gives assistance. However, having the problem solved for us is rarely sufficient. To fully understand and to be able to solve a similar problem in the future, we either need to have engaged in collaborative knowledge building with the person who helps or, when a similar problem actually arises, we have to engage in solo knowledge building, as we try to integrate our remembering of what the helper did and said with the specifics of the situation that actually confronts us (Suchman, 1987). The same is true, we would argue, of knowledge building of a more theoretical kind.

**Writing as a Tool for Knowledge Building**

Within this framework, as it applies in the classroom, writing has a dual role. The process of composing a written text is always potentially an occasion of knowledge building, as the writer attempts to communicate what he or she understands about a topic or situation to an audience of others - or to the writer on a future occasion. Furthermore, the text that results is also a source of information, to the extent that the audience is equipped to interpret it. However, as a means of mediating the enhancement of understanding, writing is most powerful when the text already written, or in process of being written, is treated as an object with which the writer dialogues in the effort to improve it. For in transforming the text, one also to some degree transforms one’s own understanding.
This opportunity for reciprocal transformation of self and text is the reason for treating writing as one of the most effective means of learning (Langer & Applebee, 1987). Generally, however, this benefit is conceived in terms of the solitary writer. The dialogue may be with an envisaged audience, but it takes place in relation to the blank page, without their responsive feedback - at least until the draft is completed. Of course, there can subsequently be much value to be gained from a reader’s comments, particularly if he or she responds to the meaning of the text and not simply to its surface features. In fact, writing conferences that provide this sort of constructive feedback at various stages in the text’s production are one of the most effective ways of teaching the writer through his or her own writing. However, just as we argued that knowledge building is most effective when it takes place through dialogue with others, so it is important that there be an audience beyond the teacher and the possibility for further writing in response. Furthermore, there may be an important role for different kinds of collaboration between writers in the construction of a single text - particularly when the topic or genre is new or relatively unfamiliar.

In these latter circumstances, the text in production is indeed an improvable object, and one which engages the joint writers in spoken dialogue about aspects of its creation, ranging from their understanding of the topic, through the selection and organization of the information to include in the light of the intended audience, to the composition of successive sentences and paragraphs. In the process, too, linguistic choices of genre, register, syntax and vocabulary are also involved - not to mention spelling and punctuation.

In order to give substance to these claims, in the following sections we will present some examples of writing functioning as a means of collaborative knowledge building, drawn from the action research carried out by members of DICEP in local schools. However, we should make it clear that this is not a conventional research report. There has been no overall research design, with teachers and students producing comparable data to answer predetermined questions. Such an approach can certainly yield valuable information, but it is incompatible with our interpretation of pedagogical action research, where the attempt is to discover and describe ‘what might be’ rather than to implement and evaluate what already ‘is’ (cf. Stenhouse,
Thus, while all members of DICEP have participated in exploring two related themes - how best to create and sustain communities of inquiry in their classrooms, and the roles that discourse plays in this endeavor - they have gone about their individual inquiries in the light of their own particular concerns and of the priorities of the specific contexts in which they work. Although this approach yields no overall quantitative results, we nevertheless believe that, when the teachers’ reports are considered together (Wells et al., forthcoming), they provide persuasive evidence of the value of this approach.

The vignettes that follow, therefore, were selected because they represent significant moments for the teachers concerned for, in them, they saw more clearly how they might better achieve the vision that they were working towards. They also show the emergence of an increasingly clear understanding of the varied ways in which writing can contribute to knowledge building in a community of inquiry.

**Dinosaur Schools**

The first example was, in fact, the starting point for this line of research and occurred some thirteen years ago in an earlier project (Wells & Chang-Wells, 1992, chapter 6). It is taken from a grade three classroom in an area of high concentration of second language learners of English, mainly Portuguese and Cantonese speaking. The class teacher, herself from a family that immigrated to Canada, had until this point adopted a mainly teacher-directed form of instruction, in which the children rarely read books of their own choice or wrote on self-selected topics. However, one part of each day was given over to project work, and here the children had more opportunity to follow their own interests - although the reports they were required to write were still pre-structured by the teacher.

The turning point came as a result of the teacher attending a workshop on ‘cooperative learning’. She decided to ‘give it a try’ and to report on her attempt at a staff meeting and, for this purpose, she sought the help of the visiting researchers to videorecord the planned episodes of cooperative learning. The first few episodes, which took place at the same time each week, were based on tasks suggested by the workshop leader; the teacher allocated the children to groups,
assigned roles, and specified the outcome they were collaboratively to achieve. After organizing several such sessions, the teacher observed that - perhaps not surprisingly - her students seemed to collaborate better when working on their self-chosen projects than when required to engage in cooperative learning tasks. As a result, she decided to try a new approach.

On the next occasion, the teacher set a different task: The children, working in self-selected groups, were to write a story based on their project work on dinosaurs, and each group would read its story to the rest of the class at the end of the session. One group was videotaped continuously throughout the session and, as the teacher later observed when viewing the tape, they stayed on task for well over forty minutes and worked extremely cooperatively. The title for their ‘story’, decided on fairly early in the writing episode, was “Dinosaur Schools”; their intention, never explicitly discussed, was to write a humorous, and obviously imaginary, account of what dinosaur schools were like. However, despite the open-ended nature of their writing project, the children clearly felt an obligation to meet expectations of plausibility, as well as those of conventional grammar and spelling. The following representative extract is taken from the transcript of their joint composing, about ten minutes into the session.

[Note: In this and the following transcript, the following conventions apply: < > enclose segments where the transcription is in doubt; * indicates an unintelligible word; CAPS indicate a segment spoken with emphasis; underline indicates segments spoken simultaneously; . a period marks approximately one second of pause.]

Tony (group leader), Tanya, Barbara, Margaret and Eric, all Portuguese-Canadian ESL students, are sitting or lying on the floor around a large sheet of chart paper. Tony, as leader, is acting as scribe.

Tanya: (reading) “Baby dinosaur school”
Tony: Yeah
Tanya: What? . were inside a volcano
Eric: Baby dinosaur school is everywhere . there were more than one school
Barbara: Were volcanOES (emphasizing plural)
Tanya: Were IN volcanoes
Tony: Baby dinosaur schools are in . are in . volcanoes (writing)
Tanya: WERE in
Eric: Were in
Tanya: They are not right now . Are dinosaurs living right now?
Tony: But this is make believe
Tanya: I didn’t realise there’s- there’s really a dinosaur school (laughing)
Tony: (speaking as he writes) “were in volcanoes”
V O K .. V O K .. K A (attempting to spell “volcano”)
Eric: I think you’ve got it wrong . it’s V O L . volcanoes
Tony: Who cares!

[They continue to work on the first sentence for several minutes. Then they decide to include a sentence about fire drills, signalled by volcanic eruptions. The following discussion concerns the frequency of these fire drills]

Tony: (speaking as he writes) “Every five hundred years”
Tanya: FIVE years . because they won’t be alive in five hundred years
Eric: Yes they would
Tanya: But they wouldn’t be babies any more
Tony: Yeah
Barbara: They’ll be five-
Eric: So they’ll be in grade six and then ***
Tanya: They are in grade six .. they’ll be in school, they’ll be teenagers, not babies any more .. then they’ll be eighteen . they’ll be in high school

The text that this group of students finally produced (see appendix) was judged to be very successful by the rest of the class. The teacher, too, was pleased with it - and with good reason. Compared with the texts written during the previous cooperative learning activities, this one had a fairly well developed theme and showed a clear sense of audience awareness; although not without errors, it also showed evidence of editing with respect to spelling and grammar. The teacher was even more pleased when she viewed the videotape, for she was able to see the sustained collaborative work that had gone into the text’s production. Against the background of her limited expectations for these ESL students, she expressed herself amazed that they had
such an ability to use their general knowledge to revise their texts and such an explicit awareness of grammatical rules. There and then, she decided to modify both her expectations of what her students could achieve and the kind of activities in which she asked them to engage.

The importance of this event, then, was that it demonstrated the potential of collaborative writing - even for ESL students, whose command of written English was still quite limited. Given the opportunity to write about a topic of interest to them, and with their peers as audience, they manifested not only enthusiastic engagement, but also a commitment to ongoing revision of their text in order to make it effective, as well as efforts to make it conventionally acceptable. Just as important, it allowed the students to demonstrate skills and knowledge of which their teacher had considered them incapable and, as a result, caused her to revise her assumptions (Newman, 1987). This is not to suggest, of course, that the teacher decided she should no longer teach her students about the conventions of form as well as about ways of creating more effective texts, but she did begin to see her teaching role in a different light. The event was also important in establishing the potential of collaborative research.

As the potential of collaborative writing became more widely known, through conference presentations and through publication, the practice was taken up in a variety of ways by other teachers, not only in the form of students working together on the composition of stories but also in working collaboratively on responses to books they had read; it was also extended to project reports in science and social studies (Wells, in press).

However, for the research group, the most important feature of the event just described was what we learned about the value of treating the emerging text as an ‘improvable object’, and writing as a means for collaborative knowledge building. From this perspective, the activity of writing can be thought of as using a tool, or more accurately a toolkit, to create and improve a structure of meaning and, thereby, to achieve greater understanding of the topic of the text. The following sections describe two very different examples of this approach, both taken from the classrooms of DICEP teachers. The first arose in the context of an exploration of ways of encouraging children to respond to the stories they read.
Seeds and Webs

Grade one children generally have very limited writing capabilities and this makes it difficult for them to write in response to the stories they read or have read to them. This was the case in Mary Ann Van Tassell’s first and second grade classroom in an independent school in Toronto. However, Mary Ann was no stranger to action research, having carried out a number of projects to make students’ questions the driving force of her inquiry-oriented curriculum in science (Van Tassell, forthcoming) and so, to overcome this problem, she decided to try a new collaborative strategy. When children took home books to read with their parents, she asked the parents to write the children’s reflective comments on Post-it notes and to stick each note on the appropriate page. Then, when several children had read the same book, she planned to discuss the book with them and create a web in which their notes were spatially related in terms of ideas that were connected in some way.

The following extract occurred after three children had read A Friend for Mrs Katz, a story about an old woman who lives alone and is befriended by Larnell, a boy who gives her a kitten for company. Each of the children had contributed a number of ‘seeds’ on Post-it notes and, in this extract, two of them are deciding with their teacher how to arrange them on a large sheet of paper to show the connections among them. (The third child is absent because he is sick.) So far, notes referring to cats have been arranged in one group and they have been considering a note that refers to the Jewish custom of putting stones on the graves of loved ones who have died. Karla has found two seeds that she thinks should go together.

Karla: (pointing to a 'seed' and reading) It's because it says "It is good that Larnell and Mrs. Katz became friends."
Teacher: "that Larnell and Mrs. Katz became friends"
Karla: And this says "That was nice what people do to see and say ‘Hi’ to people that died"
Teacher: "that was nice what people do to see and say ‘Hi’ to the people that died”
Ashlynn: "what people do to see and say ‘Hi’ to the people that died"
Teacher: Yes, so what is it that's connected? -that connects them?

What is it that connects them? (the two seeds just mentioned)

Karla: *That they're both like - they both say what*>

Teacher: How is this- you mean because this (pointing to the first seed) shows that they were friends?

Karla: (nods)

Teacher: And THIS is saying that they're friends? (pointing to the other)

Karla: (nods)

Ashlynn: Why don't we put this one before that one <altogether then>?

Teacher: Well are these all connected though? (referring to the seeds that Ashlynn indicates, which refer to Passover, friendship, and the graveyard)

Ashlynn: No

Teacher: They're not - this one (the seed of friendship) is connected to all of those. Could we put it kind of in the middle and put these around it?

Ashlynn: Yes

Karla: Yeah

It must be unusual for six-year-olds to be engaged, as they are here, in considering the relationship between the different themes of a story and providing justifications for their opinions. But what is particularly interesting about the procedure that the teacher has invented is that, by having the children’s comments on different aspects of the story written on small Post-it notes, their ideas do indeed become objects that can be compared, and physically placed in different relationships to each other. As the teacher suggests:

Throughout the conversation, both girls struggle to explain their reasons for connecting seeds. This is the meta-cognitive talk. They are not used to making these thoughts explicit, and it is exactly this type of talk that moves the conversation beyond discussion of the literal into the more abstract themes of the story. At this point, both students needed help in making these connections explicit. (Van Tassell & Galbraith, forthcoming)
As she also tells the children at another point, there is nothing final about the first way in which
they decide to arrange them, as they can always move them later, if necessary, when they see a
better way of relating them. As they arrange the seeds in the web, therefore, the children are
learning a very important feature of composing in writing: that ideas can be revised, as can the
way in which they are put together in the text as a whole. And, although they are probably not
fully aware of it, they are also learning that when ideas are arranged in different combinations,
new meanings emerge from these alternative juxtapositions. As Karla added when they had
completed the task, "We never knew things could fit together like that."

Following the use of the web in Mary Ann’s class, her colleague, Barbara Galbraith, extended
the idea of a web to investigate story elements, such as plot, key events, and characterization, in
the novels that her grade three students were reading. Here, too, the web served as a form of
synoptic text, enabling the students to make connections at a meta level that they were less able
to see as they simply read through the story, page by page. Using an interpretive framework
provided by sociocultural activity theory, the two teachers concluded their evaluation of their
research as follows:

Through interacting with others as they shared their seeds, the opportunity was
given to benefit from the experiences of others. We discovered that by including
the next step, the co-construction of a web, the students succeeded in creating an
artifact to be shared with others that would aid in moving the whole group to a
deeper level. The experience of engaging in the use of seeds and webs to respond
to literature helped us [the teachers] to grow as learners and to value the
understanding that can be gained through literature. Literature was seen as a
meaningful tool through which to understand our world and interpret our
experiences. (Van Tassell & Galbraith, forthcoming)

In this example, we see the very first attempt in these two classroom communities to use a
new genre of written text - a web - as a means of relating story themes and structures to
the story world and to personal experience. Not surprisingly, the teacher has to
provide a considerable amount of supportive scaffolding. In the next example, by
contrast, the students are sufficiently familiar with the tool they are using to manage
without such teacher support.

**Building the Knowledge Wall**

Traditionally, writing has been thought of as monologic and conversation as dialogic. However, with the advent of email and electronic discussion groups, this perception is changing, as more and more people carry on sustained discussions in writing with people they never meet face-to-face. An important question, therefore, is how this potential of writing as a medium for collaborative knowledge building can be exploited in the classroom.

Two of our colleagues, Carl Bereiter and Marlene Scardamalia, have developed the Computer Supported Intentional Learning Environment (CSILE) for exactly this purpose (Scardamalia, Bereiter, & Lamon, 1994). Technically, CSILE consists of a number of networked computers that are linked to a central server, which enables a class of students to create a communal database, to which each of them has access. So, instead of simply studying what other people have written about a topic, students are able to compile their own text, incorporating the results of their own empirical research as well as what they take from published sources. But, more important, they are encouraged to start by posing their own questions and putting forward their own tentative theories for discussion and comment by others. Since their network is linked to the internet, they are also able to contact people beyond the classroom who are interested in the topics they are investigating and to seek reactions to their questions and developing theories.

Three years ago, Karen Hume read an article describing CSILE and was intrigued by its possibilities for supporting the kind of inquiry-oriented work she promotes in her intermediate level classrooms. However, as her school did not have the necessary network of computers, she had to find an alternative, less costly, ‘technology’. Her solution was both cheap and very effective. She cleared a large notice-board on one wall of her classroom to serve as the equivalent of the database and waited for an appropriate opportunity to launch her idea.
This came early in a unit of light. Her grade 8 students were experimenting with pairs of mirrors touching along one edge. They quickly discovered that if they looked into one of the mirrors and gradually decreased the angle between them, the number of reflected images progressively and rapidly increased. One student became quite excited and announced that if he brought the two mirrors completely together there would be an infinite number of reflections between them. Others immediately disagreed, counter-arguing that there would be no reflections at all.

Karen saw her opportunity and asked the first student to write his observation and proposed explanation on a Post-it note and pin it to the notice-board. She then invited other students to add their comments and alternative explanations. Within minutes, the first notes were posted and, over the next two days, some 40 more were added to the board, some signed and some anonymous. Arguments for both positions - a very large number of reflections, or none at all - were initially almost equally forthcoming. However, those who believed there would be no reflections finally succeeded in persuading their opponents through the cogency of the arguments that they used to support their position.

This was the inauguration of the ‘Knowledge Wall’ and, since then, it has played a central role in many curricular units in Karen’s classroom. Typically, after some initial exploration of the topic, the class brainstorms the questions they think are most worth pursuing. These questions are then posted on the knowledge wall. Students select the questions they are most interested in researching and add their findings, theories and further questions to the knowledge wall as the principal means of pursuing their inquiries. From time to time, whole class discussions are held orally to make connections between the different issues being investigated and to reflect on their significance.

The following sequence of notes is taken from the first occasion when the knowledge wall was used in the study of history. It occurred in a unit on the Causes and Consequences of the Black Death in Medieval Europe in her current class of grade 6 and 7 gifted students. In their materials, some students had been intrigued by references to and illustrations of protective clothing worn by doctors. As these notes show, the students used conjecture, evidence from published material and reasoning to attempt to construct a satisfying answer to their question.
**Question:** Why did an odd bird figure in a cloak protect doctors?

(referring to an image from a history book showing a doctor clad in leather and wearing a beak mask that makes him look like a bird)

Ian: I don't have a total answer for this, but the paragraph underneath the picture says that the bird mask is to filter out the polluted air, and the wand is to heal patients. Don't ask me why he/she wears a leather cloak.

Eren: If what this guy is wearing is a mask, it might have actually helped him stay healthy.

Alec: This is good Ian, but why a bird/man/penguin?

Justin: At the end of the caption of the bird figure, in quotes, it claims, "doctors hoped to avoid the contagion by looking more like a crow than a man". Can anybody try to clarify the quote?

Alec: Why a crow?

Suzanne: People probably wanted to be birds because they saw that the birds weren't dying. This is because birds don't get fleas and fleas caused the Black Death.

Matt: It was not the bird figure protecting the doctors like a god, but it is a form of disease proof clothing. The beak is an early form of gas mask, the cloak of heavy leather. The wand is for soothing the patients. The doctor is covered from head to toe, therefore keeping out the disease.

Ray: Theoretically, the birdlike cloak thing might prevent the fleas from getting to the doctors skin, thus giving the individual the plague. The cloak was basically a shield.

Suzanne: This could and probably is true, but I doubt the people of the time knew that.

Jon: I think it is a witch doctor because of what he is wearing.

Justin: It is just a doctor dressed in leather wearing an early edition of a gas mask. More like a doctor wearing a shield from the fleas.

Suzanne: But Justin, the doctor didn't KNOW that fleas cause the disease,
therefore he couldn't have been wearing it for protection. That's why I agree with Jon that yes, the doctor probably is a witch doctor. The bird suit only had a spiritual meaning.

Justin: I didn't say that he/she knew. I mean that the doctor was using the leather as a shield.

Ray: The birdlike figure of a god worked. Scientifically speaking, it protected the wearer by preventing the fleas from reaching the skin. It had religious value too. The power of the costume prevented the virus from taking over. COMBINATION

Some guy who lived in a town saw his friends dropping like flies. He then decided to cover himself up with lots of clothes. He put clothes on that made him look like a bird. Some doctors noticed he didn't get the plague and thought it was a spirit who protected you when you wore the clothes. But what they didn't know is that it stopped the fleas from getting to you. Question solved

Justin: Did the odd bird figure protect doctors? What is your source? How did these people have the technology when they did not know the cause?

Brad: No Justin, the bird man didn't protect doctors. It was the fact that all of their skin was covered and no fleas or rats could pass the disease on to them.

Colin: Brad, I must agree, with their bird suits on, the fleas infecting the patient could not penetrate the skin, spreading the disease.

Ray: The reason that they thought the suit protected was spiritual. The reason it actually protected them was that it kept the fleas off them. Please reread my previous notes.

Alec: This is crazy. It keeps going from spiritual focus to just plain protection and shield edge. Let us first try and get which one is correct. Maybe they're both right. I don't know.

Justin: It's not crazy. It keeps on doing that because we are arguing over spiritual and protection. They are both right because the doctor
thought it was spiritual, but it was a shield.

Alec: Well put, Justin. I now understand why it keeps going. Thanks.
Amanda: Maybe that was what doctors wore all the time anyway.
Brad: Amanda, I really truly doubt that doctors wore that all the time because I remember reading something that said those costumes were first used during the Black Death.

There can be little doubt that the written mode in which this discussion was conducted contributed both to its responsivity - students picking up and responding to previous contributions - and to its progressive nature (i.e. working towards an acceptable explanation). Of particular interest, in this respect, is the exploration of the relationship between behavior, beliefs and scientific theory: “How did these people have the technology when they did not know the cause?” asks Justin. If one adopts an entirely rational perspective on the motivation of human action, this is a real problem for the explanation that has been proposed. However, as Ray explains and reiterates (“Please reread my previous notes.”), an action can be correctly believed to be efficacious, even if the supposed explanation is erroneous. As he might have added, many folk remedies involving natural herbs have been equally effective, despite what now seem quite bizarre explanations of their healing powers.

This was not the first use made of the ‘knowledge wall’; as already explained, Karen had previously put it to good use in the study of scientific topics (Hume, forthcoming). In this example, however, we can see that it is also an effective tool for inquiry in subjects which less easily lend themselves to empirical tests of alternative hypotheses. It seems, therefore, that what makes the knowledge wall so effective is that, although differently in different subject disciplines, it enables its users to exploit the composition of written texts for the development of progressive discourse. This is not to argue that writing supersedes oral discussion. In all classrooms in which this sort of written discussion occurs, participants also talk with each other about notes already posted and those they are thinking of writing. However, something more is involved when the contribution is made in writing. Unlike speech, writing leaves a record of the activity involved - an object that can be returned to at leisure, and then reconsidered and improved through revision or response (Lotman, 1988).
An equally important feature of writing in this mode is that it requires the writer to make the intended point explicit and relevant to the ongoing structure of the discussion. This need for responsivity is much less apparent when writing in essay form for the teacher; however, on the knowledge wall, it is clearly essential for the effectiveness of the contribution. The point about ‘progressive discourse’, as Bereiter emphasizes, is that this is not a solitary, but a collaborative, undertaking: as they write to, and for, each other, “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).

Discussion

The three examples that we have just presented come from very different settings and involve students at different ages and stages of intellectual development. Two things that all three have in common, though, is the students’ evident interest and involvement in what they are doing and the superiority of what they are creating with assistance from peers and/or adults compared with what they could have achieved alone [IS SUPERIORITY A GOOD TERM TO DESCRIBE IT?]. As has been established through further work on Vygotsky’s (1987) concept of the zone of proximal development, assistance can be provided in a variety of forms and by many kinds of ‘others’. What is essential is that the participants be involved in a joint activity and have goals that are compatible. Although the form of assistance that an ‘expert’ other can give is often beneficial in providing scaffolding that is tailored to the learner’s needs, there is also much to be gained from working with peers on a question to which no-one knows the answer in advance, and where each learns through collaborative knowledge building as they attempt to construct an answer or solution (Wells, 1999).

In the case of the second and third examples, the teachers were consciously acting in the light of this understanding by creating such opportunities for collaborative activities. Their classrooms were also characterized by two further common features: their commitment to a vision of a community of inquiry in which writing functions, not as an end in itself, but as a tool for
knowledge building, and their willingness, as action researchers, to explore new ways of integrating writing with students’ self-chosen interests and topics of inquiry.\textsuperscript{7}

As we have argued, one of the key characteristics of a knowledge building community is purposeful and thoughtful use of language, both spoken and written, as students actively engage in interactive/collaborative activities that involve what we, as well as Langer and Applebee (1987), have called “literate thinking”. Within such a community, writing is used as a tool for learning in many different ways, according to the interests and concerns of community members at particular moments in time. However, for it to serve as a means of building knowledge and increasing understanding, two principles seem to be paramount:

- the text serves a purpose in the life of the community and will be responded to accordingly by others who share the authors’ interests; in this sense, the writing is part of an ongoing dialogue, the aim of which is for all concerned to achieve a richer understanding of what is at issue.

- within this communicative context, writing is treated as being concerned primarily with discovering and developing meaning in dialogue with the emerging text; issues of structure and lexico-grammar are not neglected, but they are first considered in terms of their function in clarifying meaning and, together with spelling, only secondarily in relation to conventional correctness.

All three of the preceding examples go a considerable way towards meeting these criteria. The first demonstrates how knowledge building can readily occur in a group of students who are working collaboratively on the creation of a single imaginative text. The second shows that, with the teacher’s assistance, first grade students can participate in the composition of a synoptic text, even when they have limited transcription abilities. And the third shows a similar quality of collaborative knowledge building in an argumentative mode, as students advance and critically respond to alternative candidate explanations, without the need for teacher intervention.
What is also clearly brought out by the latter two examples is that many different types of text can serve as the focus for collaborative knowledge building - as the work of other members of our group has also shown. Short written notes can be as effective - or, in some cases, more effective - than a full-length essay or story. Equally effective are tables, graphs, diagrams, and other visuographic meaning representations, and various combinations of these with continuous prose (Wells, in press). When this broader view of what counts as writing is adopted, it becomes clearly apparent that the activity of making meaning in some form of written text can be a powerful means of knowledge building in all areas of the curriculum (Kress, 1997; Smagorinsky, 1995).

In the last two decades there has been much debate over the relative importance to be given to “process” and “product” in relation to the teaching of writing. However, when students are really interested in the topic they are exploring, and have a real purpose for their writing, this dichotomy ceases to be relevant. Because they care about the product, they engage fully in the necessary processes, and are keen to learn new ways of making their text as effective as possible. Conversely, where they can see no real purpose for the product - other than satisfying externally imposed requirements - it is difficult for them to engage fully in the processes of writing, however these are presented.

This issue is particularly important when it comes to the teaching of written genres - as we noted above. Some have argued that, since genres are conventional cultural solutions to the demands of recurrent rhetorical situations, they are most readily learned when writers have a genuine rhetorical end in view and can see why and how particular generic composing strategies are effective in enabling them to achieve the desired results (Freedman, 1994). We would agree. However, this is not to deny the importance of students encountering a range of examples of particular genres and, with the teacher, ‘deconstructing’ their organization in order to understand the functional significance of their characteristic features (Cope & Kalantzis, 1993). Indeed, this sort of analysis of functionally effective texts occurs far too infrequently.

But equally important is to reverse the process: given a particular topic, audience and purpose, to generate candidate generic structures and discuss which would be most effective, and why
In writing a narrative, for example, the author might consider whether to start part-way through the chronological sequence of the plot or, more conventionally, with a description of the setting; or, in explaining the working of a machine, whether to organize the exposition in terms of the functions of the various parts or in terms of how it is actually used.

Decisions of this kind, although taken within a generic framework, are not governed by prescription, but are the outcome of what Bereiter and Scardamalia (1987) refer to as an ongoing dialectic between the content space (what one has to say) and the rhetorical space (who one is saying it to and one's purpose for so doing). The result is a text that is a unique solution to the particular problem that the writer set for him or herself; furthermore, as they argue, it is in making these kinds of situated decision that writers develop their understanding of what it is they are writing about.

Thinking about writing from the perspective outlined here makes it very clear that teachers have a number of important roles to play in helping students to develop as writers. First is the creating of settings and activities in which genuine purposes for writing may develop as well as audiences to whom the writing may be addressed. These features need to be planned so that students will be encouraged to extend their knowledge about the topics or subject matter under investigation and at the same time to appropriate and make their own those written genres that are likely to be required for academic success. Second is the provision of advice and instruction - for example on register and genre choices - offered when they will be most helpful (Atwell, 1987). And third is contingently responsive support to individual students at varying stages in the composition and revision of their texts (Haneda, 1999).

The examples presented above are not put forward as achieving all these objectives. They simply represent particular interim solutions arrived at as the teachers continued to conduct inquiries about how best to work with the students for whom they were responsible. In fact, since these examples were recorded, the teachers have made further changes. The first teacher continued to link writing to other activities in which the students were engaged and, had she not taken a leave of absence the following year, we might have been able to work with her on challenging her students to try other genres in addition to narrative. In the second of the preceding examples, we
saw the grade one students learning one generic form in which relationships can be presented; since then, the teacher has experimented with drawing on this way of synoptically structuring information through the use of a web to construct prose texts for a variety of purposes and audiences. In the third example, the students spontaneously chose to use a highly dialogic argumentative genre in their messages. The next step, which became a regular feature of work on the knowledge wall (Hume, forthcoming), was for those who had been most involved in a particular discussion to summarize the arguments so far and the conclusion, if one had been reached.

In this paper, we have drawn on the work of students and teachers involved in the Developing Inquiring Communities in Education Project to argue for the value of treating writing, not as an end in itself, but as a tool for knowledge building. In particular, we have drawn attention to the importance of agency - the making of deliberate, functional choices - as well as working in collaboration with others as criterial features of such communities. As we hope to have shown, when writing is used as a means of knowledge building, not only do students extend their repertoire of writing strategies but the effort they put into creating functionally effective texts plays a significant role in their learning and enhances the development of shared understanding among all those involved. In this spirit, we invite our readers to continue the dialogue by sharing their suggestions about how writing of various kinds and in various genres can serve as a means for knowledge building.
References


Appendix

DINOSAURS SCHOOL
(first draft)

Baby DINOSAURS Schools were in VOCKanos. Every 5 Years The
Fire Drial would Go On as an ERUPTION. They wirht About People.
The Paper was 10 mters long. And The Pencil is 5 mters long. There
Close is pokta Doted. And THERE Poget is about THE Fugter. THE Librery is called Home read stone.
And THE books or made of saled. Rock. THEY live in Haya rock. THERE Brian or as small as marbells.
THERE LUNCH is Bronto burger. THERE TOYS ARE all With batreries. THERE HOUSE is MADE OF Pebulls.

[Baby dinosaurs’ schools were in volcanoes. Every five years the fire drill would go off as an eruption. They wrote about people. The paper was ten meters long and the pencil was five meters long. Their clothes were polka dotted. And their project was about the future. The library was called Home Read Stone. And their books were made of solid rock. They lived in Hawaii rock. Their brains were as small as marbles. Their lunch was brontoburgers. Their toys were all with batteries. Their house was made of pebbles.]
Notes

1 More recently, Flower, in particular, has been involved in research of a more socially oriented kind (Flower, 1994).

2 See, for example: Bruner, 1996; Dewey, 1956; Duckworth, 1987; Freire, 1970; Lave and Wenger, 1991; Resnick, 1987; Stenhouse, 1975; Vygotsky, 1978, to name but a few.

3 The ‘Developing Inquiring Communities in Education Project’ was initiated with assistance from the Spencer Foundation to the Ontario Institute for Studies in Education of the University of Toronto. In thanking the Foundation for their support, we must make it clear that the views expressed here are those of the authors and not necessarily those of the Foundation. The DICEP group includes teachers from grades 1 through 8 and university-based educators. More information about the group, together with details of publications (some available on-line) can be found at the project’s webpage: http://www.oise.utoronto.ca/~ctd/DICEP

4 Of course, this does not mean simply those topics in which students are already interested. One of the teacher’s major responsibilities, in selecting themes for exploration, is to arouse and foster new interests (Wells, 1999). But, as Ann Maher pointed out, it is difficult not to become interested in a topic if one really begins to explore it in detail (Wells, Chang & Maher, 1990).

5 Karen Hume first experimented with the “knowledge wall” when she was teaching a grade 8 class in a small town on the edge of the Greater Toronto Area. The following year, she moved to a school in a nearby town in the same school district, where she took charge of a grade six and seven program for gifted students. In both cases, she taught her class all subjects but French and Music in her own classroom.

6 The gender imbalance in this discussion is at least partly due to the gender imbalance among the students. Seventeen of the twenty-four students are male.

7 The first teacher, too, had the intention to introduce collaborative activities but, unlike the second and third, her reason for doing so was much more limited. At least initially, ‘collaborative learning’ was merely plugged into her existing pedagogy without a rethinking of the whole.
In this context, Vygotsky would have referred to the process as ‘internalization’. However, it is significant that in his ‘general genetic law of cultural development’, in which the development from inter-psychological to intra-psychological is encapsulated, he adds "but it goes without saying that internalization transforms the process itself and changes its structure and function" (1981, p.163).

Various electronic media provide venues for such sharing of teachers’ research. Information about listserv discussion groups and on-line journals can be found on the RTE homepage: http://www.ncte.org/rte