Chapter 2: Understanding Student Thinking and Learning in the Classroom

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INTRODUCTION

The original purpose of this chapter was to provide an account of student thinking in the classroom. There was a time, some years ago, when the content of such a chapter would have been self-evident. It would have included research on the development of problem solving skills and on the ways in which teachers could encourage students to use higher-order cognitive skills by asking appropriate questions and setting appropriate problems. My own early studies of 'classroom interaction' were concerned with the logical demands made by teachers' questions and the effects these had on students. The results were published under the title of Thinking in the Classroom (Nuthall & Lawrence, 1965). The categories and concepts that were used to set clear boundaries around different types of classroom behaviour were largely borrowed from research in the psychological laboratory (e.g., Bruner, Goodnow, & Austin, A Study of Thinking, 1956; Skinner, Verbal Behaviour, 1957) or from logic and analytic philosophy (e.g., Hirst & Peters, The Logic of Education, 1970; Smith & Ennis, Language and Concepts in Education, 1961).

As recently as 1986, a review of student thought processes in the classroom (Wittrock, 1986) could make a clear distinction between thinking and learning and achievement. Thinking was seen as a distinct set of processes that took place in the student's head and mediated between teaching or instruction and classroom behaviour and learning. The range of processes included in thinking had widened since the previous decade, but there was no question that thinking processes were distinct and easily distinguishable from learning and achievement. Thinking was considered 'higher order,' while learning (especially of knowledge and practical skills) was seen as important but of a lower order.

There has, however, been a radical change in conceptions of thinking and learning in the classroom in recent years. New perspectives, introduced from a range of different disciplines (e.g., linguistics, sociolinguistics, aesthetics, semiotics, social anthropology, literary criticism), a range of different methodologies (e.g., ethnomethodology, phenomenography, discourse analysis, textual criticism) and cultural perspectives (e.g., Soviet psychology) have produced
what appears at first glance to be a confusion of new ways of conceptualising and understanding student experience in the classroom.

Whether we like it or not, it is no longer possible to retain the concepts and theories that lay behind most classroom research until a decade ago. Distinctions that used to be made between thinking and learning, between language and thought, between the individual and the social, have all become problematic. New processes and concepts are being suggested that do not fit within the traditional disciplines that used to inform classroom research. For those who believe in the value of constant challenge and change, or who accept the postmodernist perception of everything as endlessly evolving particularities and subjectivities and delight in disrupting established discourses (Lather, 1991), these are exciting times. For the writer of a review of recent research on student thinking in the classroom, it presents considerable problems.

What I have attempted to do in this chapter has been to bring together as many recent studies of student experience in classrooms as I could and try to identify the common themes and issues that seem to hold them together. This led me to group the studies into three broad categories based on the conceptual background or interests of the researchers. These categories are not sharply defined. They represent approaches or perspectives rather than theories, and many of the studies included in one category have elements in common with studies included in one of the other categories. This is partly because many of the researchers (such as Wells, 1994) have tried to take a multi-disciplinary approach, incorporating insights from several disciplines into their studies.

The first category includes those studies that appear to be primarily psychological in their orientation. Learning and thinking are incorporated into a broad concept of cognition, and students are seen as creating or constructing their own knowledge and skills. The second category contains those studies that are primarily sociocultural in their orientation. Learning and thinking are seen as social processes occurring in social contexts, between rather than within individuals. Students progress through a process of apprenticeship within significant social groups. In the third category there are those studies that have a primarily language or sociolinguistic orientation. In these studies, the language of the classroom is both the content and the medium of learning and thinking. What students acquire are the linguistic ‘genres’ of the disciplines. These genres contain the concepts and ways of perceiving and thinking that characterise the disciplines.

While each of these three broad types of studies contributes something different to our understanding of students’ classroom experience, they are more than just complementary perspectives on the same processes. They challenge and compete with each other over a number of central issues. As I worked to bring the studies together and find common themes I became increasingly aware that the differences between the studies occurred around these central is-
sues. They concern the nature of mind and of the processes of the mind. They bring into question the way we have traditionally described and understood the changes that education is supposed to produce in students.

Beneath a diversity of different perspectives and methods of analysis, I have become aware that a paradigm shift is occurring that is as significant as any that has occurred in classroom research. The nature of the new paradigm is not yet clear. The debate is still in progress and radical ideas that challenge the basis of our thinking are being proposed alongside minor modifications to familiar and accepted ideas.

The purpose of this chapter is to inform the reader about the nature of the current debate. This is done in the first three sections of the chapter by describing the three different approaches to understanding student cognition in the classroom. In so doing I become involved in the debate myself. In the fourth section of the chapter I examine the major points of conflict between the three approaches. These concern the existence of mind and the processes by which students learn from classroom experience. I then describe, using data from our own studies, a new perspective on classroom learning and thinking that incorporates the currently conflicting perspectives.

Throughout this chapter I have tried to keep the discussion in touch with the realities of student classroom experience. To do this I have made use, wherever possible, of examples of classroom observations, transcripts and interviews. Most of these come from studies that I have undertaken with Adrienne Alton-Lee (Alton-Lee & Nuthall, 1992; Alton-Lee, Nuthall, & Patrick, 1993; Nuthall & Alton-Lee, 1993). I am aware that extensive use of classroom observational data is unusual in a handbook chapter of this kind, but I hope it will constantly remind the reader of two things. First, the concepts and ideas that are debated in this chapter are supposed to provide insights and understanding of students' classroom experience. Second, it is a major strength of most of the research referred to in this article that it has been based in classrooms and can, without difficulty, be referenced back to its original classroom context.

THE COGNITIVE CONSTRUCTIVIST PERSPECTIVE

The studies that share the greatest continuity with earlier research on student thinking and learning in the classroom are those studies that have a broadly defined 'cognitive' perspective on student experience. With the development of cognitive science and of the concept of 'cognition' as a way of understanding all mental processes, the careful distinctions that used to be made between concepts such learning, thinking, problem solving, and remembering, are no longer tenable. As a consequence, it no longer makes sense to talk of knowledge simply as a behavioural response or as a kind of substance that is transferred from
the mind of the teacher, or the page of the textbook, to the mind of the student. Instead, it is now commonly accepted that knowledge is a product of the ways in which the student's mind is engaged by the activities and resources of the classroom. Recent research studies on teaching and learning in science education (Carey, 1986; Driver, Asoko, Leach, Mortimer, & Scott, 1994; Magnusson, Boyle, & Templin, 1994), in mathematics education (Brown, 1993; Carpenter, Fennema, & Romberg, 1993; Cobb, 1994; Ernest, 1989), and in social studies education (Brophy & Alleman, 1992; Gregg & Leinhardt, 1994) have increasingly been based on the view that students construct their own knowledge as they engage in the processes of interpreting and making sense of their classroom experience. Learning is seen as the conceptual restructuring that results from this cognitive processing.

As a consequence of this view, it is no longer possible to make the assumption that there can be a direct link between teaching and learning. The way that tasks are structured, the questions that teachers ask, the examples that students practice, can only have indirect effects on student learning (Hiebert & Wearne, 1993). As students encounter new experiences, their minds construct representations of those experiences that are structured by their own previous knowledge and beliefs. These individually constructed representations interact with each other in the production of new knowledge and beliefs.

How this process works can be illustrated with an example from one of our studies. Kim was a third-grade student we observed in a class that was studying a social studies unit on England in the Middle Ages. The concept of a ‘charter’ as a social contract was a concept that came up several times during the unit. The teacher expected the students to learn about a charter although she did not discuss it directly.

Our observations showed that Kim came across references to a charter on three occasions during the unit. First, he read a work sheet (supplied by the teacher) that described the occasion when the English barons forced King John to sign the Magna Carta. This work sheet described the Magna Carta as a ‘great charter’ that ‘sets out all the rights of free men.’

Three days later the teacher conducted a class discussion about life in medieval towns. The teacher summarised the discussion by writing a set of sentences on the blackboard. These included ‘The marketplace was in the centre of town. People bought and sold goods there, the town crier made announcements, and it was a place where criminals were punished. A charter was a written promise giving the town its freedom.’ Along with the other students, Kim copied the sentences into his project book. The teacher also gave each student an outline picture of the central square of a medieval town with instructions to colour it and paste it into their project book alongside the sentences. This picture showed a marketplace at a cross roads, with shops, various people and animals, and a
person throwing objects at a man locked into the stocks. Kim coloured his picture and pasted it into his project book.

Each morning during the unit, the teacher gave the students a list of spelling sentences containing key words related to the content of the unit. The students were required to copy these sentences into their project books and learn to spell the relevant key words. Two days after the previous experience, the teacher included a sentence about a charter in the morning spelling activity. On this morning, the teacher put a set of sentences on the blackboard that related to the previous class discussion of medieval towns. In each sentence the key word had been omitted and the students were expected to identify this key word and learn to spell it as part of their homework. Before beginning the task the teacher discussed the sentences with the class.

Student: (reading sentence from blackboard) ‘A written promise called a something showed that the town had been given its freedom.’
[Student knocks on door of classroom, enters to find out the number of students who needed to order food for lunch.]

Teacher: What was it called? Celia?

Celia: Charter?

Teacher: Right. [To lunch-order student] Are you coming with the charter?

Lunch-order Student: Any lunch orders? [Students indicate orders.]

Teacher: Right. Good girl. I wonder if anyone can tell me what the root word is for charter? Bev?

Bev: Chart.

Teacher: Right. Er. Chart - er ...

This discussion continued for the other sentences about the mayors and market places of medieval towns. Later Kim wrote these sentences in his spelling book.

This was the last of the three occasions when Kim experienced anything related to the concept of a charter during the unit. When we interviewed Kim about two weeks after the unit, he described a charter in the following way.

Kim: Charters. I think it was, showed people directions for moving about the towns, 'cause there was charters in the middle where the market was, I think.

Interviewer: Describe one to me ... anything you can tell me will help.

Kim: Um, I can remember a person in the middle of the road with a scroll.

Interviewer: Right.
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