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ABSTRACT

A study identified some implicit concepts, knowledge, and skills that a seemingly standard adult literacy and numeracy "lesson" contains. Conversation analysis was used to show instances of how adult numeracy is embedded in adult language and literacy. The "conversation" was a transcript from an adult literacy class for long-term unemployed adult men that began with a recall segment about question and answer patterns. Two types of questions were compared: those occurring "naturally" as part of the "common sense" made during the classroom conversations and those asked as part of the instructional content of the lesson appropriate to the subject matter of mathematics. Analysis showed how language and literate practices in the adult literacy classroom created the reality that adult learners come to recognize as the subjects mathematics or numeracy. Two implications were explored. First, considerable differences between school mathematics and real-life numeracy raised the dilemma of what should be taught. Second, embedding of language with particular sets of valued "content areas" caused teachers to reproduce school-based practices and discourses for adults who had already experienced school failure and implied that literacy and numeracy teachers be trained in language interaction patterns and ways for teachers and adult students to manage them to achieve an identified purpose. (Contains 28 references.) (YLB)

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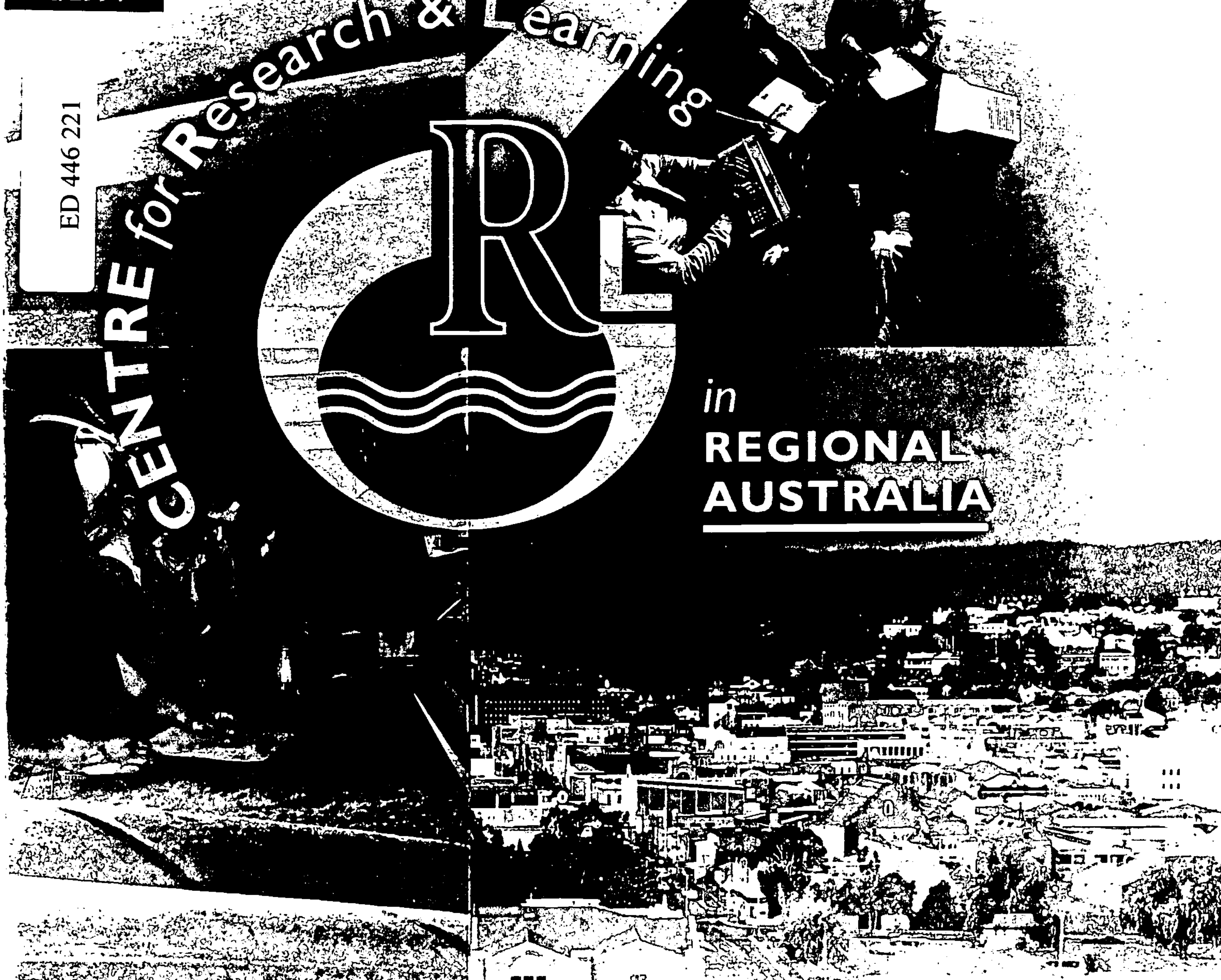

Numeracy: Language construction of whose mathematics?

Ian Falk

Discussion Paper D2/1997

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NUMERACY: LANGUAGE CONSTRUCTION OF WHOSE MATHEMATICS?

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Abstract
The various literate practices which together constitute the knowledges and ideologies of a society are grouped into recognisable discourses (Gee, 1990), and one sub-group of such discourses is the group associated with formally valued knowledge in what are commonly referred to as "subject areas". The case examined in this paper is that of the subject mathematics, viewed in the context of an adult literacy classroom. In such a learning context, mathematics is often called numeracy (e.g., Barin, 1990; Riley, 1984; Willis, 1990), and being numerate has come to be viewed as being able to "...function effectively mathematically in one's daily life" (Willis, 1990, p. vii). The purpose of the analysis presented in this paper is to uncover some of the implicit concepts, knowledge and skills which a seemingly standard adult literacy and numeracy "lesson" contains. The teachers and lessons used in the paper conducted what is surely an excellent lesson. The paper is not concerned with judging the value of such a lesson, or critiquing the teacher. What is in the lens of the analysis I to display the embeddedness of socio-cultural practices which teachers (and all adults) draw on as they engage in conversations with their adult students. The purpose of the analysis is, then, to afford a glimpse of some "taken for granted" matters and so allow a consideration of their implications and possible solutions.

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Introduction

The adult literacy profession (in Australia at least) has for many years considered the place of "numeracy" within its research and practice, and the meaning of the term "numeracy" compared with its co-term "mathematics". The terms "mathematics" and "numeracy" are often used interchangeably, although numeracy is used more for mathematical activities which are embedded in language, or the more functional, life-skills mathematics activities. Indeed, the Australian Council for Adult Literacy defines literacy as incorporating numeracy (Zimmerman and Norton, 1990, p. 146). Attempts to tackle the numeracy issue have tended to focus on definitional matters, which is to say, they look at *what* numeracy is, so there are repeated assertions that numeracy is included within the meaning of literacy.

So far this has not, however, explained *how* numeracy is included in literacy, a question that is important for practitioners who are teaching these subjects to adult learners. It is the aim of this paper to explore the *how* of the matter: *how is numeracy included in literacy, and what are the implications of this for the field?*

In order to achieve this, the paper will employ conversation analysis to show instances of how adult numeracy is embedded in adult language and literacy through an analysis of a transcript from an adult literacy (or adult basic education) class. The terms *adult literacy* and *adult numeracy* are here argued to be sets of literate and ideologically bound "subject area" practices. It will be shown how language and literate practices in this adult literacy classroom create the reality which adult learners come to recognise as the subject mathematics or numeracy. The implications of such a language construction of mathematics and numeracy are crucial for illustrating how numeracy is, in fact, related to literacy in adult learning contexts. There will be important implications for practices which will need to be further explored.

Subject areas as language and literate practices

The general notion that the perception of social reality is primarily constructed through language and literacy is not a new one (Berger & Luckmann, 1966; Cook-Gumperz, 1986; Foucault, 1977; Goffman, 1959; Wittgenstein, 1968). It has been argued elsewhere that what a literate community accepts as reality, and therefore knowledge, is both constructed by its literate practices, and constructs those very practices (Falk, 1993; 1995; 1997). Cook-Gumperz (1986) includes ideologies within the idea of what constitutes knowledge as she argues that "[v]alid knowledge is a creation of the society, its ideology of learning and of pedagogy" (p. 15), and cites the case of "...literacy as an ideology" (p.15).

This paper asserts that the various literate practices which together constitute the knowledges and ideologies of a society are grouped into recognisable discourses (Gee, 1990), and that one sub-group of such discourses is the group associated with formally valued knowledge in what are commonly referred to as "subject areas". The case examined in this paper is that of the subject mathematics, viewed in the context of an adult literacy classroom. In such a learning context, mathematics is often called numeracy (e.g., Barin, 1990; Riley, 1984; Willis, 1990), and being numerate has come to be viewed as being able to "...function effectively mathematically in one's daily life" (Willis, 1990, p. vii).

Numeracy for adults in the Australia of the late-nineties is still enmeshed with the pedagogical definition of adult literacy which, as has already been noted, ...incorporates numeracy" (Zimmerman & Norton, 1990, p. 146), but it seems there is little empirical work available which shows *how* numeracy is incorporated in literacy, although Marks and Mousley (1991) provide research about the relationship between language and school mathematics, arguing that mathematics "...may be seen as being comprised of texts" (p.143) in Kress's (1989) sense, while in Halliday's (1985) terms, mathematics constitutes at least a register of language. Bishop (1988) argues for a view of mathematics which is ideological, in that its continued image as being difficult or inaccessible is used, as is literacy in many instances, as a tool to maintain a particular position of power in society, an assertion in keeping with Gee's (1990) definition of Discourse with a capital D:

> ...mainstream dominant Discourses in our society. ..privilege us who have mastered them and do significant harm to others (p.91).

Adults join literacy and numeracy classes because they feel that, for some reason, they have not acquired the skills which they need or want. These students and their teachers are likely to exhibit both the effect of such powerful, valued mainstream "Discourses" and even exhibit those Discourses in the process of construction and reconstruction through conversational interaction. The settings where such effects and constructions might occur are learning occasions, either in classrooms or in one-to-one learning relationships with teachers or tutors. Discourses are likely to be evident in the interactional spoken language use, that is, classroom talk, or talk which occurs during teaching and learning sessions. It is for this reason that the paper will examine some instances of classroom talk in an adult literacy classroom.

Methodology

The purpose of the analysis presented in this paper is to uncover some of the implicit concepts, knowledge and skills which a seemingly standard adult literacy and numeracy "lesson" contains. The teacher and lessons used in the paper conducted what is surely an excellent lesson. This paper is not concerned with judging the value of such a lesson, or critiquing the teacher. What is in the lens of the analysis is to display the embeddedness of socio-cultural practices which teachers (and all adults) draw on as they engage in conversations with their adult students. The purpose of the analysis is, then, to afford a glimpse of some "taken for granted" matters and so allow a consideration of their implications and possible solutions.

To achieve this, the analysis employs the theory and practice of conversational analysis based on ethnomethodology (Boden, 1994; Garfinkel, 1967; Heritage, 1984) . Conversation analysis informed by ethnomethodology provides an analytic link between the conceptual domains encompassed in this study, since it is seeking to disclose or recover embedded cultural phenomena in the language-in-use. That is, how the members of the community, in this case the educational community, daily and interactively encounter the wider culture. It is argued that knowledge, values and society's moral order are themselves aspects of the culture used as resources in interactive moments, and are enmeshed in conversation, recoverable through the analysis of the social practices of conversational structures. Hence the link between instances of interaction (as the data analysed here) and the possible outcomes, of which social capital is supposed to be one. The linking of knowledge and values as co-constructed conversational outcomes is outlined by Jayyusi (1991):

> The practices, in which our category concepts are embedded and used, and the knowledge contexts bound up with them, are ones in which description and appraisal, the conceptual, moral, and practical are reflexively and irremediably bound up with, and embedded in, each other. Intelligibility is constituted in practico-moral terms. (p. 241)

The notion of the inseparability and embeddedness of knowledge and values in mundane conversational practices is used in this study in methodological and analytic respects: in the way the research clearly relates the broader sociological concerns of the study to the interrogation of the data, then to the coherence of the findings and implications which may be made about the wider social order. Ethnomethodology provides a compatible theoretical and practical link from the local interaction to the question of 'resources' through its devices of Standardised Relational Pairs, Membership Categories and the Membership Categorisation Devices (MCD). In simplified terms, the sense that social actors make of the world and the way they construct and reconstruct it relies on resources drawn on in the course of the everyday, mundane interactions (e.g., Heritage, 1984). In ethnomethodological terms, it is through these interactions, which participants make sense of through drawing on mutually understood categories of (intellectual, epistemological, ethical and social) resources, that social life and structures are constructed and reproduced. While not all of these techniques are utilised here, the particular ideas of French and Maclure's (1981) work with Initiate/Respond/Evaluate (IRE) classroom sequences is relied on heavily.

About the lesson

The segments referred in this paper were taken from a lesson for long-term unemployed adult men which began with a recall segment about question and answer patterns. The teacher had noted that there had been some mathematics work the week before which involved questions and answers, a common enough teaching device. The teacher had gained the impression that the learners were experiencing difficulty with the whole idea of what questions actually were. To test out this idea, an activity was attempted whereby the

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group was given the answer to a question, and it was their task to devise questions to suit the answer. The teacher had noted that the learners experienced great difficulty with the activity, and wished to begin the following session, also planned as mathematics, by revising the question and answer activity begun the previous week.

The total transcript length for this lesson segment was 707 turns. In the 191 turns under discussion, there are 1,232 words in all. There are 262 clause complexes in those 1,232 words, giving an overall sentence length average of nearly 4.7 words. The 191 turns appear to fall into three main segments, following the lesson content. The first segment, where the teacher is reviewing the language question work of the previous week, and is predominantly related to general knowledge content with common daily products and events as the subjects. The second segment shows the process of the teacher purposefully directing the language work established so far to numerical subjects, and re-orienting the language activities to increasingly more "mathematical" examples. The third segment is predominantly about rehearsing questions-about-mathematics subjects.

The average sentence length for each of the three parts is 4.7, 4.5 and 4.8 words respectively. Of the 1 91 turns, the teacher has 89 turns. In those 89 turns, the teacher asks the class 61 questions, four of which are primarily classroom organisational ones, leaving 57 content-related questions. The learners rehearse the asking of questions, which is the activity of the lesson, but only one other kind of question is asked by a student in the entire 191 turns (Turn 76) which is a request for clarification of the meaning of the word "numeric". This potentially leaves the way open for student input, except that the Initiation/Response/Evaluation (IRE) (French & Maclure, 1981) pattern following as it does almost without exception, tends to reduce student questioning.

The turn-taking patterns are remarkably regular, and follow for the most part the IRE pattern noted above. There are eighty paired turns of the teacher with one student response type, and only eight more where that response becomes teacher plus two or more student responses. Only one of these teacher and more-than-one student responses occurs in the last one third of the 191 turns where the mathematical content is at its densest.

Three sample passages from the start, middle and end thirds of the 191 turn sequence are included now, and the turns included here, and others from the nominated sequence, will be subsequently discussed:

Passage 1: From the beginning

1. T On Friday we were doing these sort of questions and ( ) in the maths when we ( ). On Friday, remember we started with the answer and you had to come up with the question?
2. S Yep
3. T 'Member that? So, I want to do a little bit of work on that too. Just to keep some practice going. 'Cause as I said to you that

the ability to ask questions is the really important part of reading. So let's start with the answer. Any volunteers?

4. S Answer.
5. T Yes
6. S Cornflakes.
7. T Cornflakes, right, what's the question?
8. S How many grams of cornflakes are there in each packet?
9. T What's my answer to that question?
10. S ( )
11. T So my answer would be the number of grams, my answer is not going to be Cornflakes.
12. S ( )
13. T So think of a question.
14. S ( ) What brand is the cereal?
15. T To answer that question I would have to ( )
16. S Cornflakes.
17. T So what brand/
18. S /of, ah, cereals
19. T What is a brand of cereal? That would be right.
20. S What brand of cereal am I holding in my hand?
21. T Right. Good.

Passage 2 (a): From the middle

73. T Alright, let's have a numeric answer.
74. S1 America
75. S2 A numeric
76. S3 What?
77. T A numeric answer.
78. S Translate *numeric*.
79. T What does numeric mean?
80. S ( )
81. T It's made of what?
82. S Words.
83. T Numbers.
84. S Oh right. Numeral, numeric.
85. T Yeah, that's right, yeah.
86. S ( )
87. T That's the question, so what's the answer?
88. S 4
89. T The answer is 4. Good.
90. S No, he said/
91. T /so 4 is the answer. Right. So what is another question for that answer?
92. S What number ( )?
93. T Hey, what about your card tricks?
94. S ( )
95. T The ... the trick you taught me last week. How many aces are in a pack?
96. S Yeah, 4.

8

Passage 2 (b): From the middle

103.	T	So that makes 9 doesn't-it?
104.	S	Yeah, cause there is 8 blokes and 1 woman.
105.	T	Right. So we want an answer of 4. How are we going to get to that answer?
106.	S	Take 4 people away and then you are left with ( ).
107.	T	Well, give them an excuse to go. Set your story up so that you've got a reason for them to go.
108.	S	I want 4 people left in the room. The first 4 people I want to leave.
109.	T	Great.
110.	S	Or, 4 people have to do something, something else.
111.	T	Yes. How many are left to do the other class?
112.	S	8 minus 4.

Passage 3: *From the end*

163.	T	OK, let's try. We've got 10 lots of 100 is 1000. What is 20 lots of 100?
164.	S	( )
165.	T	30 lots of l00
166.	S	30 000
167.	T	What are you wanting? 3 000.
168.	S	( )
169.	T	40 lots of 100?
170.	S	4000
171.	T	90 lots of l00?
172.	S	9 000
173.	T	9 000. 100 lots of l00?
174.	S	10 000
175.	T	10 000. So I'll just put a comma in there just so that you can see it. So 100 times 100. So getting back to your question.
176.	S	You gotta halve ... you gotta halve that.
177.	T	What's half of it?
178.	S	Two. 5000
179.	T	5 000. And that mean that we only want $50.
180.	S	How many ones, how many one cent pieces in $50?
181.	T	And we end up with 5 000 as our answer. Have a look at this one. There's our answer, how many dollars?
182.	S	( )
183.	T	10. Yeah, there it is. So it is only $10.
184.	S	( )
185.	T	On Friday you were doing a lot with metric measure. 'Member we were pacing out and all that? Think about 1000 when we, umm, in relationship to the metric work that we did. What did you find out about grams?
186.	S	How many grams adds up to ( )?
187.	T	Yes, what?
188.	S	Kilogram.

189. T Kilogram.
190. S 1 000.
191. T Good. Can you ask another question similar to that? What about ( ) measure?

Analysis

Baker (1991) presents three interpretations of a classroom literacy event, the third of which is a perspective on possible effects of questioning and answering sequences for organisational and institutional relations between students, teachers and texts. Such an approach, based in part on the work of Heap (1985), Baker (1991) and Baker and Freebody (1989) examines, broadly speaking, what particular culture children (in their cases) are given access to. Baker (1991) looks at the "politics of reading sessions" (p. 15), and views children and teacher as being positioned by texts, which are not neutral.

In this analysis I shall attempt to provide a cultural and interactional account of a social and interactive event in an adult literacy and numeracy classroom: an event which may both constitute and be heard as constituting *what counts as knowledge* in that event. In focusing on the matter of the spoken texts of question/answer patterns, and the ways the questions may be heard by the participants. In addition I will use elements of conversation analysis, with the ethnomethodological perspective already noted, afforded by the work of Boden, 1994, Button (1991), Garfinkel (1967), Heritage (1984) and McHoul and Watson (1984).

Two kinds of questions

I will examine the 61 questions and focus on and compare two types of questions: those questions which occur 'naturally', as part of the 'common sense' (Button, 1991; Heritage, 1984; Garfinkel, 1967) which is made during the classroom conversations, and those questions which are asked as part of the instructional content of the lesson, namely using questions appropriate to the subject matter of mathematics. In this case, the teacher appears to practise question patterns beginning with "what" (Turns 1 to 50), then "where" (Turns 51 to 71), followed by "how" (Turns 95 to 191).

Question type 1: Conversational questions

From Turn 1, the teacher uses conversational questions to elicit responses from the students:

1. T ... On Friday, remember we started with the answer and you had to come up with the question?

2. S Yep

A student hears the teacher's turn as a question, as he answers it. The common understanding of the uses of questions, how they should be asked and how they may be heard, is continued in the next pair of turns:

3. T ... Any volunteers?

4. S Answer.

Another student hears the teacher's turn as a question as evidenced through the fact of the answer, and instead of answering it, seeks clarification of the question, or perhaps gives himself time for thought, in his answer. Once more, in Turns 7 and 8 the student proves his familiarity with the purpose of conversational questions, and his skilled everyday ability to manipulate this language form, through his immediate response, this time in the form of a perfectly composed, grammatically and mathematically correct "How" question, followed by a lengthy pause before the teacher's response.

7. T Cornflakes, right, what's the question?

8. S How many grams of cornflakes are there in each packet.

9. T ...What's my answer to that question?

The teacher's dilemma here might well be to choose what is the primary purpose of this sequence: is it to elicit a correct question language pattern? Or is it to elicit a correct question for the given answer? It was the teacher's stated purpose to provide practice for the students in formulating questions when given the answer, and she decides to stick with this purpose, while not responding to the 'wrong answer' in an overtly negative way. In Turns 10 and 12, the student's responses are inaudible, but Turn 14 provides some warrant for saying that the student has heard the teacher's Turn 9 as a negative response, and has used the intervening turns to achieve the teacher's hearing of his response as an acceptance in the latter part of Turn 19, "That would be right".

In Passage 2, there are further instances where the teacher asks formal questions, for example Turn 79: "What does numeric mean?", Turn 91: "So what is another question for that answer?" and Turn 95: "How many aces are in the pack?". In each case, students demonstrate the sense they make of the questions through answering them, and through their manipulation of answer forms to clarify the task, as in Turn 92: "What number?", a response which seeks to clarify the given answer from Turn 88.

In the same passage, there are two variations to the language pattern of the more formal question which reflect a more conversational tone: Turn 73 inflects a demand into a question: "...let's have a numeric answer", and Turn 81 inverts the usual construction: "It's made of what?". Both questions are heard as questions, since they are answered, although Turns 74 to 78 are used to clarify the mishearing of the words "a numeric answer" as “America”.

The significance of this analysis lies in the demonstration of the students' existing skill in understanding and manipulating question and answer language forms within conversations where the participants are making common sense. This common sense is made irrespective of the structure of the question's language stem, and whether the language is formal, as in How many...? or What does...? or informal, where a sentence is used with a question inflection, such as Turn 73: "...let's have a numeric answer" and Turn 185: "'Member we were pacing out and all that?". That common sense is made through demonstrably formal and informal question patterns during the course of normal conversations is a crucial point to bear in mind as the analysis moves now to consider the inflection of language into "mathematical questions".

Question type 2: Mathematical questions

(a) Compliance with the language pattern of the mathematical question

First of all, the term "mathematical question" is used in this paper to refer to an identifiable type of more formal language, used around mathematical expressions, which this teacher in this classroom appears to value as being of importance to mathematical learning. She places considerable emphasis on the students being able to demonstrate a capacity to think of a question which would suit a given answer. Willis (1990) has compared school mathematics with the mathematics required both in real life tasks, and the mathematics likely to be required in the ever changing society where it will be applied. She finds that:

> The school mathematics curriculum in many ways still reflects the demands and priorities of economies based on industry and agriculture, where a majority of people are prepared for jobs on factories or on farms and an elite minority are prepared to enter professional careers. (p. vii)

It would be surprising if the language expected to constitute "mathematical questions" did not, therefore reflect such a pattern, since this view of language is likely to be that held both by teachers and adult literacy students, based on their own experiences with school mathematics which have been framed by particular and more formal language expressions of mathematics, both as question and problem formulation.

As an instance already noted in the discussion under "Conversational questions", a student asks what might be judged to be a sound mathematical question in Turn 8, if judged on language criteria:

8. S How many grams of cornflakes are there in each packet?

During the ensuing 1 80 turns, however, the teacher is not heard to accept the student's actual language portrayal of this mathematical question type until the very last sequence of 7 turns:

185.	T	On Friday you were doing a lot with metric measure. 'Member we were pacing out and all that? Think about 1000 when we, umm, in relationship to the metric work that we did. What did you find out about grams?
186.	S	How many grams adds up to ( )?
187.	T	Yes, what?
188.	S	Kilogram.
189.	T	Kilogram.
190.	S	1 000.
191.	T	Good....

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Here, it is worthy of note that Turn 186 is the only time following Turn 8 in which any student asks a correct "mathematical question" to the given answer.

(b) Language formulation of 'school mathematics' problems

We are undoubtedly all aware of the language used in many traditional school maths problems, for example: "A train leaves Melbourne at 3 pm and travels at 70 kph. Another train leaves Sydney..." and so on, a common enough two part language structure which will end with a question, such as "... how many kilometres from Melbourne will they meet?". For those who have developed negative attitudes towards mathematics, such phrasing causes confusion, and an inability to pursue the problem. School textbooks still contain number problems embedded in words. It is more than likely that workplaces contain numerical problems tied up in complex syntax.

In this adult literacy classroom, Passage 2 (b) presents an instance of the beginnings of how a teacher might deconstruct (or reconstruct?), in meaning-making terms, the phrasing of a school-maths problem. Given an answer of 4, the teacher asks, in Turn 105, "...how are we going to get to that answer?". The student's response of "Take 4 people away and then you are left with ( )" is not heard as sufficient, and the teacher's reply contains the elements of establishing the 'language problem':

> 107. T Well, give them an excuse to go. Set your story up so that you've got a reason for them to go.

First of all, the teacher's message is that the student's response, although apparently sufficient mathematically, is lacking: those people who leave should have a reason for doing so; not only that, the students are told that this is in fact a story, and that "reasons" for actions in this mathematical problem are important. The student accepts these suggestions, replying:

> 108. S I want 4 people left in the room. The first 4 people I want to leave.

Here, the student's response begins to echo the two part "school maths" problem structure of "A train leaves Melbourne at 3 pm and travels at 70 kph. Another train leaves Sydney...". The student's response seems an acceptable answer to the teacher, who in turn presents her evaluation:

> 109. T Great.

But where is the question which we would expect to finish off the school maths problem sequence? In Turn 110, another student supplies another "story" in response to the teacher's demand for a reason: 4 people leave because they "have to do something". The teacher accepts this as complying: "Yes", then *she asks the problem question herself:* "How many are left to do the other class?" (Turn 111). The language of the school mathematics has been reconstructed.

There is a measure of significance in the student's codicil in Turn 112, "8 minus 4", in that this mathematics statement is a summary in the shortest possible terms of the motived, story-based syntactically complex problem achieved over the preceding 10 turns.

Turning common sense into what counts as knowledge

Already it is suggestive that to reverse the order of a common sense and commonly understood, and commonly manipulated pattern of "initiate and respond" in question/answer form, is *not* a common sense activity for these adults, and does not apparently occur commonly in the lives of these adult students. It is certainly one which does not seem to come easily to them. The setting where such word games is common is in a school classroom, where such games, aiming to encourage meta-language and metacognition, abound. This is not to say that there are not adult workplace settings where such activities are contained within the performance of real tasks; the formulation of solutions to problems bears some similarities to the Question/Answer language reversal exercise, although in this classroom activity, the exercise is purely one of language form entwined with numbers, and does not form part of an actual task. As Freebody, Cumming and Falk (1993) state:

> The mathematics that constitutes most primary school curriculum is not synonymous with adult numeracy, is often redundant in workplace and life skill applications, and has a decontextualised and lock-step hierarchical development which is questionable for adults, if not for children also. (p. 41)

Two related questions emerge as a result of the considerations in this paper: "What actually *does* count as numerical or mathematical knowledge in adult literacy classrooms?" and "What *should* count as numeracy or mathematical knowledge in an adult literacy classroom?" since what *counts* as numeracy will be what the teachers judge to be successful learning of numeracy, which will in turn be reflected in the teachers' assessments of the students. A third question revolves around whether there is a causal link between the capacity to perform mathematical tasks and the language-based questions that are used to express them. Or is this relationship more one of the traditionally valued language games based around the subject of mathematics which are played in school, and which may or may not bear a relationship to the mathematical requirements which are enmeshed in real-life tasks for adults involved in real-life settings? The relationship between school mathematics and job-related mathematics may have parallels with Mikulecky's (1988) findings concerning the implicitness of literacy in job-related literacy, and its differences in other respects, compared with school literacy.

The learners in this classroom can handle conversational questions: they know what they are, since they hear them as questions: they answer them. It is also clear in this sequence how inextricably intertwined language and numerical operations are, or are made to be, and that the teacher values particular language activities, and that these activities are being transmitted in the process of these 191 turns

Implications

Mikulecky (1988) concludes that there are considerable differences between school literacy and real life literacy. There are likely to be parallels with school mathematics and real life numeracy as well. The analysis presented here has as a first implication the dilemma of what *should* be taught in adult numeracy classrooms: Should we teach the residual school-based mathematics with the more generic skills attempted in the lesson segments shown in this paper? A ten week course hardly seems long enough to achieve any success in terms of generic skills, so should we forsake this in favour of teaching applied numerical real life tasks? This dilemma can be resolved by some more rigorous attention to curriculum standards and development, a framework for which is now afforded through the National Reporting System (NRS) for adult language, literacy and numeracy. Such a system has at its core the need to view language, literacy and numeracy as contextualised social practices, and view consistent with the analytic point of view in this paper.

The analysis here also allows practitioners and researchers alike to observe how closely language is bound in with the construction of whatever valued set of mathematical practices we teach in adult literacy and numeracy classrooms. The embedding of language with particular sets of valued "content areas" has a second and strong implication for the professional development of adult literacy and numeracy staff, in that the recourse that such teachers have to mathematical and numerical skills, knowledge and values often, but not always, stems from school-based experience. This can be seen to be reproduced in adult literacy and numeracy classrooms such as is discussed in this paper. Once these school-based practices and discourses are reproduced for adults who already have school failure enshrined in their pasts, the possibility of successful literacy and numeracy outcomes must surely be restricted.

Related to the above, the embedded nature of language with the concepts the language is used to construct, provides a visible reminder of the hidden complexities involved in adult education practice. It will be recalled from the earlier analysis how complex the conceptual construction of the linguistic pillars of the "school maths problem" are. Analyses such as these assist in displaying the complexities so that structuring and sequencing of lessons can maximise implicit adult knowledge and logic such as is displayed through their conversational routines shown in this paper.

It follows as another implication that literacy and numeracy teachers should have in their training (initial and concurrent) as much as possible about the language interaction patterns and the ways these patterns may be managed by teacher and adult student to achieve an identified purpose.

In teachers' hands, language has the power to construct knowledges, realities and ideologies, which is what this paper maintains. It is crucial, then, that they should be aware of *how* this is achieved so that they may, in turn, become critical and aware teachers who are able to pass on to their students how to be equally as critical and aware.

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