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Introduction from the Editorial Group

Consideration of literacy and schooling are not unusual for this newsletter, but, in this particular issue, they are highlighted. The other highlight is the diversity of these pieces. The ages of the subjects of the studies range wide-- Hoffman studies a child of 3, Zinsser's work involved 4 and 5 year olds, Delgado-Gaitan and Trueba's subjects were in first, second and third grade, Michaels reports on sixth graders, and Crook is concerned with adults. Equally diverse are the populations studied, the settings for the studies, and the researchers' roles. Crook and Hoffman became researchers of their own activities-- Crook focuses on his own introduction to electronic mail to consider the implications of this new medium for adults engaged in literate work; Hoffman, in the tradition of academic parents, presents a modernized diary study (augmented with audio-tapes) displaying the cultural events and tools that are organized into literacy games by and for her young son and considers the detail of middle class early literacy environments. While Delgado-Gaitan and Trueba were not observing their own activity, they are in the position of social insiders with respect to the population of Hispanic children whom they observed at home and school in an attempt to document the dynamic interplay of culture contact and the multiple interpretations of children's behaviors with other children in different settings. Zinsser, as an outsider, assumed a participant's role to chronicle the literacy encountered by youngsters from Fundamentalist homes as they attend church schools. Michaels combined classroom observation with a cleverly designed and administered task that allowed her to relate the

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Electronic Messaging and the Social Organization of Information

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Electronic messaging is a form of communication maintained on computers to which a number of individuals have common access. Within an institution (for example, a university) there may be a computing service meeting the requirements of several hundreds of users; if suitable software is available, each of those users can be provided with 'mailbox' space within the system into which any other user may direct a written message. Messages may be read from one's electronic mailbox at will and then filed away or discarded, answered or ignored. Received messages may also be forwarded to other users. Very often, the service can transfer messages to and from other, geographically remote, computers. In such cases, the range of a user's communication is greatly extended.

The appeal of computer-based message systems has been unexpected. For example, when the Department of Defense established the ARPA network to link university and other research workers, they did not predict that one of its most valued uses would be relaying informal message traffic (Newell and Sproull, 1982). It might seem that this medium could only be a boon for communication. Once made available within a working community, it could help to optimize the nor-

mal flow of information. Moreover, it might broaden the constituencies of such communities and draw together more diverse groups of people for joint activity.

If electronic messages were merely a resource to facilitate established patterns of communication and extend their reach, then there would seem little ground for concern. However, the argument to be developed here is that this medium could create quite new effects, the consequences of which may not be so benign.

Message networks are devices for managing and transmitting knowledge: They exemplify culturally-created devices that extend human cognitive activity. Accordingly, it is important to monitor how access to such resources is determined. Moreover, as with any other communication medium, we must recognize the skills that are needed to master and exploit it. I shall consider those skills here and argue that they are such as might lead to the medium having a socially divisive influence. If certain information becomes concentrated *within* message networks, then these effects will prove a matter for concern.

To lend some weight to the argument, I shall describe a case study in the use of electronic messaging. That experience will serve as a useful vehicle to convey a number of claims about the medium. It will prove a poor substitute for the empirical work that is urgently required on this topic, but it may help to define the research issues and priorities at the present time.

A Case Study

This is a case history drawn from my own experience as a visitor at the University of California at San Diego. I needed certain information rather urgently and electronic messaging seemed the natural way to get it. The relevant internal network at UCSD is a sophisticated one and it is widely used; this makes it a good example to reason from. The perspective of an unprejudiced novice may also carry some advantage.

What I was seeking was the address specification for a computer message route from UCSD to my own university in England. In short, a network came to be used to acquire more information about using a network. The inwardly looking quality of the enterprise is apparent but this will

not undermine the arguments -- although it is no coincidence that it is information of this general kind that is under discussion (I will return briefly to this issue later).

There seemed to be no document in which this particular route address was recorded. In any event, extensive documentary searches were not the locally recommended solution to such problems; the favored strategy was to identify individuals with expertise on this topic and send them a message seeking help. If they were not sufficiently expert to know the answer they would probably be experts on knowing who the appropriate experts were. This particular task turned out to be a good one for illustrating this way of using the medium: It was a difficult problem, a number of individuals became involved and much exchange was required among participants as the problem took shape. I will comment on three aspects of the process.

1. Answering a request for help. This experience (and others subsequently) suggest that if you indiscriminately broadcast the same request to a sizeable group of people, then you will probably receive few replies -- at least, if the question posed is more than a trivial one. The addressing information carried by the message reveals to each recipient that they are (merely) one in a large group to which you are appealing. An individual who realizes this may feel no strong obligation to respond. That, at least, is what social psychologists have documented as the "bystander effect" in other social situations.

While undirected messages may serve to diffuse responsibility among their audience, their impersonal quality may further reduce the likelihood of any particular individual replying. A related observation, about individually addressed messages, provides more evidence about the personal-impersonal dimension: Of the eight people I contacted with individually-addressed messages, the three from whom no replies were ever received were the three that were unknown to me at that time.

Sending a message for help does not reliably elicit replies. This may be unsurprising, but it highlights the need to identify factors operating in the cases that *are* successful. Those factors are

indicators of the skills that define effective use of the medium. It is reasonable to expect that personal acquaintance with the inquirer would be one factor in securing responses.

2. Forwarding messages. None of the personally-addressed correspondents could furnish the information themselves or readily suggest where it might be found. However, two individuals pursued the matter in a way that the medium encourages: They forwarded the request to someone they judged to be a more informed authority. In this way, I became linked to a chain of two other people in one case and four other people in the second case.

Thus, another measure of control over this medium appears to be the amount of energy you can release in the system -- defined in terms of how far an inquiry gets forwarded. This suggests finer elaborations on the variable of "personal acquaintance," such that success becomes more exactly related to aspects of individual social status and social skill. As it happens, the integrity of the longer "chain" in the present case was intentionally maintained by one aspect of social standing -- but not prestige. It involved applying a 'fellow-countryman-in-need' strategy. This facilitating device may well account for the greater productivity of this chain. Note, also, that the powerful strategy of 'forwarding' means that any control of the medium associated with social standing may be amplified -- if the contacts of the highly-placed are themselves highly-placed.

3. Interaction. You may be sure that solving a problem of this kind depends upon extended exchange of messages among those pursuing a solution. The original inquiry may not be specified in enough detail or it may not be possible to respond with any single or simple answer. As the interactive properties of the medium took hold in the present case, so factors relating to the composition and pragmatics of the messages began to surface.

Some messages were hard to interpret. The problem often seemed to lie at the point of composition: Technicalities were not fully elaborated, references were left implicit and so forth. The problem may be that the medium encourages a conversational style of writing but it cannot pro-

vide all the contextual and non-verbal support of real conversation. (A solution might be to embed the message-writing facility in an accessible screen editor in order to facilitate review and revision.)

Pragmatic issues come closest to our interest in defining the skills involved in using the medium. Once again, without those familiar cues characteristic of verbal conversation, subtleties of meaning and intent may be hard to discern and transmit. It is not only the user of this 'conversational writing' medium who encounters difficulty handling the pragmatics; there is not much in the way of research on pragmatics that appears applicable for someone studying the medium. Indeed, vigorous research into the discourse processes that define indirect *speech* acts is not matched by comparable documentation of the pragmatics of written communication.

One problem I confronted was an uncertainty as to how energetically I should press my correspondents in pursuit of the inquiry. (In Austin's terms, it was uncertainty related to the perlocutionary force of some of the messages and a difficulty in deciding whether the author of the message expected me to desist.) Regulating the communication in this sense does seem to depend upon skillful interpretation of intended meaning. Here are two examples chosen from the present corpus of messages:

"I got this information from [a source] by the way, which is available to you!"

"I will try to see somebody re: [a topic] as soon as I can (which unfortunately may not be that soon)"

In the first case, the author seems irritated at being drawn into a problem when the solutions to it are already within direct reach of the inquirer. In the second case, the author had been working on my problem for some time and I might wonder whether his anticipation of a delay before the next message is unavoidable, or whether I am actually approaching the limit of time this person is able to invest in my problem. When the correspondent is not known to the inquirer, this kind of interpretation can be especially difficult. Novices to the medium are likely to be particularly vulnerable to these uncertainties.

Commentary

The experience outlined here persuaded this novice that the availability of message networks offers a powerful resource for accessing information. It has been noted elsewhere (Lang, Auld and Lang, 1982) that, within professional communities where the social exchange of knowledge is predominant, publically recognized experts will emerge. The message system provided easy contact with large constituencies of experts; their very presence on the network seeming to legitimize personal inquiries in a way that might be more inhibited in other media. However, the present experience emphasized how factors related to one's positional status within the networked group may influence the outcome of efforts to access the available expertise. Complicating the issue, a novice finds himself uncertain about the very details of the pragmatics of the communication which may be crucial for announcing, establishing and maintaining advantageous status in the group. It may be said that what you can derive from the system may depend on (perhaps incidental) factors concerning who you are. These facts, coupled with the ease with which information can be contained within a network, suggest grounds for vigilance in monitoring the development of electronic messaging.

It may be argued that message systems give no reason for concern that does not apply elsewhere. Interpersonal and positional factors have always been instrumental in determining ease of access to information that resides with individual experts. The present critique might seem to apply equally to communication through the media of telephone or postal mail. In fact, these social constraints are yet more marked with those media and so the availability of accessible message systems could be seen as a development that lessens a problem.

It is true that these observations do not apply uniquely to this new form of communication. But the claim is not that these networks introduce a problem that is particularly new, more it is that this medium may amplify the old problems. There are certainly other media for which ease of access to information is already confounded by interpersonal factors. The worry about message networks is the conjunction of three features: (1) They are indeed another context in which these interpersonal factors are significant; (2) They have a great potential for growth; (3) As they

grow, so they will challenge the relative importance of other media for which access is more socially equitable.

First, let us consider the claim that they have potential for growth. The medium does have features that give it important advantages over either telephone or mail. The telephone can put an inquirer into direct and immediate contact with a source but it can be very intrusive. This inhibits its casual use (by the more polite, anyway); in any event, the telephone's various intrusions encourage people to put protecting individuals (or devices) between them and their telephones. Moreover, it may not be possible to answer many inquiries as immediately as the telephone requires. On the other hand, an electronic message may be read and responded to at a pace that suits your source. It allows a reply in the permanent medium of writing. Mail has these properties also, but it is slow: The kind of multiple exchanges that were necessary in the case described above would be very difficult to sustain by mail. Messaging lies somewhere in between these established media. It is relatively fast, has an interactive quality and yet does not threaten to intrude on people.

These advantages are likely to hasten the growth of message networks. For example Brown University in the United States and Strathclyde University in Britain are both planning to equip all their undergraduates with microcomputers. In both cases, the communications potential of networks built on these systems has been recognized.

It is unlikely that the growth of electronic messaging will occur without having some impact on other forms of communication. There is a particular danger that, as message systems flourish, so more traditional, and more permanent, means of documenting information will contract. There are good reasons for supposing this may happen, at least for certain categories of information.

The real problem lies in areas where information rapidly becomes obsolete. Consider the possible attitude of people possessing such information, when those people are also working within electronic messaging environments. They may feel little pressure to make their knowledge public for two reasons. Firstly, it is information that will rapidly be outdated, perhaps within the lag time of any likely paper-printed publication outlet.

Secondly, the people may feel that their knowledge can be accessed adequately on the network -- a strategy they themselves may routinely use to advantage. Moreover, their professional standing within the appropriate peer groups will be maintained because their colleagues can message them and respect their expertise and availability. Thus, experts may feel confident that their knowledge is reaching where it "should" reach. However, the socially-mediated nature of its dispersal may make it relatively less accessible to novices and outsiders. The skills required for fluent use of message networks make it more difficult for such people to reach and draw upon the information sources, i.e., the experts.

What kinds of information are liable to become locked into networks in this manner? It is likely that knowledge relating to the management of information itself will be most vulnerable to this kind of development; that is, knowledge bearing on procedures, sources and technique. Where that knowledge becomes standard practice, then there may be pressure to publish it -- and prestige for doing so. However, at the leading edge of a fast moving technology, there will always be information that is in flux, but which nevertheless may be information that is very powerful. At the time of this writing, the routing procedures for accessing members of computer communication networks may be a good case in point.

Electronic messaging may well prove a potent device for drawing more diverse groups into the culture's activities. However, there are grounds for being vigilant in monitoring its development. The availability of these systems will undoubtedly cultivate preferences for the accessing of information by means of direct contact with experts. Facility in this process is not equally distributed. It appears to be determined, in part, by interpersonal and social-positional factors. If there is, then, a tendency for message systems to undermine traditional habits of archival documentation, there is a real danger that knowledge will become "trapped" within networks. If so, the technology will have contributed to the evolution of information oligarchies and its liberating potential will not have been realized.

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performance of the children with a computerized text editor to the social forces operating during the year that the children worked with the computer.

We are interested in the diversity here, not because we think it an adequate and exemplary sample of some full universe of studies that will display the current state of the art of the complex issues related to literacy and schooling, but almost because of the opposite. Work on literacy and schooling is so far flung that almost every piece reminds you of some further detail that some other piece convinced you would be needed in order to understand the situation, of some variation that some other piece suggests should be a hedge or an addendum to a conclusion or generalization. In the juxtaposition and re-admiration of the diversity available, we are able to "see" the gaps that prove the need for, and point the way toward, theoretical and practical advances. In that light, the final piece is a dialogue relevant to an article published in an earlier issue of this newsletter: Giyoo Hatano comments on Denis Newman and Newman replies.

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One can't help reaching the conclusion that it is more efficient to use a human being as the computer's partner than to spend many years trying to teach the computer a talent for which it is not well suited.

John G. Kemeny, 1972.

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Classroom Processes and the Learning of Text Editing Commands

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Introduction

In current discussions about computers used for writing, educators and software developers alike speculate that the computer's electronic editing capabilities will have the greatest impact on student writers by making revision easier and, hence, more frequent. But before students can use the computer's electronic capabilities, they must learn the text editing commands of the particular writing software used. At this point, we know very little about how text editing commands are or should be taught and what social forces within a classroom (such as teaching style, opportunities for peer interaction, etc.) influence students' learning of commands or understanding of the mode shifting that may be required for inserting, deleting, or rearranging text.

As research in cognitive psychology and educational sociolinguistics has shown, learning is not a simple transfer of information from one person (e.g., the teacher) to another (e.g., the student). Rather, information transmittal is socially organized; learning is mediated through highly complex interactional and communicative processes (Au, 1980; Cook-Gumperz & Gumperz, 1982; Heath, 1983; Newman, Griffin & Cole, 1984). The sort of teaching and learning which take place depends in part on the way opportunities for communication are organized in the classroom (who can talk to whom about what). Given that communication occurs, learning is constrained by the way information is organized and interpreted.

Recently, as part of a three year ethnographic study of the impact of microcomputers on student writing, an Apple IIe computer with QUILL writing software was introduced into two urban sixth grade classrooms midway through the school year.¹ Because QUILL was not available commercially at the time, students could not have used it previously either at home or school. Any learning of QUILL text editing commands that occurred

was a result of mechanisms and processes specific to the classroom. Because of this limited exposure, QUILL could serve as a kind of 'tracer' of learning in these two rooms. During the five months that the computers were in the classrooms (February through June, 1984), we were able to study the way information about the computer and its text editing capabilities was introduced by the teachers and how this information diffused throughout the classroom. By means of a hands-on text editing quiz given at the end of the year, we were able to assess students' learning of text editing commands and their understanding of the mode organization of QUILL's text editor.

This report looks at students' understanding of, use of, and ways of talking about text editing commands and editor modes in light of classroom processes surrounding the teaching and use of the editing software. By examining how text editing commands were learned and used over time, we hoped to understand what social processes in the classroom influenced the development of text editing expertise among students, and whether such processes created barriers to student learning. In what follows, I will describe the organization of the QUILL text editor and the task which was designed to tap student mastery of it. The results of administering this task will then be discussed and specifically related to classroom patterns of information introduction (how information is first introduced into the setting) and diffusion of knowledge (how information spreads throughout the classroom community).

The distinction I am making between introduction and diffusion of information should not be confused with the distinction between 'formal' vs. 'informal' learning, or teacher initiated vs. student initiated activities. Depending on the knowledge base of the students and the teaching approach of the teacher, the introduction of information in a classroom could fall at various point on continua of formality and student responsibility; that is, it can occur as a whole group lesson, a wall chart, peer tutoring, informal group discussion, etc. Similarly, how the information diffuses may depend on a wide variety of formal or informal processes, e.g., through peer experts with explicit tutorial duties, one-on-one conferences with the teacher, or casual peer chats. All teachers depend on diffusion, on information spread, but teachers may not be fully aware of the extent of it, the multiple

channels through which it occurs, or the barriers to it. If teachers can become aware of the complex relationship between the social organization of information transfer in their classrooms and learning outcomes, they might be better able to maximize the learning opportunities that naturally occur and minimize previously unforeseen barriers to learning.

The Organization of the QUILL Text Editor

QUILL² is a set of microcomputer based programs that includes a storage and retrieval program (called Library), an electronic mail program (called Mailbag), and a program to help students plan and organize a first draft (called Planner). Embedded within each program is a mode-oriented text editor (called Writer's Assistant). Because I am concerned with students' understanding of the commands and terms relating to the manipulation of text, I will concentrate on the characteristics of Writer's Assistant.

In each of the QUILL programs, the text editor is accessed as the writer enters a text file to write. One is automatically in the default mode (sometimes thought of as the 'move' mode). In this mode, the writer can move the cursor using a variety of options or select a variety of other modes, such as 'insert,' 'drop,' or 'exchange,' in each case accessed by a single letter ('i' for insert, 'd' for drop, or 'x' for eXchange). Some of these options are presented in the 'menu' line at the top of the screen. Thus, in the default mode, the writer sees the following at the top of the screen:

> W: In Drop Quit Help ?

While composed of simple words, comprehensible even to a young student, the information supplied by the menu is not immediately transparent. An explanation of the default mode menu follows: The right bracket symbol ('>') before the 'W' indicates that variable cursor command keys, such as the page scrolling command, the CONTROL-I command (which moves the cursor a word at a time), or the RETURN key (a line at a time), will move the cursor to the right and FORWARD through the text. Pressing the 'comma/left bracket' key will replace the symbol with a left bracket ('<') and reverse the direction of the cursor so that it moves BACKWARDS up through the text. It is worth noting that this feature of QUILL is rarely noticed and exploited by beginners (teachers or students alike). The 'W'

stands for 'Writer's Assistant.' In other modes, the letter symbol in this position represents the mode the editor is in. In this case, the 'W' indicates that one is in the default mode from which any of Writer's Assistant's commands can be accessed. Following the 'W' mode symbol are a set of the most basic options available to the writer: 'In' for the insert mode, 'Drop' for the delete mode, 'Quit' to end the editing session, and 'Help' to access the help files. The QUILL editor has far more modes than these four; in order to see more options, the writer must press '?'. A complete listing of modes appears in Table 1.

Mode Name	Key	Description
Drop	d	Deletes text.
Quit	q	Leaves the editor.
Help	h	Provides help about modes and keypresses.
Exchange	x	Allows for a letter-for-letter substitution of text.
Mix	m	Followed by (s)entences or (p)aragraph, rearranges the text in a paragraph sentence by sentence or in paragraph form. This command would be used when altering the margins of a file.
Page	p	Moves the cursor through the file one page at a time.
Set	s	Followed by (e)nvironment, sets margins, paragraph indentation, and a range of other functions; followed by (m)arker, delineates text segments.
Aline	a	Moves a line of text to the center, flush to the right or left margin, or space by space to the left or right.
Jump	j	Followed by (b)eginning or (e)nd, moves the cursor to the beginning or end of the file.
Find	f	Finds a specified character string.
Transfer	t	Moves chunks of text from one location in the file to another.
Byline	b	Automatically prints out on the screen whatever word or words are listed in the "environment" as the byline.
Copy	c	Followed by (b)uffer or (f)ile, copies text either from the buffer or from another file on the disk into the current file.
Replace	r	Exchanges a character string (e.g. a word) for another for each occurrence in the file.
Word	w	Checks the spelling of a word, provided the spell.list disk is inserted.

Once a particular mode has been selected, the writer has various options, all of which are indicated on that mode's menu line at the top of the screen. For example, while in the insert mode, the menu reads as follows:

> In: Type your text < - CTRL-C ESC

The writer can type in text, use the backward arrow to erase letter by letter, press CONTROL-C to save what has been entered, or press the ESCAPE key to undo whatever has just been inserted. Pressing either CONTROL-C or ESCAPE will close off the insert mode and access the default mode. (It should be noted that as text is scrolled forward beyond a single screenful, the menu line disappears.)

While all of the modes available in Writer's Assistant relate in some way to text manipulation, the modes have different functional relationships to text. Some of the modes relate directly to putting words in a file, removing them, or rearranging them (e.g., insert, drop, exchange, transfer, copy, byline). Other modes provide support for the writer in going about the job of editing (e.g., help, set, word). Still others relate specifically to cursor movement (e.g., jump, page, find). This complexity adds to a teacher's challenge in introducing QUILL to students. He or she must decide which commands to teach, in what order, whether to talk about the menu and its organization, and in what manner.

In addition to modes (such as 'jump') which control cursor movement, there are a variety of other commands which will move the cursor while in the default mode. These commands are not considered modes and hence are not listed in the 'W' menu. These are the left and right arrow keys, which move the cursor one letter at a time to the left or right, 'o' which raises the cursor one line at a time, 'l' which lowers the cursor one line at a time, 'RETURN' which lowers or raises the cursor depending on the direction arrow ('<' or '>'), and 'CONTROL-I' which moves the cursor one word at a time, also depending on the direction arrow. (The up and down arrows have no function in QUILL and in nearly every mode will cause an error signal to beep.)

The complexity of mode/cursor command organization in QUILL poses some additional challenges to both novice teacher and student: 1) Some commands are named and listed in the menu; others must be introduced and remembered

with no support from the system. 2) Some commands have mnemonic supports: 'In' for insert, 'o' for over (which raises the cursor), 'l' for lower (which lowers the cursor); others have no such support: CONTROL-I (which moves the cursor one word at a time) bears no obvious relation to words. 3) Some keys have a value similar to that which they have on a typewriter, such as 'RETURN,' while others have no counterpart, such as the 'CONTROL' key.

One interesting outcome of QUILL's mode and cursor command organization is that, depending on the mode, a given key stroke will have various meanings. For example, pressing the letter 'l' will either type out the letter on the screen (in the insert or exchange mode), move the cursor down a line (in the default mode), erase an entire line of text (in the drop or transfer mode), type the letter on the menu line (in the replace or find mode), move the cursor to the beginning of the line (in the aline or jump mode), or do nothing at all (in the copy or set mode). Typing a letter other than one which would access a mode or move the cursor in the default mode would type the letter on the screen in the insert or exchange mode but cause the computer to beep a rather loud error signal in the drop, transfer, aline, or default modes.

I mention all of these fine points to illustrate the complexity of the QUILL text editor, an editor which was specifically designed to be accessible to children. Clearly, not everyone needs to master all aspects of the text editor in order to be able to insert, delete, and rearrange text. However, it is important to keep the *nature* of the complexities in mind when considering what teachers and students are faced with in learning to integrate QUILL into a writing program, and when thinking about reasonable goals and feasible strategies for teaching students to use the QUILL text editor.

Text Editing Quiz Protocol

During the last week of the 1983-84 school year, an editing quiz was given to all the students present in the two sixth grades we studied (which I shall refer to as Classroom A and Classroom B). The quiz was designed to assess students' knowledge of the most basic modes and a range of cursor commands. On-going classroom observation suggested that this would be appropriate for even the most proficient students in the two classrooms.

The setting. One by one, each student was called up to the computer and offered the chair directly in front of it. Two researchers, familiar to all of the students, sat on either side. One of the researchers interacted with the student while the other took notes and occasionally asked a follow-up question. The task required the student to edit a piece of text on the screen and then answer some questions designed to tap the student's understanding of the mode organization of the text editor.

The text material. On the screen was printed the following text, with recognizable errors in need of correcting:

The words of a Michael Jackson song go like this:

Billy Jean

She was more like a movie queen from a movie scene
I said don't mind but what do you mean I am the one
Who will dance on the floor in the round
She said I am the one who will dance on the floor
in the round. [sic]

The procedure. The researcher read the first line of the text aloud, to make sure the student knew the text was a Michael Jackson song, and asked if the song Billy Jean was familiar (in every case, the answer was yes). She then said, "OK, I want you to pretend that you had just written this yourself on the computer, and when you got to the end of the first verse, you were all finished writing and you pressed CONTROL-C." [This moves you out of the insert mode and into the default mode, where the cursor can be moved around without affecting the text.]

After the student acknowledged that he or she understood, the researcher said, "But, then, let's say you noticed that Michael Jackson's name was spelled wrong [pointing to the misspelled name on the screen and indicating what was wrong if the student did not immediately show signs of recognizing it], and you wanted to fix it before you printed this off. How would you go about fixing it?" From this point, the student took over and was not expressly helped unless he or she asked for help, or gave up. There were two mistakes in Michael Jackson's name, which could be corrected by first deleting the letter 'l' in 'Michael' and then inserting the letter 'c' in 'Jackson.' If a student got completely confused or gave the computer commands that he or she could not undo,

the researcher stepped in, got the text back in order and went on to the next editing task, if one still remained.

If the student was able to move the cursor up to the misspelling and successfully or nearly successfully carry out the editing tasks, a second set of questions was asked. The researcher said, "OK, now let's suppose you decided you wanted to type in the second verse of this song. What would you do?" Invariably, the student moved the cursor down to the end of the text and pressed 'i' for insert.

At this point, the researcher said, "But now if you wanted to go back up and fix something, what would you do?" (The point here is that in order to move the cursor, you have to first get out of the insert mode.) At this point, both researchers engaged the student in a discussion about why sometimes pressing 'o' would raise the cursor and other times it would simply print out 'o' on the screen, to get a sense of the student's understanding of modes and the fact that the same key stroke would have a different effect in different modes.

Results

In quantifying students' performance, I will separate results into four different categories: 1) ability to carry out specific editing tasks, 2) use of particular editing commands, 3) understanding of the mode organization of the text editor, and 4) the language used by students to talk about what they were doing. Following this, I will discuss these results in light of the students' classroom experiences.

Table 2 shows a striking contrast between the two classrooms with respect to students' performance in carrying out basic editing tasks. In Classroom B, the majority of students had fully mastered the insert and drop tasks, and could move the cursor throughout the text. In Classroom A, only 3 students showed some success on these basic tasks, and only 1 student successfully completed them all.

In addition, there were differences with respect to the commands students used to accomplish particular tasks. As mentioned above, there are several ways to move the cursor. These commands vary in speed and sophistication. For example, to move the cursor up to the beginning of the text from the bottom, the slowest way is simply to

press the backward arrow key over and over so that the cursor moves letter by letter up to the top. This command is relatively intuitive, drawing on one's understanding of the arrow sign. The fastest way is to shift modes, pressing 'jb' to get the cursor to 'jump to the beginning.' This is a non-intuitive command with mnemonic support, listed in the second row of the default menu line (not visible unless one presses '?'). Alternatively, one can press 'o' which moves the cursor up one line at a time. Because it is not a mode, it does not appear in the default menu. It must be specifically taught and remembered with no support from the system aside from the mnemonic cue of 'o' for over.

Understanding Mode Organization

Only those students who had some facility with editing were asked questions about the different editing modes. It was assumed (rightly or wrongly) that any student who could not move the cursor or insert or drop text would have little understanding of the text editor's mode organization and would not know, for example, that certain key strokes would have different meanings in different modes. Table 4 displays the differences in understanding that we observed in the two classrooms we studied.

Scoring. In order to be counted as having 'complete understanding,' the student had to discuss (in his or her own words) the need to give a command (e.g. CONTROL-C) in order to leave

Table 2

Students Successful at Editing Tasks

() = nearly successful

<i>Task</i>	<i>Room A</i> <i>N=12</i>	<i>Room B</i> <i>N=17</i>
Moves cursor up from bottom of text	3(1)	17
Uses DROP mode which involves pressing 'd,' erasing text, and pressing CONTROL-C	1(2)	14(3)
Uses INSERT mode which involves pressing 'i,' a letter, and pressing CONTROL-C	2(1)	15(2)
Moves cursor across a line of text	3	17

Table 3 shows the variation in commands used by the students to move the cursor up, down, and across a line. In Classroom A, where only a few students knew any commands, none had mastered the more sophisticated ones which involved using the jump mode or CONTROL-I. Only 1 student used 'l' and 'o.' In Classroom B, students evidenced a range of mastery, quite a few students using the more sophisticated commands and many using the commands 'l' and 'o' with great facility.

Table 3

Students Using Various Commands

() = occasional use

<i>Task Required</i>	<i>Solution Used</i>	<i>Room A</i> <i>N=12</i>	<i>Room B</i> <i>N=17</i>
Raising the cursor to the beginning of the text	TOTAL	3(1)	17
	arrow key	2	2*
	'o' key	1	12
Moving the cursor across a line	TOTAL	8	17
	arrow key	0	4
	space bar	3	11
Lowering the cursor to the end of the text ***	TOTAL	2	15
	RETURN	1	2
	'l' key	1	7
	'jump' mode	0	6

Notes:

* One student started with arrows then switched to the jump mode.

** One student used both the space bar (moves the cursor one character at a time) and the CONTROL-I (moves the cursor one word at a time).

*** Only students who had successfully inserted or deleted text were asked to perform this task, 2 in Classroom A and 15 in Classroom B.

a mode before being able to move the cursor freely. For example, when Richie was asked how he would move the cursor up after having pressed 'i' (which put him in the insert mode, he said promptly, "First you have to CONTROL-C so you can see the words 'W, In, Drop' at the top." (This refers to the 'menu' on the top line of the screen while in the default mode.) "Then you can move where you want to move. But first you have to CONTROL-C."

We followed up this sort of answer with a question about why sometimes if you press a certain letter, it comes out on the screen and other times it moves the cursor up or down. Richie's response was, "If you're doing 'i' [which stands for 'insert'], it just types out letters, but then if you do 'CONTROL-C,' you have the 'W, In, Drop' line and you can move the cursor." (Note that Richie did not refer to 'the menu line' by name, and no other student referred to it at all.)

By incomplete understanding, I mean that the student had some sense of how to insert or drop text, but did not understand the significance of pressing CONTROL-C when finished. During the editing task, some students would try to press 'd' or drop while in the insert mode (or vice versa), and when asked why sometimes the letter 'o' moved the cursor up and sometimes just printed an 'o' out on the screen, they said they did not know.

Scores. As Table 4 shows, only 2 students in Classroom A evidenced some sense of modes and mode shifting. Of these 2, only 1 had a complete understanding of mode shifting.

In Classroom B, all of the students knew that in order to insert or drop text, you have to press 'i' or 'd' and then end with 'CONTROL-C.' Some had difficulty (particularly in the drop mode) putting the cursor in the precise spot to insert or drop the text. Often, these same students had an incomplete understanding of mode organization and did not really see the distinction between insert and default modes, for example, or did not know why key strokes behaved differently at different times. There were two students (Not Determined in Table 4) who did not say enough in response to the researchers' questions to allow us to know whether they understood mode organization or not.

In summary, only 1 student out of 12 tested in Classroom A had complete understanding of the mode organization of the text editor, while 11 (and possibly 13) out of 17 in Classroom B did. This difference between the students in the two classrooms is consistent with the differences displayed in Tables 2 and 3.

The Language Factor

Another striking difference that emerged during this test was the way students in the two classrooms talked about the computer.

The Cursor. At some point during the first editing task, whether or not the student was able to complete any of the steps, the researcher pointed to the flashing cursor on the screen. As part of the conversation about moving the cursor up to the misspelled words, she asked, "What do you call that?"

In Classroom A, only 1 student knew the term 'cursor,' the one student who had a complete understanding of modes. All of the others had developed their own idiosyncratic term: 2 students called it "the dot;" 1 "the marker;" another "the box;" and someone else "the square." (The two who shared the same term -- Sonya and Robert -- had never worked on the computer together and apparently developed the name independently.) The other students said they did not know what it was called.

In Classroom B, *all* of the students used the term 'cursor.' One student thought for a moment and said, "Curse, um, curse, oh yeah, cursor." Everyone else used the term with no hesitation or faltering, as if it were completely obvious.

Table 4

Students' Understanding of Mode Organization

Group	Complete	Not Complete	Not Determined
Room A	1	1	-
Room B	11	4	2

CONTROL-C. In Classroom A, only 2 students used the term 'CONTROL-C.' (One other student pressed CONTROL-C at some point but did not talk about it.) One of the students who actually mentioned the term said she did not know how to do any editing because she "wouldn't CONTROL-C until after the teacher checks." (Presumably, she meant until after her teacher had corrected and OK'ed her handwritten draft, thus obviating the need for any editing on the computer; the teacher did not make a practice of checking students' text on the screen.)

The only other Classroom A student who used the term was the only one of them who had a complete understanding of mode shifting, and was quoted above as saying, "First, you have to CONTROL-C so you can see the words 'W, In, Drop' at the top." Twice, he used the term as a verb, 'to CONTROL-C,' and once he said, "You have to do CONTROL-C," using it as a de-verbalized noun.

In Classroom B, all 17 students pressed CONTROL-C at some point during the editing tasks. Twelve of the 17 used the term in trying to explain how to move the cursor up, starting in the insert mode.

Nine students used the expression "CONTROL-C 'freezes the text'" or 'freezes it.' As an example, Theresa explained, "You have to freeze it to go up. CONTROL-C freezes it, and then you can move the cursor up."

Three other students talked about "controlling" the text in order to move the cursor. For example, Amelia said, "You have to control it, and then if it's controlled, once the text is controlled, you can move the cursor up."

It seems that the students have reanalyzed the term 'CONTROL-C' to derive not from the 'control' key on the keyboard but from its everyday meaning, 'to have power over.' Thus, 'controlling the text' carries, via the words themselves, the notion of finalizing the text changed or inserted prior to using CONTROL-C.

In the talk about CONTROL-C, as well as in the case of the term 'cursor,' the students in Classroom B had a shared vocabulary. They had a set of expressions for talking about and, it appears, for thinking about the way the computer works.

Discussion

Before asking why such striking differences in text editing performance and understanding came about in the two classrooms, two points should be made. First, it is important to note that the insert, delete, and cursor movement commands on the QUILL text editor are well within the grasp of every student in these two classrooms. Conceptual or technical complexity is *not* a valid explanation for students' (in both classes) failure to learn the commands.

Second, in both of the classrooms, the teachers used a 'process' approach for teaching writing. They called for the following steps to complete a piece of assigned writing: 1) brainstorming, 2) writing a first draft, 3) editing and revising, 4) writing a final draft, and 5) publishing or sharing the writing. In both rooms, revision was considered an important, formal step in the writing process. However, both teachers integrated the computer into the final draft or publishing stage of the process, using the computer as a typewriter (as a tool to enter a final draft or a letter, not enter or edit a first draft).

While the computer was not intended by either teacher to be used specifically as an editing tool, students' facility with text editing commands did influence their experience with text on the computer. In Classroom B, even though students were entering text from already corrected drafts, those who knew how to edit did indeed have occasion to use the editing commands, such as when a mistake was found after CONTROL-C had been pressed. Likewise in Classroom A, this skill *could* have been useful to the students. We know of 5 separate cases where a student in Classroom A retyped an *entire* composition into the computer (making only minor corrections), instead of using QUILL's editing capabilities. The point here is that it is *not* the case that in one classroom editing commands were needed (and hence learned) but not needed in the other.

In order to explain differences in students' facility with the QUILL text editor, it makes sense to ask first, how information about editing on the computer was introduced, and, second, how this information diffused throughout the classroom. From observations and interviews with students, we know that there were few editing discussions led by the teachers and no organized, whole group

instruction on editing commands in either classroom. The menu line and mode organization of Writer's Assistant was not discussed in either room. The only whole group instruction on the computer that occurred happened the first day the computer was introduced and the first day that QUILL's Library and Planner programs (text storage and planning software) were used. Instruction in these cases revolved around mechanical issues such as care of the computer, accessing the different programs, and giving the computer appropriate commands for beginning and ending a writing session.

There were, however, differences with respect to how information on editing commands was made available. In Classroom B, a week after the computer was introduced, a large wall chart (prepared by the teacher) was put up next to it. The chart named and explained the most basic editing commands (including the following: 'i for insert,' 'd for drop,' 'CONTROL-C freezes the text,' 'o raises the cursor,' 'l lowers the cursor'). Interestingly, the chart was organized as a vertical listing of commands, unlike the menu line on the screen where commands appears horizontally. The chart included information about mode commands as well as non-mode cursor commands. In Classroom A, there was no wall chart. Instead, each student was given xeroxed copies of four pages from the QUILL Teacher's Manual describing step by step procedures for inserting and dropping text. These pages were put in computer writing folders for each student. Two weeks later, these folders were tacked to a bulletin board displaying computer writing.

The classroom researcher from Classroom A reports that she never saw any student looking at these xeroxed pages, even in cases where they had difficulty with text editing commands. In Classroom B, however, students made frequent use of the wall chart while working at the computer. Four students looked up at the chart during the computer quiz (and, of these, two looked up at it repeatedly).

oo oo oo oo oo oo oo oo

He [Kemeny's opponent] indicated that the users were on the whole extremely happy with the service they received. My rebuttal was: "The average computer user never uses your system at all because he finds it too frustrating."

John G. Kemeny, 1972.

On an end of the year questionnaire students were asked the following question:

Where did you learn most about using the QUILL computer?

From the teacher? _____

Classmates? _____

Just using it yourself? _____

Other ideas? _____

One student in Classroom B wrote in, "The wall chart," as the Other Ideas choice.

Another factor relating to the introduction of information is that the teacher in Classroom B (whom I will call Teacher B) became a computer expert, thoroughly familiar with the most common text editing commands. She was seen by the students as the classroom expert. In response to the question "Who in your class knows the most about the editing commands on QUILL?" the majority of students wrote, "Mrs. B."

Teacher B's expertise allowed her to provide more individualized, informal instruction about QUILL on occasions when she was called over to the computer to help a student. This partially explains why some students knew more sophisticated commands for moving the cursor than others. When Teacher B saw that certain students were ready for additional information, she provided it. At first, only the students who were extremely facile with the insert and drop commands were taught the 'extra' commands (such as 'jb' for 'jump to the beginning,' or CONTROL-I for moving the cursor one word at a time).

After several months, Teacher B put up a new wall chart, which included these 'extra' commands in addition to the original ones. Some students who were less facile with the editor began to use these 'extras' (either in response to the prompting of one of the more expert students or by looking at the wall chart). Overall, Teacher B was able to fine-tune her individual help by providing additional information to those students who seemed ready for it.

With regard to student-to-student diffusion of information in Classroom B, the single most important factor is that students often worked in pairs at the computer (at least 30% of the time). Partners were assigned on the basis of the order in which first drafts were completed and edited by

the teacher: hence, a certain unpredictability was introduced. Mixed sex and mixed computer ability pairings were common. On several occasions, one of the more proficient QUILL users was observed telling another student how to move the cursor or edit text. Expressions such as "CONTROL-C freezes the text" or "I lowers the cursor" were often in the air.

Thus, pair work (in addition to the wall chart) led to wide diffusion of computer vocabulary, expressions and editing information. There were no obvious sex differences related to which children had extensive information about the editing commands and the modes. Those who did not master the commands, in every case but one, were students whom the teacher saw as real behavior problems; they were often denied turns at the computer as punishment. It is possible that they received less help and informal teaching from the teacher.

Patterns of introduction and diffusion differed greatly in Classroom A. For one thing, Teacher A did not become the classroom QUILL expert. Instead, a student did. Precisely how this came about is unclear, as the student's and teacher's perception differ somewhat. When asked in an interview how he learned the QUILL commands so quickly, Richie, the student expert, explained the process as follows:

Like, when she was teaching a group she would always call me up first. And she asked people from the other class [Classroom B] to teach me. She asked some students from Mrs. B.'s class, Michael. Mrs. B. sometimes helped me. Mrs. B. taught me how to unlock the columns. Some students taught me how to change, like if you make a mistake, you can call it back up and change it, change the mistake.

Mrs. A.'s perception does not wholly match Richie's. She acknowledges that she perceives Richie to be both a good writer and technically adept. (In fact, she predicted early in the year, months before the computer went into the classroom, that Richie would become a computer star.) Likewise, Richie was selected by Mrs. A. to be one of three boys who set up and took apart the computer each day, and he was often selected to be among the first students to learn something new on the computer (as when Planner was first introduced to the class). However, Mrs. A. says she did not plan for Richie to go over to Classroom B to get special tutoring from Teacher B or students in

that class. Rather, the fact that he developed special text editing expertise was somewhat fortuitous. She figures that on some occasion when Richie had been chosen to deliver a message to Mrs. B., he hung around the computer for a while and picked up some new skills. Mrs. B. corroborates this, saying that she may have given him a little bit of information but does not recollect giving him a special editing tutorial.

In spite of this difference in perception surrounding the making of Richie into a computer expert, one thing is clear. Once Richie emerged as someone who had mastered the basic QUILL editing commands, Mrs. A. sent other students to Richie with editing questions, and he became known as the classroom expert. In response to the question, "Who knows the most in your class about the editing commands on QUILL," every single student named Richie (two named Richie and Michael).

This had consequences for the diffusion of editing information. Any informal teaching that took place was left up to Richie. He was often called over to the computer to help a student, but he gave only perfunctory directions ("Press CONTROL-C,") or solved the problem himself. As a result, no one else in the class fully mastered the basic QUILL commands.

Additionally, the help Richie did give was primarily to other boys. In Classroom A, there was no official partner policy at the computer (unlike Classroom B); students who had nothing to do were often allowed to hang out at the back of the room while a friend used the computer. As a rule, groupings at the computer divided along sex lines (as did groupings in the lunchroom and on the playground). For this reason, Richie spent more time at the computer with other boys, and only occasionally helped a girl. Not surprisingly then, on the computer quiz the only two other students to demonstrate some knowledge of the QUILL commands were boys who were close friends of Richie's. Not a single girl in Classroom B demonstrated that they knew how to insert or drop text during our editing quiz.

In sum, the differential learning of QUILL text editing commands can be explained, at least in part, in terms of: (1) how information was made available to students -- via wall charts, informal teaching by the teacher or a student expert;

how and under what circumstances information was passed from student to student -- through voluntary (same sex) grouping or through assigned (mixed sex) pair work. These factors should be explored further so that teachers can decide what kind of dissemination strategies and peer grouping they are most comfortable with, but which would, nonetheless, allow for widespread diffusion of text editing skills. For example, a teacher who was not interested in becoming the primary classroom expert might indeed choose to give special editing instruction to a few students and encourage peer tutoring. In this case, a reasonable suggestion would be to train both a boy and a girl or establish a non-voluntary partner system which ensured mixed sex pairings. Researchers and teachers can collaborate to document a variety of options from which novice teachers can pick and choose.

Conclusion

Introducing the same computer hard- and software into both classrooms allowed us to 'trace' the spread of information that could only be learned within the classrooms. It was possible to study how information about the computer was organized and presented by the teacher and how this information diffused throughout the classroom community. This work strongly suggests that, in order to understand the impact of the computer on children's writing, one must first understand the classroom itself as a complex learning environment in which the teacher is a key determinant of social organization and students' access to knowledge.

Thus, in addition to asking, "What impact does the computer have on student writing;" we must ask, "What impact does the classroom have on the computer and the way students learn to use it?" It is then possible to see more precisely how the classroom environment (rules, patterns of interaction, and instruction) influences students' access to computer training and writing opportunities, which in turn, influence outcome variables such as the kind and amount of writing produced, improved literacy skills, or the extent to which students learn to take full advantage of the computer as a writing tool.

Notes

¹The Microcomputers and Literacy Project, funded by the National Institute of Education (Grant #G-83-0051), is a three year project designed to study the impact of microcomputers used for writing on life in classrooms, teacher/student interaction, and student writing. Principal Investigators include Bertram Bruce (Bolt, Beranek & Newman), Courtney Cazden (Harvard Graduate School of Education), Karen Watson-Gegeo (Northeastern University), and myself. Research assistants, Cindy Cohen, Barbara Craig, John Strucker, and Polly Ulichny, have assisted us in carrying out classroom observations, interviews, and data analysis. Project work is, thus, inevitably a collaborative enterprise; hence, the "we's" scattered throughout the paper. However, I take full responsibility for the text editing quiz, the analysis of it, and any shortcomings in the paper. At the same time, I gratefully acknowledge comments and suggestions I received from the two teachers, project members, and from Esteban Diaz and Peg Griffin at LCHC. Finally, special thanks are due to Mrs. A. and Mrs. B., two fine and dedicated teachers. Hopefully, their time and effort over the course of this project will make it easier for other teachers down the road who are struggling to integrate computer technology into an already full classroom day.

²Under contract from the Department of Education, Quill was developed by Bertram Bruce and Andee Rubin at Bolt, Beranek & Newman, making use of the text editor Writer's Assistant developed by Jim Levin at UC San Diego. The software is now published by DC Heath.

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A perfectly rational, machine based, electronic, radio-controlled, and generally technological poetry is impossible for one reason, which must be well known to both the poet and the mechanic: a rationalized machine poetry does not acquire energy or transform it as does natural poetry, it only uses and distributes energy. Input is equivalent to the output... A machine lives a deep and satisfying life, but you will never encounter seeds from a machine.

OSIP MANDELSHTAM

Dilemma in the Socialization of Mexican-American Children: Sharing for Cooperation or Copying for Competition

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According to several scholars (Jencks et al., 1972; Bowles and Gintis, 1977; Burstyn and McDade, 1984) the educational system in the United States has stressed the value of competitive individualism and personal achievement even at the expense of community goals. Often, Hispanic students are socialized at home in a cooperative mode of learning; not surprisingly, then, they seem to have some problems conforming to the competitive, individualistic modes required by the schools.

From the Mexican-American children's perspective (the result of their socialization), the

main concern of classroom learning tasks is that *all* children advance at a comparable pace by helping each other. This cooperative concern takes precedence over the level of the child's own performance, because the welfare of the community must be placed before personal advance. The children are, therefore, likely to "share" information with each other. In a classroom where the competitive mode is predominant, "sharing" by Mexican-American children may at times be considered "copying."

The present study explores the relationship between home socialization processes and children's modes of learning in school; specifically, the uses of competitive and cooperative modes is contrasted. The research focuses on the students' participation in learning activities where "copying" can be seen as appropriate "sharing" of information or as an inappropriate appropriation of another's work. Our results indicate that Mexican-American children are highly versatile and pragmatic about integrating home socialization patterns and values with those of the school. As children acquire a second language and culture, they also become highly selective in the use of appropriate learning modes and adapt to the demands of either home or school with admirable ability and common sense.

Table 1

Children's profile

Child Code Name	Sex	Age	Grade	Nuclear Family Members	Family Years in U.S.	Parents' Occupations
Manuela*	F	10	3	8	10	Both work as factory assembly-line persons
Ramon**	M	9	3	6	10	Father, gardener; Mother, restaurant cook
Lupita	F	8	2	4	5	Both work as factory assembly-line persons
Juan	M	8	2	5	4	Father, musician; Mother, cook
Joaquin*	M	7	2	8	10	Both work as factory assembly-line persons
Rosita**	F	7	1	6	10	Father, gardener; Mother, restaurant cook
Antonia*	F	6	1	8	10	Both work as factory assembly-line persons

Key: * members of one and same family; ** members of another and same family

Research in the Community: Home Tasks and Play

Seven children from four Mexican-American families comprised the sample. Table 1 summarizes information about the children's backgrounds. All of the families are intact, both parents are present. Two families have resided in the U.S. for ten years, the others have lived here from four to five years. The parents are employed in low-paying, unskilled labor occupations such as factory assembly-line worker, cook, gardener or restaurant worker.

The children attend the Oakgrove Elementary school in Los Portales. The school had 350 students at the time of our observations: 60% Mexican-American, 22% Anglo-American, 10% Black, 5% Samoan and 3% other minority. Two of the students in the study were in first grade, three in second and two in third. All were classified as limited English proficient (LEP).

In Los Portales, children of all ages perform a variety of tasks at home. Adults in the family have a well-defined role in the assignment of tasks. They exhibit direct, clear, and authoritarian patterns of behavior which emerge consistently in our data and permit us to anticipate their interaction with children. Once parents assign a task to children, it is expected that they will become fully responsible for its completion. Adults set certain parameters and norms of behavior, and children comply, although they often negotiate the nature and timing of completion. Negotiations include trading tasks with another child. The child's ability to clarify a task is seen as a manifestation of his or her desire to execute the task promptly.

Children display a great deal of autonomy in negotiating the manner in which they perform the task, and yet they feel free to ask for and receive adult assistance. Clarification is requested by children in the form of a simple question or by restating the order. Occasionally adults intervene without the children's request if the observed routine duties are changed. However, most often parents prefer that their children work independent of adult intervention. At times, children may also request a reward for performing the task, usually a dime or a quarter. Parents give children spending money upon request (\$.25 to \$1.00) even when work is not assigned. By the same token children may initiate a task on their own or offer

their help, particularly if they have an interest in the task being completed more quickly. Thus, home tasks executed by children are characterized by cooperative and egalitarian modes of behavior geared to common goals. Our study reveals a complex network of communication exchanges among children and with adults. The children communicate in Spanish with adults and display cultural and sociolinguistic competence in these interactions.

Peer interaction during play is also an important socialization context that helps children acquire the competencies they need at home and in school. In our observations, peer interaction emerged as especially important because it offered children an opportunity to bridge the gap between the home and school learning environments. Playing is the favorite pastime for Los Portales children. Siblings are in closer proximity than friends, and yet children go to friends' houses in search of peers of the same sex. The seven children of the study spend long hours in formal games such as "La Vieja Inez," and informal games such as jumping, playing ball, or in make-believe activities, including games of skill, chase, vertigo, simulation and others as described by Schwartzman (1978). At times all seven children play together as a group; at other times they form smaller groups or play alone.

The games start with negotiation of roles for each child in a real or imaginary setting. Children formulate their own rules of interaction without adult interference. An invitation to play does not necessarily specify the type of game; this becomes the first item to be negotiated after acceptance. Play is initiated by a simple invitation: "Vamos a jugar" ("Let's play"), or by a challenge: "A que yo te gano a correr" ("I bet I can beat you at running"). They negotiate rules and create new ones according to their personal interrelationships. An invitation is declined when parents have made other plans for a child.

Although children do not determine the rules of interaction in the home, there is continuity of values reflected on the importance given to collective behavior in children's home tasks and in their play organization, as well as clear continuity in the use of the Spanish language, although some English is used during play. Fischer and Fischer (1963) suggest that Anglo-American children often approach play in a more competitive way than

children from other cultures in the U.S., especially Mexican-American children whose cooperative relationship in assigned home tasks is carried over to play. But as children go from Los Portales to school there are serious discontinuities in language, values, modes of interaction, cooperation and competition.

Research at Oakgrove School

Immigrant children often start school at a disadvantage owing to the serious discontinuities they face. In our study, however, we found that school play offered the children significant continuity, especially regarding language and game organization. During the course of this study, the children changed: They progressively used more English in play, both at Los Portales and in the school, and carried the competitiveness of school play over to community play. The knowledge and values the children brought to school -- the norms, standards, ideas and patterns that had grown out of their cultural group's socioeconomic and political reality and had impacted the school activities--began in turn to be modified and to integrate with school patterns and values. This integration of values was shown in the way they talked, raced to finish assignments, and especially in the manner they redefined appropriate social behaviors such as "sharing" in contrast with "copying."

Oakgrove School is located in the heart of Los Portales. The children in our study attended 1st through 3rd grade in the bilingual program and participated in three types of academic tasks:

(1) teacher-directed instruction for the entire class, (2) teacher directed instruction for small groups, and (3) independent seatwork. The teacher assigns tasks for each group according to her perception of the children's ability, and the tasks must be executed by each student independently, via use of dittos and workbooks.

Normally, the teacher assumes the responsibility of policing independent work and preventing peer communication. At times she gave clear orders such as: "No talking," "Stay in your seat," or "No copying." If copying was observed, lesser academic ability was imputed to the student. At times, children seem to ignore the teachers' orders and continue to share information with each other, in order to clarify questions, check answers, or

simply encourage each other in efforts to find the right answers. The rule, however, is that if a child is caught copying he or she must repeat the assignment.

A detailed analysis of field notes and recordings indicates that children's concept of copying contrasts with the concept of sharing in the following way: If a peer is asking for an answer and another peer willingly offers assistance, this action is called "sharing," not copying. But if the child who is asking for an answer decides to take it without the other child's consent, then this action is called "copying" and deserves to be reported to the teacher. Children, who have learned to race against each other, make it a point to demonstrate to the teacher that they are competitive, while they also offer help selectively to peers. To illustrate how this complex combination of cooperative and competitive modes coexist in the context of instruction, we will present samples of conversations recorded.

TEXT 1

[Ms. Pérez is instructing the first grade class for reading-readiness. T = Ms. Pérez; A = Antonia; R = Rosita; B₁ = first boy; and B₂ = second boy.]

- T: Work on the papers that you have on each table, and after I finish the Orange Group all of you will come here. Los Amarillos, Rojos and Verdes, van a hacer sus papeles. Luego voy a tocar la campana y quiero todos los groups Rojo, Verde, Amarillos. Naranja! Pórtense bién! Trabajen! (The Yellow, Red and Green groups, go and work on your papers. Then I'll ring the bell and I want all the groups. Orange! Behave! Work!)
- A: Tú te volteaste y saliste derechito y después nos ibamos copiando y después te diste esa volteada así para ganarnos, pero no nos ganaste. Nadie nos ganó. A mí me van a dar dos [dittos], porque y me gané dos. (You turned and left directly and then we were copying but you turned so that you could win but you didn't. No one beat us. They are going to give me two [dittos] because I won two.)
- B₁: [Talking about Antonia] Nos quería ganar, ¿verdad? Pero no nos ganó. Todos los muchachos estaban viendo la *race*. (She wanted to beat us, right? But she didn't. All the guys were watching the race.)
- R: Y después . . . ma-pa-la-la. El te está copiando. (And later . . . ma-pa-la-la. He's trying to copy you.) [Antonia looks at the boy and he looks away, then B₂ asks her a question.]

- B₂: ?Con qué empieza gorro? (What does hat begin with?)
- A: Go-rrro. (Hat.)
- R: ?Qué es esto? (What is this?) [points to the picture]
- B₂: Elote (Corn).
- A: Mira yo escribí seis con una S. (Look I wrote six with an S.)
- R: Pipa, yo ya pasé esa. (Pipe. I already passed that one.)
- B₂: [Looking at his paper] Esto es salero. (This is a salt shaker.)
- R: [Pointing at a picture on her paper] Este no es salero, es sopa. (This isn't a salt shaker; it's soup.)
- B₂: Estrella, salero, elote. (Star, salt shaker, corn.)
- R: Tú pusiste salero. (You put shaker.)
- B₂: Yo acabé, ya les gané. (I'm finished, I beat you.)
- R: [Sounds out the initial letter M] M-m-m.
- B₂: [To B₁, pointing to the pictures] Rubén, ¿sabes leer? OK. Ahorita me vas a leer algo. (Ruben, do you know how to read? OK, you are going to read something to me.)
- B₁: Yo sé leer. (I know how to read.)
- B₂: Yo te los enseño y tú los lees. (I'll point to them and you read them.)
- B₁: Salero, león. (Salt shaker, lion.)
- [Children continue asking questions, then:]
- T: OK, Rojos, Verdes, y Amarillos, todos conmigo. (OK, Red, Green and Yellow, all with me.)

Children request information from each other, compete and challenge in search of opportunities to learn collectively through social exchanges. When one of the boys attempts to get some information without Antonia's permission, Rosita protects her: "El te está copiando ("He is copying from you"). But when the same boy requests information, "?Con que empieza gorro?" ("What does 'gorro' start with?"), Antonia willingly sounds the word for him "ggoo-rrroo."

Students in Ms. Rivera's second grade class behave in ways similar to those first graders. They cooperate and compete, sometimes individually, and sometimes one group with another. In the following text we will see Juan and Joaquín, two of the students observed, dealing with concepts of "greater than" and "lesser than."

[Juan and another child are working together when Joaquín joins them. Ju = Juan; Jo = Joaquín; and B = third student.]

- B: ?Cómo es esto? (How do you do this?)
- Ju: No sé. (I don't know.)
- B: Tú no sabes, ponle un círculo en la flechita esa. (You don't know, put a circle on this little arrow.)
- Ju: Tengo así, mira. (I have this, look.) [Shows the third student his paper and points to a circle around the ">" "greater than" symbol. Juan's response, however, is incorrect.]
- Jo: [Walks over to Juan and B, with his ditto worksheet in hand. He stands facing both of them] ?Qué hacen? (What are you doing?)
- Ju: Esto. (This) [Pointing to his worksheet, while Joaquín continues to stand and watch the two boys work quietly. Then Joaquín sits at their table, looks at his paper, writes a number, and looks up. Juan, turning to Joaquín says] Estás copiando. (You're copying.) [Juan puts his arm over his paper.]
- Jo: Yo no. Nomás estaba viéndote. (Not me. I was just looking at you.) [Joaquín sits at the table looking at his paper and occasionally looking up at Juan and B without a word.]

Two of the children work in a team, share information and figure together the questions and answers on the same worksheet. That is not copying. But when Joaquín comes uninvited and takes information from them without permission, he is denounced: "Estas copiando" ("You're copying").

In Ms. Thomas' classroom, the third-grade, there is less talk about not copying. Students assist each other until the teacher interrupts them. But she does not trust students' ability to provide each other with the correct answer. Her feeling is that students who share information are lazy. In the example which follows, Ms. Thomas uses a game that week for the fourth time that week. Students apparently got very enthusiastic about it and the teacher felt it was an appropriate way to drill for word knowledge. The text below illustrates collective competitiveness patterns of children.

TEXT 3

[Ms. Thomas announces the game. T = Ms. Thomas; and Ra = Ramón.]

T: This morning we're going to play your favorite game.

Class: Oh boy! Yeah! Goody, yeah!

T: Settle down, now, or we won't play this game and you'll have to read your books. I've got all of these words you should know [she holds a stack of flash cards in her hand] and each row is a team. [All students' desks face forward and form six rows. The teacher flashes a card to the first student in row 1.]

B₁: Lake. [Student stands up and reads. Row 1 cheers.]

T: [Moves up and down each row, then she flashes another card to a student in row 3: "Monument."]

B₂: Mont-men. [Student in row 3 reads.]

T: No. [She moves to next row and flashes the same card. Row 3 students look at B₂ disappointed.]

Row 3: Oh! You! You! Why didn't you get it?! See, you're making us lose!

B₂: [Just sat and faced forward.]

T: [Flashing another card to Ramón in Row 4: "Balance."]

Row 3: Miss it! Miss it! Get it wrong! You don't know it!

Ra: Balance [answers correctly in row 4].

Row 3: Boo! Boo!

T: Sh-sh [to Row 3]. If I have to tell you to be quiet again, we'll stop this game!

By the time Ms. Thomas gets to Ramón in row 4, the competitive mood between rows is extreme, to the point of trying to make the opponent fail. Although the above scene illustrates the degree of collective competitiveness in children, there are examples of third- and fourth-grade children sharing knowledge generously. In fact, Ms. Lewis, who has a 3-4 grade class, seems to encourage sharing and does not refer to copying as a dishonest practice; she just ignores it.

TEXT 4

This group of third-grade girls is working together on a multiplication ditto. Each student has her own sheet. They have been instructed by Ms. Lewis to complete the assigned page while she goes to work with another small group. T = Ms. Lewis; Ma = Manuela; G₁ = girl one; G₂ = girl two; G₃ = girl three; and G₄ = girl four.]

G₁: Así, así. [Turns toward G₂ and points to the multiplication problem in her workbook.] (Like this, like this.)

G₂: ¿Por qué se hace así? (Why do you do it like that?)

Ma: Porque así sale bien, tonta ('cause that's the way it turns out right, dummy).

G₃: No, así, mira. Tenemos que llenar los cuadros, cuadro X 7 = 42. (No, like this, look. We have to fill the little squares, space X 7 = 42.)

G₂: Yo sé, pero, ¿cómo se hace? (I know, but how do you do it?)

G₄: [Addresses G₃] Tú ya lo hiciste. A verlo. (You've already done it, let's see it.)

G₃: ¡Ay tú! (Oh you!) [Places her sheet of paper in the middle of the table and the other girls crowd in. She performs a division problem, 42 divided by 7 = 6; then pulls her paper back.]

Others: [Looking at G₃ and at each other without a word return to their paper to do the same thing.]

G₁: ¡O sí! (Oh yeah!)

Ma: ¡Yo ya sé! (I know!)

G₂: Pero esta otra no es igual. (But this one isn't the same.) [Then pausing a few seconds] Oh sí, se hace lo mismo, ¿verdad? (Oh, yeah, you do the same thing, right?)

This group of girls freely request, offer and receive assistance in the form of responses, explanations, coaching and encouragement. There is a great deal of teaching and learning in peer interaction. The combination of individual work and collective work seems to work well. If the teacher had demanded compliance with the strict policy of "no copying" it is likely that Manuela and other students would have taken much longer to understand math concepts and operations. While this group was doing collective work, Ms. Lewis supervised another group. On two occasions she offered, at least implicitly, her support for collective efforts.

Copying is conceived by Mexican-American children as a legitimate activity of sharing knowledge with each other, provided permission has been granted by the child who possesses the knowledge. More importantly, in collective learning through sharing, not only the answers to questions, but also information relevant to the understanding of concepts and operational principles is perceived as more rewarding and effective. These children's effort to collectivize their learning experience suggests a strong impact of the home socialization patterns, and continues in spite of the opposition of some of the teachers. Sharing knowledge in dyads or small groups is a practice

compatible with either group or individual competitiveness. Children, like in play, decide whom they help and with whom they compete.

Our data show that teachers in general did not value or trust collective work and sharing of knowledge among children. With one notable exception, they even opposed collective learning on the grounds that "copying" is a dishonest practice. Therefore, teachers emphasize competition and discourage collective work patterns and cooperative learning modes (without increasing the academic performance of Mexican-American children). It is possible that if teachers understood the significance of collective work in the Mexican-American family and community, they could build more effective instructional practices based on cooperative modes of learning.

Conclusions and Discussion

The implications of this study for teacher preparation and classroom instruction are that: (1) "Appropriateness" of behavior is a moral concept which may not be shared across cultures and must be internalized as an integral component of the new cultural values accepted; (2) Competitive and cooperative modes of learning are not necessarily incompatible; children can integrate them both in play, home, and classroom activities; (3) Collective learning experiences seem to be highly rewarding to Mexican-American children as they offer some continuity in behavioral patterns and expectations in the home and in school; (4) The competitive learning mode is learned by these children and transferred from play to academic tasks; (5) The children redefine norms for cooperative and/or competitive behavior in play and classroom settings, so that they can integrate home and school values; and (6) Children take a very active role in determining their participant structures for both the cooperative and competitive modes of operating in play and in academic tasks.

In our opinion, teachers who recognize the significance of the cultural, linguistic and cognitive development that takes place in the home via socialization, especially in the case of language minority children, are more resourceful and effective in classroom instruction. Lack of this recognition may lead to inflexible teaching practices and a waste of talent and time with culturally different children. Building on children's values results in more rewarding and productive instructional

practices, as well as successful transition from home to school. This tends to be a difficult transition because of the serious cultural, linguistic and social discontinuities for immigrant children.

This consideration, however, must not undermine the realization that immigrant children can change too, and can gradually acquire the skills required for a competitive learning mode that characterizes the American educational system. They can learn to be highly individualistic in order to participate successfully in the more advanced stages of educational development. In the early stages of intellectual growth, however, we cannot make a strong enough case for a more flexible and humane learning environment.

Educational researchers have come to view learning as a universal human process taking place in and outside of school, in the day-to-day activities of work and play, in the home and the community. Learning as a process is essentially an interpsychological, social and cultural phenomenon (Spindler, 1974; Soltis, 1984). Educational researchers also have come to view ethnographic research as a powerful tool to study the social and cultural aspects of the learning processes, the more human aspects of learning left untouched by traditional empirical methods and theories. As often is the case in ethnographic research, our study in Los Portales and Oakgrove Elementary School has raised questions which we are not yet able to answer. The interplay of competition and cooperation, the continuities or discontinuities of cultural patterns learned in the home, as well as the need for adaptation on the part of immigrant children to a new linguistic, cultural and learning environment are indeed very complex problems. Ethnography teaches us the need for thoughtfulness and flexibility in the organization of instructional practice and the selection of learning modes.

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For the Bible Tells Me So: Teaching Children in a Fundamentalist Church

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The subject of this paper is part of a larger study of how children are taught in a fundamentalist Sunday school and vacation Bible school. I want to focus on the church setting as a context for literacy, by looking at how information is organized and presented to children. In addition to the home and non-religious community institutions, the church school can provide data on the acquisition of literacy.

The two churches I studied called themselves "fundamentalist," a designation which places them in the conservative wing of the evangelical movement. Evangelicals can be defined as those who describe themselves as "born again," have encouraged other people to believe in Jesus Christ, and believe in a literal interpretation of the Bible.

Using this three-part definition, the latest Gallup religious poll shows that one out of six American adults can be classified as evangelical. Nationally, certain groups are over-represented in the evangelical ranks -- women, non-whites, persons with less than a college education, Southerners, older people, Protestants, rural residents, and the less well-to-do.

Considering the large population committed to the evangelical church, the prevalence of evangelical Sunday schools for members of all ages, the fact that many children experience their first classrooms at Sunday school, and that these schools are based on sacred textual material, this subject has received surprisingly little study as a source of literacy socialization.

What I would like to suggest is that, in fundamentalist Sunday schools, children are taught specific skills for Bible literacy; that they are taught by a systematic form of classroom discourse; and that the sacred text differs markedly from secular text in its significance for reader, its establishment of authority, and in the sequencing of presentation. Finally, I want to speculate on the possible difficulties for children shifting from a framework of church classrooms to other, more mainstream, kinds of schooling.

The two churches which I chose were located in a Northeastern state. The first, which I will call the Bible Chapel, was located in a town of 50,000. The second, which I will call River Baptist, was in a rural area. The congregations of both were almost totally white and both working and business classes.

My own professional background includes elementary public school teaching, and although I am a Protestant, I am not a member of an evangelical church. All my observations were of pre-primary classes of four and five-year-old children who had not yet entered first grade and who had not been "officially" taught to read and write.

At the Bible Chapel I spent two weeks, as a participant observer, helping with a group of 75 children during daily vacation Bible school as well as five weeks observing a Sunday school class of 50 children. At the River Baptist church I observed a Sunday school class of six children for one month. In both churches, teachers were non-professionals, largely mothers of children in Sunday school.

The Bible was central to the programs I observed. All children were expected to bring Bibles to Sunday school. At River Baptist, each classroom session began with a Bible count, with children awarded stars for remembering their Bibles. Most Bibles were standard-sized with small type, in the King James version, which was used as text and in curriculum materials.

Aside from curriculum workbooks or worksheets, the Bible was the only text used. A single incidence of a girl bringing a non-Bible storybook to the vacation Bible school assembly area caused an adult to tell her to close it.

At River Baptist, Bibles were referred to as "swords" that could "stab the devil." Although none of the children in the River Baptist class was able to read the Bible, the teacher opened each child's book to the appropriate passage during the Bible storytelling.

A central part of each morning's program was listening to a Bible story. Teachers prepared these stories with great conscientiousness. Although they used the curriculum material as a guide to the order in which stories were to be told, they used the Bible text itself as their main preparation and told the stories in their own words, inserting frequent textual quotations.

On the daily vacation Bible school schedule, twenty minutes were allotted for telling the Bible story. During this period children were generally quiet and the tone was one of solemnity. One child was heard saying to another, "Shh! Pay attention! This is the *Bible story!*"

As a followup to the Bible story, teachers read what were called "application stories" from the curriculum guide. These were stories in which the lesson from the Bible story was applied to a situation in everyday life. For example, following the Bible story of Jacob's ladder, the curriculum guide included an "application story" about a little boy's first day at school when he was apprehensive about making friends. By remembering that his best friend was Jesus and that "He said He would be with me" (a reference to "The Lord said . . . I will be with you," Genesis 31:3), the boy was comforted and was able to make friends.

During daily vacation Bible school, a mother volunteered to take over the "application story" part of the daily program. She soon, however, substituted stories from her own life, or "testimony," stressing the importance of her conversion experience. Such testifying was a common part of these Sunday school programs.

A primary goal of Sunday school teaching was to bring about conversion experiences -- being "born again." Teachers prayed together that they might "reach the souls of children" and the

vacation Bible school ended with ten conversions in the pre-Primary class. Learning Bible text was viewed as the means both of mastering personal problems and of achieving salvation.

For these non-readers listening was the principal way of learning Bible text. The importance of listening was constantly stressed. At River Baptist children went through a routine of "screwing on their listening ears." During the vacation Bible school one of the craft activities was making a set of styrofoam "earphones" labeled "God Speaks" and "We Listen."

Memorization of Bible verses also played an important part in Bible school curriculum. In Sunday school a new verse was presented each week and during vacation Bible school children were given a new verse every other day. When verses were memorized, the citation was always included, for example, "At the name of Jesus, every knee should bow -- Philippians 2:10."

Children learned memory verses by repetition, listening, and watching adult lip movements. Parents were expected to help with the memorization at home, and both workbook sheets and craft materials were sent home bearing verses to be memorized.

Another form of memory work was learning songs whose words reinforced lessons, as in "Jesus loves me, this I know, for the Bible tells me so," or actually quoted scripture as in the song, "I will make you fishers of men." Children were taught new songs by "catching on" to the singing rather than listening to an explanation of the meaning of the words. Hand motions accompanied songs and were often used as an aid in learning new material.

Because the Bible was taught as "the word of God," children were not encouraged to think speculatively about the stories, to supply additional details out of their own imaginings or to suggest alternative endings. Children were familiar with the formulaic answers required in response to the curriculum guide material as in these examples:

Teacher: What could help if you were afraid?

Children: (Chorus) Pray! Pray to Jesus!

Teacher: Who can help us?

Children: (Chorus) God!

Teacher: Yes, the Lord. How can we ask God to help?

Children: (Chorus) Pray!

Children listened for cues which would indicate which answer was suitable. These cues were not always clear, as:

Teacher: What was the loud noise?

Children: (Chorus) God!

Teacher: No, it was thunder.

At River Baptist where the class was only six children, they were all proficient in "reading" their teacher's cues as to the correct response. Sometimes she taught by repetition:

Teacher: And Jesus said, "Thy faith hath made me whole." Say it.

Children and Teacher: Thy faith hath made me whole.

She also used syntactic cues:

Teacher: What can God do? He can do--

Child: Anything.

And syllabic cues:

Teacher: She got well because she be--

Child: Lied.

When children were unable to read the teacher's cues, they remained silent until more cues were offered.

In this classroom children habitually answered questions with single words -- words not from their own experience but "correct" answers that were elicited by teacher cueing. Although this might be labeled learning by rote, children were constructing strategies for selecting the correct responses.

The teacher's repertoire for cueing was a varied one, and she did not always cue accurately. Children not only had to decide what to answer but whether the cues were sufficient to risk answering at all. Rather than acting as passive receptacles, as the term "rote" might imply, the children were actively learning and practicing rules of pedagogical discourse which included turn-taking, forms of questions and answers, and contextualization cues.

How well they had learned these rules was illustrated by an incident when I, left temporarily alone in a Bible Chapel classroom with ten children, asked, "Do you think we have a photograph of Jesus?" I was trying to elicit an answer which had to do with Jesus living before cameras. My question was met with what appeared to be complete blankness. The children assumed my question was ritualistic opening to a didactic story and were waiting for me to cue the correct answer -- I was waiting for them to think about my question. We were at an impasse of unfamiliarity.

These children in fundamentalist church settings were learning a great deal about literacy. Neither reading, in the sense of decoding, nor writing, in the sense of composing, was formally practiced. But the children nevertheless assumed the roles of literate people. They were surrounded by printed messages on walls and on hand-out worksheets. They could memorize and repeat textual material. They were practiced in listening to text read aloud. They carried their Bibles with them and sometimes opened them into reading position. But Bible literacy within this context is a particular kind of literacy, presenting new viewpoints on several issues that have been raised in the literature.

Scribner describes a literacy process in which a "break" is made between empiric approaches to everyday problems and theoretic approaches to problems whose subject matter does not "count." In the fundamentalist church classrooms, however, the subject matter of literacy, the Bible text, *does* "count." Biblical literacy is taught with urgency toward conversion, with expressiveness of personal commitment, and within the shared community believe in God's word. It is not a "cool" analytical experience.

Church teachers strongly emphasize the authority of Biblical text and thus supply an important aspect of becoming literate as Olson has described it; that is, learning that the text has an authority of its own. But the authority of Biblical text, unlike secular text, is not an impersonal one. It is the word of God to whom one is both responsible and connected in everyday life.

In contrast to Olson's speculation that children make the transition from oral to written language by proceeding from "interpersonally based oral language in the early grades to increasing reliance

on written text and text-like language in the later grades." Bible school students are immediately plunged into the task of learning text and curtailed in interpersonal language during pedagogical discourse. Whether the skills Bible school students have learned -- listening, memorizing, singing -- in the acquisition of Bible literacy will be used in the learning of secular material and whether the rules of pedagogical discourse which they have mastered will prove to be a help in other classrooms will depend upon what kinds of schools they attend.

Some of these children will attend fundamentalist church schools. Others will attend public schools. If their public school classrooms are ones in which children are rewarded for divergent, speculative and critical opinions of textual material, these children will need to learn new rules of classroom behavior. Heath found that Roadville children, from a community whose church experiences resembled those described here, were criticized by public school teachers for lack of imagination, minimal answers, no extension of ideas, rarely asking questions, lack of initiative, and laconic behavior. She linked these school behaviors to family backgrounds of Roadville children.

We do not know how the children in this study who enter public school classrooms will perform or how they will compare to those who enter fundamentalist church schools. These are areas for further research. One could speculate on the basis of this ethnography, however, that children whose family discourse, early fundamentalist Sunday school pedagogical discourse, and later school classroom discourse are consonant, will acquire literacy through a process quite different from that indicated by mainstream public school curriculum.

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Play and the Acquisition of Literacy

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This report is a new reflection on data collected for a larger diary study of my son, David, from the ages 2:6 to 4:6. The focus of the original study is on the emergence of literacy during the preschool years (Hoffman, 1982). For it, I collected data in a handwritten diary on a day-and-night basis, on audio tapes and with collected artifacts.

For the purpose of this report, I will discuss David's early socialization for a literate orientation by examining his literacy games and his play with commercially available literacy toys and literacy related items.

David, in his attention getting behavior and curiosity, developed several learning games for himself and a willing partner. These child initiated and directed games cut across several facets of literacy. While some of the games used decontextualized print others focused on contextualized written language; some were number games and others letters and words; commercially produced games were used for some and home constructed for others; some games focused on reading, some writing, some counting, some listening, and some speaking. In these interactions we see David as a creative and active partner in his games of communication, manipulation and invention.

I will discuss David's play with literacy games and motifs as it related to his early enculturation into his middle class home and values. Intrinsic in these values is a strong literate environment and exposure -- for the present and the future. Literacy is fostered in the preschooler in order to prepare the child for a life as a literate person in a literate environment. The child is socialized for school from the crib on, as he is read to daily, played with, questioned, and answered. Scollon and Scollon (1979) refer to "unconscious parental instruction in literacy" (p. 50). My own method was perhaps most exemplified by my attitudinal feedback and encouragement which became a type of instructional motif. David initiated his own interests, books, games and the like, and I, as parent-researcher, facilitated his progress.

Several investigators report that typically middle class children are successful in their later schooling (Heath, 1979; McKenzie, 1977; Michaels and Gumperz, 1979; Ninio and Bruner, 1978; Scollon and Scollon, 1979). Yet, there remains a need for a clear profile of the process of development of literacy in these middle class homes (Heath, 1980).

As David was socialized into the family, he was likewise socialized as a literate person. That is, David's socialization intertwined with his literacy development. This involved David playing tricks and games with his newly acquired literacy skills. These games were not imposed upon David in a teaching-learning fashion; rather, these contrived and sometimes tedious games emanated from David and terminated as he lost interest. If these games had been other-initiated they might have been more structured, possibly dull and never as spontaneous. By asking willing partners to play with him, David was always able

to find a friend to be with, and took pride in his ability to keep a game going with someone so much older than himself.

The object of one of David's spontaneous games, "Sign Reading," was for "us" (David and myself) to read as many signs as we could *while* I was driving the car. At first, David pointed to the signs and asked me to read to him. After playing the game for a while, David began to interject his own reading of the signs that he could "catch" as we whizzed by them. His favorites were the gas station signs like Exxon, Arco, Gulf, and Shell. Later he learned to read the street signs such as Stop, Speed Limit 35, No Parking Any Time, School Zone, End School Zone, and so on. Sometimes he wanted me to tally how many times we read each of the signs. The following examples are representative of the hundreds of such examples of "Sign Reading."

Example 1 (David; Age 3:6)

On the way to nursery school, David said, "Let's talk about signs! What does that sign say?"

I answered, "Right turn signal."

David proceeded with, "And what does that yellow and red shell say?"

I answered him, "It says, 'Shell' -- that's a gasoline station."

He asked, "Does it have seashells in it?"

I answered, "No."

We proceeded to read signs. I read the majority as he requested. However, David read, "Speed Limit 35," "Bike Route," "No Parking Any Time." When we came to "No Parking This Side of Street," he thought it was, "No Parking Any Time."

These were the signs that I was able to read as he requested while I was driving. They were not the only ones on the route.

SPEED LIMIT 40
SPEED LIMIT 35 (12 X)
NO PARKING ANY TIME (20 X)
SCHOOL SPEED LIMIT (2X)
NO PARKING THIS SIDE OF STREET (7X)
BIKE ROUTE (2X)
NO TURN ON RED (3X)
WATCH CHILDREN
SIGNAL AHEAD (3X)
NO LITTERING (1X)
DRIVEWAY (1X)

In this example we can see where patience was needed in order to communicate with a young child while I was driving the car. This repetitive reading of individual signs (some 12 and 20 times

a morning) was the manner in which David learned to read these same signs over time. Through a game, even car riding contributed to David's literacy development.

The next example of "The Sign Reading Game" is taken from a larger audio tape of our morning car rides to nursery school. In this example we can see where I am requested to read most of the signs, but that David does fill in the ones that he recognizes.

Example 2 (David; Age 3:7)

David	Sandy
	This one says, "Watch children," and another one says, "No Turn on Red."
	Speed Limit 55 and Limit when Flashing.
It's not flashing.	It's not flashing. Right. So we don't have to go 15 miles. _____
What does that one say?	No Parking This Side of Street. No. Speed Limit 35. End School Zone. No Parking This Side of Street. No Parking This Side. Here's one for you.
Speed Limit 35.	How about this little one down here?
No Parking Anytime.	Right! No turn on Red. Watch Children. _____ Yellow!
Speed Limit 35.	Okay, the next one? (Pause) School Speed Limit When Flashing (slowly)
But, it's not flashing.	Right. End of School Zone. Here's another one.
Speed Limit 35. (read as Spee Limut)	How about this one?
Speed Zone Ahead. (read as Spee Zo Ahead)	Good. (6 sec. pause) How about this one?
No Turn on Red.	Did you see the first word? It says, "No." N-O is no. Do you see the "no" there?
Yah.	We used to write that with your magnetic letters.
N-O. No.	N-O right.
_____ on there. A O-N	The other way. N-O.
Where's the "N" on there?	It was first.
No, on your car.	

In this excerpt, one can see our turn-taking and literacy discussion while I was driving the car. In it, I read the signs for David and pointed out the ones for him to read. We had "played" "Reading Signs" so often that I knew which signs were in his repertoire. While this game was fun for David, it represented his hours of practice in identifying contextualized print (print in its environment) Several investigators have studied young children's reading of contextualized print (Harste, Burke & Woodward, 1979; Harste & Carey, 1979; Ylisto, 1967). In all of the studies, the children were reading signs in the environment before they read the decontextualized words.

Another child-initiated game was David's spontaneous "Word Rhyming" game. In this game David either drew in other players or would have fun rhyming words as he saw objects in the environment. These spontaneous rhyming games were prevalent for an eight month period of time (from 3:3 to 3:11). In example 3 we can see where objects in the environment were the stimulus behind his rhymes.

Example 3 (David: Age 3:4)

David and I were driving in the car. David wanted me to buy him a toy to play with. He told me so. Then he said,

"Toy rhymes with boy."

We passed a fence on the road and he said,

"Fence rhymes with mence."

The light turned red and he said,

"Red light rhymes with bed light."

We passed a big truck and he said,

"Truck rhymes with muck,"

In this example we can see where David over-generalized in order to rhyme words. He was free to form nonsense words. David enjoyed rhyming words during these months and therefore he often contrived ways to play with words that rhyme.

Garvey (1977) considers rhyming as the most obvious type of word play. She also notes that "the manipulation of sense and nonsense is one of the components of successful rhymes and stories written by adults for children, but children too can create nonsense" (p. 39). Several other investigators have observed this type of speech play (Chukovsky, 1963; Kirshenblatt-Gimblett and

Sherzer, 1979; Geller, 1983; Iwamura, 1980). However, only Geller links rhyming with literacy socialization.

In example 4 David directs other members of the family in a "Rhyming Word" game.

Example 4 (David; Age 3:11)

All of the family members were at the table eating lunch (Mother-Sandy; Father-Jerry; Sister-Alisa; Sister-Sharon; and David).

David: "Let's think of all the people in our family and their rhyming words. No, let's think of the people in the whole world."

David: "Lisa, what rhymes with Lisa." I know pizza."

David: "Sandy, what rhymes with Sandy?"

Sandy: "Candy"

David: "Jerry, what rhymes with Jerry?"

David: "Berry"

Sandy: "Merry"

David: "Sharon, what rhymes with Sharon?"

Sandy: "Baron"

David: "Caren"

David: "David, why rhymes with David?"

David: "Mavid"

In this game David gave the directions, set out the limits, and was the controlling player. He made sure to include all of the members of the family, saving himself for last. This initial consonant substitution is a favorite of young children. Geller (1983) feels it's the most popular rhyme form in children's traditional verse.

In the following example, David demonstrates how he played with a literacy game in order to pass the time. We were stuck in traffic and David had a captive audience.

Example 5 (David; Age 3:3)

While we drove to nursery school, David asked to play "Rhyming Words."

David: "Mom, what rhymes with tree?"

Sandy: "Bee"

David: "Pee" and he laughed.

David: "Me rhymes with tree and bee rhymes with tree too."

David: "Let's do another one."

(We were now stuck in traffic.)

David: "What rhymes with stuck?"

Sandy: "Truck"

David: "Luck rhymes too. Hey, Mom, know what rhymes with chair? "Bear."

In this example we can see where David was in control of the conversation which involved turn-taking with his willing play partner. This game was initiated and terminated by David.

In the following short example we can see where David tried to use rhyming words to get out of a bad situation.

Example 6 (David; Age 3:8)

David was angry with me and said, "I hate you."

Alisa said, "Ooooooooooooooooooooo," in a teasing fashion.

David said, "I said I bait you -- like bait a fish. That's not bad!"

Here we can see where David was beginning to manipulate language by using his rhyming words. Kirshenblatt-Gimblett and Sherzer, in their introduction to *Speech Play* (1976), describe speech play as, ". . . any local manipulation of elements and relations of language, creative of a specialized genre, code-variety, and/or style. A key word, of course is 'manipulation.'" (1976, p. 1)

A third type of child-initiated and child centered game which David loved is his "Protagonist-Antagonist" game. Many of the characters for this game come from the literature which I read to him. All of these games require a willing partner who was familiar with David's repertoire and background.

Example 7

David was in the car with his father and the discussion was about protagonists and antagonists.

David: "Batman"

Jerry: "The Joker would overcome Batman."

David: "Judah Maccabee would overcome the Joker."

Jerry: "The Phillistines would overcome Judah Maccabee?"

David: "Samson would overcome the Phillistines."

Jerry: "Delilah would overcome Samson."

David: "The Friendly Giant and the Crab would overcome Delilah."

Jerry: "Who?"

David: "Orion would overcome Delilah."

Jerry: "Cyclops would overcome Orion."

David: "The Maccabees would overcome Cyclops."

Jerry: (Gave up)

In this game David plays with the old theme of "goodies and baddies" in a competitive manner. In it he takes turns with his father and tries to think of the stronger or winning character. In order to do this, he must have complete comprehension of the characters and their stories. This kind of implied conceptualization is often asked for in later school years under the guise of "reading comprehension."

In the following example David and I play the same game together. This time he refers to more characters from the literature that has been read to him.

Example 8 (David; Age 3:10)

We were in the car driving to nursery school.

David: "I'm *King Tut* and I can overcome *Pharaoh*."

Sandy: "*Moses* can overcome *King Tut*."

David: "*The Magicians* can overcome *Moses*."

Sandy: "*Zeus* will overcome the *Magicians*."

David: "*Hercules* would overcome *Zeus*."

Sandy: "*Paul Bunyan* would overcome *Hercules*."

David: "*David* would overcome *Paul Bunyan*."

In example 8 we can see where David plays this game until either or both of the partners runs out of characters. At that time the game is terminated and David goes on with something else. The object of the game is to think of the winning character from any time period in either fiction or nonfiction. No answers were considered incorrect.

A fourth type of literacy game was played by David with a partner. In this game a conventional deck of cards was used to play a once-popular card game. In it, the players try to gather in the most cards by adding. Simple addition is used to capture cards, i.e., you could take in a 3 and a 4 with a 7. Once David learned to play this game (age 3:8), he tried to cajole a willing partner to join him on a daily basis. This card game made use of all of the combinations of a number up to 10. By playing the game often, David was able to practice these literacy skills which are often referred to as "number facts" in first grade.

David played with commercially available *magnetic plastic letters* which he placed on the dishwasher in the kitchen. He often referred to

this play as a game. For this game, David made use of the contextualized print which he read in his "Sign Reading" game. He asked for the spelling of the words, decontextualized them, and placed them up on the dishwasher. In addition to these words, David learned to "write" his name, those of the other members of the family, and some favorite words. Later he learned to form short messages with the magnetic letters. Although David's own printing was not yet fully developed, he was able to play with invented spellings, proper spellings and with phrases. As time went on, he was able to express himself with short sentences. All of this play was at David's discretion and usually while I was cooking dinner. In this way he was able to play and still be near me, his mother.

The following few examples are representative of the hundreds of such events.

Example 9 (David; Age 3:7)

A First! David uses his magnetic letters to write a word. The alphabet magnetic letters are on the dishwasher. David picked out the proper letter and wrote *DAVID* in upper case letters. This is the first time that he's written a word with the letters.

In this early example of David's manipulation of the print, we can see the beginning of his freedom to express himself with print. This was months before he was able to execute his own name with paper and pencil.

In the next example (10), David demonstrates his enjoyment in physically manipulating his letters and fixing his words.

Example 10 (David; Age 3:9)

I bought David a duplicate box of magnetic plastic letters. David put all of his new letters up on the dishwasher and then we put the names of the gas stations up together.

EXXON
SUNOCO
GULF
SHELL
TEXACO

David still wanted to leave up his "old" words, *COOK*, *FOOD*, and *SUPER ADAM* (his nickname).

In this example David moved from contextualized print (the gas station signs within their logos) to decontextualized print (the words outside of their signs). From this point on, he "played with" (manipulated) the words daily to the point where he could then put them up by himself if they fell or were accidentally moved around. David's movement from contextualized print in the environment to decontextualized print is reminiscent of Ylisto's study (1967) where several children made a similar transition under direction.

In example 11 David begins to invent spellings and to segment words.

Example 11 (David; Age 3:7)

While I was on the phone in the kitchen this morning, David found an "X" on the dishwasher. He said,

"I'm going to write 'Exit.' This is 'X,' now where is 'it?'"

I pointed to the "it" letters and showed him where they go. Then I gave him the "E" to precede the "X" and he said,

"I don't need that, the X says X and that's enough."

One can see how hard David "worked on" his play with literacy. He spent hours adjusting, straightening, fixing, moving and manipulating his letters. In time he could "put up" more than three dozen words. (For a list of these words see Table 1.)

Table 1

Some words which became a part of David's repertoire

EXXON	EXIT
SUNOCO	STOP
GULF	NO
SHELL	GO
TEXACO	UP
ARCO	DOWN
COOK	ON
FOOD	SEE
SUPER ADAM	LOOK
DAVID	BOOK
SANDY	BUT
JERRY	CUT
ALISA	IS
SHARON	FIRE
MOMMY	COOKS
DAD	MEAT
I LOVE YOU	NO GIRLS ALLOWED
I	ME
	YES

In example 12 we can see where David learned to use the magnetic letters to form a message.

Example 12 (David; Age 4:6)

David was playing with his magnetic letters. He asked me how to spell, "No girls allowed."

I told him the spelling as he picked out the letters and put them up on the dishwasher.

He left up "I love you Mommy."

In example 12 David begins to compose messages with print before he is facile enough to do the same easily with a pencil.

Magnetic letters were not David's only medium for messages. He also "played" with the typewriter and sent messages through the mail. In the following example, David typed a letter to his grandmother. He had asked her to stop smoking and then sent her the same message by mail.

Example 13 (David; 4:3)

Dear Bubby,

Please stop smoking. I love you.

Love David

David asked for the spelling of several of the words and found the letters on his own. He felt that the typed letters was more official than his oral request.

Aside from David's "Sign Reading" game, "Rhyming Word" game, "Antagonist-Protagonist" game, "Casino," "Magnetic letters," and "Typing," David spent many hours playing with commercially produced items which claim to foster literacy. These included Sesame Street Alphabet Cards, Sesame Street Alphabet Puzzles, Candyland, Picture Dominoes, Animal Rummy, and others. Through this gaming, David was able to practice and "work on" different aspects of literacy. He developed his own sight vocabulary, played with rhyming words, learned to identify letters and sounds, worked on number facts and manipulated print.

Even though the games were child-centered and child-initiated, they didn't just happen. The gaming took place in a language oriented home environment where literacy is sought after, worked on and taken for granted; it is an integral, intertwined facet of socialization. That is, all of these literacy games and events were set within an

environment whereby book reading and storytelling were daily ritual; David discussed, role played, questioned and referred to literature throughout his daily narrative. In essence, then, the literacy events reviewed and discussed in this report were merely one small facet of an all encompassing way of life and child rearing.

This study presents data to suggest an approach to literacy in the home and school that is naturalistic and holistic, one which respects the individual learner, his interests and style as well as the cultural milieu and its effects on learning.

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Reply and Response

Editor note: The following commentaries were written for the book, *Kyooshitsu ni maikon wo mochi-komu mae ni* (*Before bringing micro-computers into classrooms*), based on a mini-conference organized by Naomi Miyake at Aoyama Gakuin Woman's Junior College, in Tokyo, Japan, on January 8th, 1985. The book also contains the translated version of Denis Newman's paper, "Functional environments for micro-computers in education," which appeared in the April, 1985, Vol. 7, No. 2 issue of this *Newsletter*. Appearing below are, first, the response of the Japanese developmental psychologist, Giyoo Hatano, to the Newman article, which is then followed by Newman's reply and the references for both notes.

Toward an Educational Theory
Based on Realistic Constructionism:
Comments on Denis Newman's
"Functional
Environments ..."

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"Realistic" Constructionism vs. "Romantic"
Constructionism

If I were to describe in a word my impression of Denis Newman's paper, though I agree with him on many points, I would say his theory of functional learning environments (FLE) has not yet reached an educational theory of realistic constructionism, at which we should be aiming.

Whether we focus on microprocessors or not, theories about learning environments, or educational intervention in general, can be characterized on two levels. On one level the theories state which environments or intervention would be effective for acquiring adaptive and flexible knowledge that supports human thinking. On the other level they prescribe what the term "education," or promotion of development should mean. On each of these levels, our task is to formulate our thoughts as clearly as possible so that the theories can be used to guide educational practice.

I say "realistic" constructionism, because I contrast it with the more traditional, or "romantic" counterpart. As seen in Newman's description of the past LOGO projects conducted at the Bank Street College, the educational theory based on romantic constructionism adopts a version of "preestablished harmony" theory in setting up learning environments, combines that with a child-centered philosophy, and has to a reasonable extent, successfully developed into a coherent system.

Papert's optimism is one of the most typical cases of this approach. According to the preestablished harmony theory, children are assumed to achieve socially meaningful learning if they are just allowed to do what they want to do joyfully and enthusiastically. It also assumes that children naturally acquire the necessary knowledge from acting upon their physical environments, if they are allowed to interact with such environments spontaneously. These assumptions are backed up by the child-centered philosophy that regards children's spontaneous choices as of the highest importance.

Though this classic constructionist theory of education may appear attractive enough, it cannot be accepted without modification. In terms of the efficiency of learning, the basic assumptions are hard to accept. The results of Bank Street's LOGO projects clearly show the difficulty with this approach. A child would become obsessed by a computer game, but the skills gained from this situation may not be socially desirable. It is questionable whether a child would interact with a computer if you just left the child with a computer in an isolated room. It is harder to believe that the child would learn, say, the concept of recursion and/or how to write a program involving recursion just by interacting with a computer.

Moreover, though the respect for self choice is agreeable in principle, it is often true that young children are not fully equipped to decide the relative importance or desirability of the available alternatives before them. Arbitrary decisions made by young children could easily end up with unfavorable results. We should also take into account indirect manipulations from the political powers and from commercial interests. I would say if education is left to children's free choice, the end product would be far from the desirable development of children as human beings.

Instead of this romantic constructionism, what we need is an educational theory based on more realistic constructionism. Since it is a version of constructionism, it claims that adaptive and flexible human knowledge cannot be just transmitted (handed down), but has to be constructed by each child and each learner. What a teacher teaches does not automatically become a part of what a child knows. On these presumptions, however, it tries to examine what is necessary in order to create desirable learning environments.

Applying the Brakes on the Teaching Side

Even among educational theorists with constructionistic backgrounds, the importance of the teacher's role is generally acknowledged. Roughly there are two kinds of roles. One is to set up a (physical) learning environment. This is done either by providing sequences of tasks/problems within children's concerns that are challenging to them, or by setting up an environment so that children themselves can do that. The term learning environment itself implies that it is in many senses chosen and arranged in accordance with some educational intention. The other role is to introduce social interaction. The teacher can achieve this either by setting up a peer group and encouraging students to interact, or by participating in the group as a member (not as authority). In the educational theories inspired by Vygotsky, an important aspect is the social interaction of the type where mature members of the society help less mature members acquire knowledge.

Inagaki and I (1983) once modeled the process of children's acquiring a scientific piece of knowledge spontaneously through peer group activities, while emphasizing the role of the

teacher enabling and supporting these activities. It could be said that the theory of FLE developed in Newman's paper is, essentially, close to ours.

What we need to do here, however, is to clarify the limit of the control and/or intervention by the teacher, after acknowledging that such things are important in promoting children's learning. In the case of setting up the physical environment, overdoing this denies the initiative to the children and prevents them from choosing tasks and attacking problems on their own. It could create a situation where children only solve problems "given" to them.

If a child is left in the room only with a computer, it is likely that he/she will touch and try it. However, this is not a spontaneously chosen activity. We wish to minimize direct intervention by the teacher, such as giving specific directions about what should be done next, or providing correct answers too soon. The teachers' roles should be limited at the points where, to use Newman's expression, they suggest tasks, or provide children with alternative interpretations. One of my biggest complaints against Newman's paper is, however, exactly to this point: the limit is not clearly stated. I do not disagree with his saying that learning environments should also be functional for teachers, or that adult help and support is important. What I fear is, unless we make it clear to what extent teachers should structure such environments, the constructionism we cherish could easily be transformed into mere transmissionism. Furthermore, too much emphasis on learning efficiency can make us blind to the more longitudinal aspects of development, such as the growing of a human being into an independent learner. Taking our foot too far off the brakes may turn the constructionism into something different, which we would not call by the same name.

One of the important suggestions made in Newman's paper is that it is possible that both the teaching side and the learning side can bring different viewpoints into the same learning environment. That is, children engage themselves in a task with joy, without fully realizing what educational outcome could result; the teaching side, at the same time, in a sense by utilizing children's intrinsic interest, helps them achieve some goal that is educationally sound from teachers'

perspective. I admit that this is one way of integrating the two opposed concepts, self choice and vicarious execution (Hatano and Horio, 1979).

In our society, parents and teachers often vicariously choose goals for children, who are supposed to be yet unable to do that for themselves. If this could be done carefully and faithfully, from the nature of vicarious execution, it should guide the course of children's activities most desirably for their development and learning. However, in actuality, there are possibilities that interests or fixed beliefs of teachers and parents can distort the children's development and learning. Thus, the confrontation between the self choice and the vicarious execution becomes a big issue in educational theories. Newman appears to maintain that fulfilling both of these is the best way. I think we need to apply some kind of brake here, as well. We have to admit, as I have pointed out earlier, that learners are not always fully ready to make reasonable choices for themselves. But still, we need to apply the brakes, such that teachers respect learners' activities, that they sympathize with the learners in their goal setting, and that they show yet higher alternatives to the learners' goals. When these brakes are lifted, there emerges a danger that the teaching side will take advantage of the learners' intrinsic need instrumentally, and that it orients the learners' activities to a different goal from the learners' original intention. When this happens, teachers are no longer the underpinning of the child-centered philosophy; they could instead be a very tricky agent of control.

The final point. I cannot help questioning the fact that in his paper, which deals with acquisition of cognitive skills and strategies, he never uses terms like "construction of knowledge" or "understanding." At a superficial look, it appears possible to transmit cognitive skills and strategies. We even hear, not rarely, an argument for dynamic support: to have a child acquire some skill or strategy which the child cannot accomplish by him/herself, first we should provide him/her with a lot of support, and then gradually reduce its amount. The skill or strategy is "transmitted" when the child becomes able to execute it without any help. From this view, the main responsibility of a teacher is, at best, to explain to children why such skills and strategies (which are desirable from the teacher's point of view) are useful, and to

search for a context where children can acquire them enjoyably. It does not pay any attention to questions like what children really want to learn, or how children are trying to understand from their own perspectives. I think this is definitely different from the realistic constructive educational theory we should be aiming at.

Some readers might think that I read it too negatively. This is not true. As I said at the beginning, I heartily agree with Newman on many points. What I want to stress here is that we have to clearly distinguish realistic constructionism from transmissionism as well as from romantic constructionism.

Reply

Denis Newman

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I was delighted to read Hatano's insightful comments on my paper about functional learning environments. I agree with him about the importance of distinguishing romantic and realistic constructionism.

Perhaps one of the things that distinguishes the realists is the realization that teaching is a demanding profession. The teacher certainly has an active role in the classroom in guiding the children's education but at the same time the teacher must allow the children to construct their own understanding. Keeping a balance between the two is the great challenge. Hatano's challenge to me is to define what the point of balance is more clearly.

The two poles that we are trying to find a balance between are, on the one hand, a romantic child-centered constructivism, and, on the other hand, a belief that education is simply transmission of adult knowledge. My paper argued against the former but this should not be taken as advocating the latter. Hatano is right to point out that my argument can be taken too far and we need to know when to apply the brakes.

I certainly cannot offer a complete answer to this question but I can suggest one argument that might help keep the balance. The teacher must pay close attention to what the children are doing

and thinking in order to know whether they are beginning to construct an understanding of what is being taught. In order to find out, she must let them do things or answer things on their own. This does not have to happen on a standard kind of test. While she interacts with the children, a good teacher will continually provide opportunities for the children to act on their own. The clearest test of whether children understand an idea or procedure is to see if they can apply it to a situation that is not defined as a problem by the teacher. This requires great restraint on the teacher's part--to observe without explicitly structuring. To be effective, the teacher must, at times, not teach.

There are other ways in which good teaching requires the teacher to apply the brakes. Rowe (1978) reports a series of studies of the number of seconds a teacher waits in science lessons between a question and the children's response or between the response and her next comment. Most teachers do not pause at all. Pauses as short as only 3 seconds have profound effects on the quality and quantity of the children's discussion. Lively classroom discussions not only foster the children's deeper understanding of the scientific topics by presenting several points of view on the same question, but also give the teacher important information about the various understandings the children are coming to. Once again, effective teaching requires restraint by the teacher.

My argument for restraint by the teacher is that it is in the interest of good teaching. Teachers must observe what the children are doing so they can use it in their teaching. Very often teachers appropriate a child's suggestion and use it to illustrate a concept that is more advanced than the concept that the child had in mind. For example, a teacher might ask a question about how whales, which are warm blooded mammals, keep warm. The child might answer "because they are very fat." Without rejecting the answer because it is incomplete, the teacher can use it by extending the meaning of "fat" to "round" thus introducing the general principle of surface area versus volume. The teacher's explanation is effective because it uses an example that the child produced. The teacher reinterpreted it only retrospectively. We have found this process of

appropriation to be a pervasive feature of teaching (Gearhart & Newman, 1980; Newman, Griffin & Cole, in preparation).

I believe that Hatano is correct in saying that what is often called "dynamic support" requires that the teacher set the goal for the children. Perhaps this is the case because the concept is most often used by software designers who try to get microcomputers to do some of the work of human teachers. Unfortunately, current computers are far less observant and sensitive than human teachers. In particular, computers are unable to do the kind of retrospective reinterpretation that is involved in the process of appropriating children's responses. Since computers are not as good as humans at dealing with two alternative interpretations of the same action they tend to force their own interpretation from the outset.

I have tried to argue that there are principled reasons for putting on the brakes even when the teacher has a clear teaching goal. The teacher must find ways to use the children's excitement and spontaneous exploration. Unlike the romantic constructivists, I do not believe that unguided exploration is the only true road to understanding. In fact, such exploration very often reduces to play unless it is guided and reinterpreted by a good teacher.

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Clear Water

*The stones at the bottom
Seem to be moving;
Clear water.*

Natsume Soseki
(trans. R. H. Blyth)

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Mount Fuji

*A thousand times at Fuji-san I look,
A thousand times I wonder that 'tis ever new;
In clouds and wind still always varying,
The whole year through.*

Chigusa Arikoto
(trans. A. Miyamori)

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

The Crane

*The crane on one leg at the waterside--
How still it stays!
But in the ripples
Its reflection sways.*

Kawada Jun
(trans. A. Miyamori)

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Characteristically, John Kemeny put the human element into computer history:

But it is worth noting here how far computers have come in twenty-five years. All the calculations that we did on those seventeen IBM machines at Los Alamos in a full year, a generation ago, can today be carried out by a Dartmouth undergraduate in one afternoon, while a hundred other people are also using the same computer. To me this comparison is more meaningful than simply indicating that calculations that used to take several seconds in 1946 now take several microseconds...

John G. Kemeny, 1972.

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