CULTURAL VIEWS OF LEARNING AND THEIR INFLUENCE ON TEACHING STYLES

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Human Sciences Research Council,
October 1987

In this paper I am going to focus on two views of learning as applied to primary science, how these views influence what happens in the class, and the way in which pupils are assessed. Because I am talking about science particularly in relation to Black Std. 3 pupils, I will naturally be talking about language issues too, since language is a key challenge to pupils at this level.

Before I start to talk about the two views of teaching and learning styles, I should like to make a couple of assumptions quite clear. When I talk about the two models, I do not mean that they apply to two specific and identifiable situations. The rote learning model features in all South African learning systems. But for example, we would all know that there would be differences between highly urbanised schools in places like Soweto, semi-urbanised such as Temba, and deep rural such as Pitsedisulejang. The second assumption that I will make is that classroom practices are not immutable, in other words, change is a natural and inevitable process.

It is my thesis that the teacher's view of knowledge and learning determines what happens in the classroom, and determines what becomes available to be learnt. I should like to show you how this influence works by looking at a general model: we will then go on to look at two different models. During the discussion time perhaps we can look at details of the two models which appear on the first page of your handout.

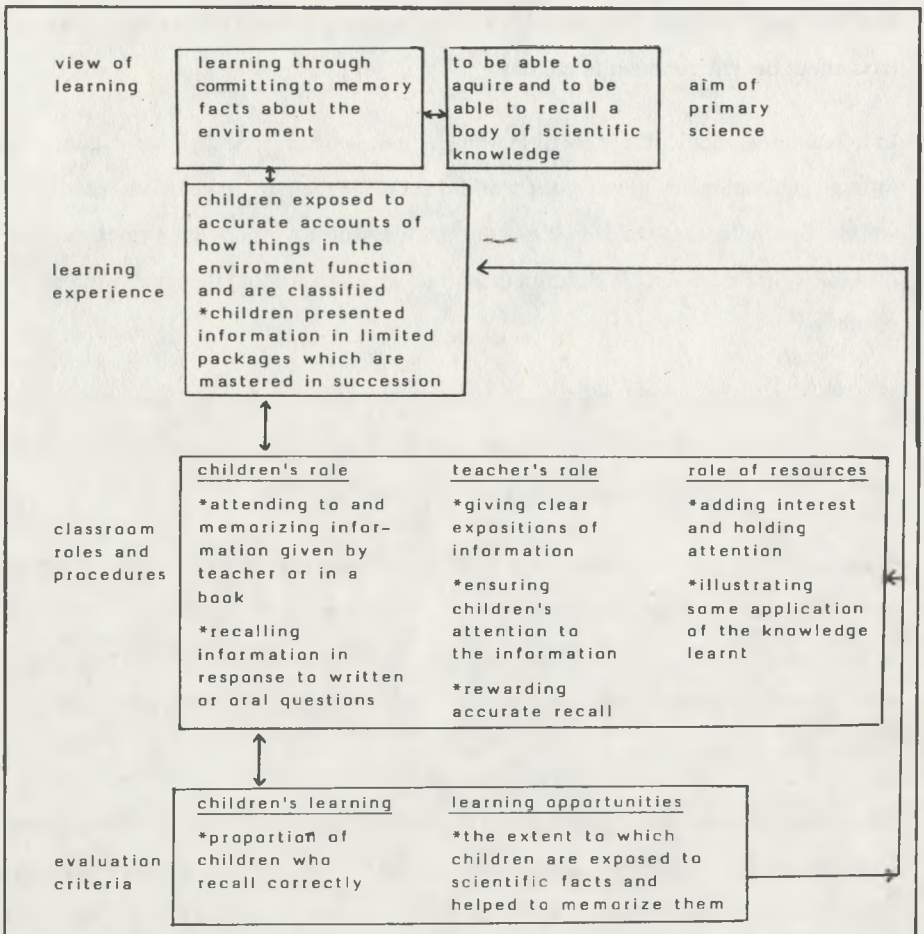

Figure 1:

A model for note learning in science

Harlen & Osborne (1985)

Fig 1. Features of a model for learning and teaching

In a rote learning model, the teacher's view of learning is that it results from committing facts about the environment to memory.

In a generative model, the view of learning is more complex: firstly, that children learn through generating new views of the world that enable them to make better sense of their world. Secondly, that children learn through developing processing strategies. These processing strategies enable children to interact with things about them and with the ideas of others.[1]

In the rote learning model, the interaction is teacher-centred, and we have what has been called a "teaching spectacle". In the generative model, the interaction is problem-centred, and we have what has been called a "learning festival" approach.

Now why would a teacher choose to use a rote learning rather than a generative approach to teaching science? One could say that she does this because she has an implicit theory of learning. It is not a theory which is consciously constructed, nor does she really have to think about it very much. Rather the theory comes from her own experience in a particular educational "culture".

It is our experience that especially in Std. 3 with subject teaching, rote learning is the norm. Why should this be so? One possible explanation is that the practice has deep cultural roots. In cultures with an oral tradition the knowledge is transmitted from "above", with relatively little questioning from "below". So, teacher functions as a "knower" who shares his knowledge with the pupil functioning as the "information seeker". It has been pointed

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1 The processing strategies which Wyn Harlen (1985) has elucidated include observation, inference, hypothesis, explanation and others.

out (Luma 1983) that an African teacher often feels he needs to demonstrate that he is a master of his suject, or else his pupils may wonder whether he is not evading his responsibilities. Here the classroom interaction is characterised by a series of exchanges consisting of initiation, pupil response and teacher feedback (IRF). [1]

When we are talking about science, we should also look at the traditional view of knowledge that goes with the transmission-rote model. As far as Western science is concerned, there is always some alternative to an established body of theoretical principles. Not so traditionally: rather, it is assumed that there is only one answer to a question, and attempts to establish alternative theories are likely to generate anxiety (Horton, 1967). What this means in the classroom is that the teacher and pupils are unlikely to seek out alternative methods or answers to science problems.

In a rote learning model, the main focus of cognitive activity for the child is on listening, memorising and recalling. Pupils' learning is chiefly evaluated by the proportion of pupils who accurately recall. There are two remarks which should be made at this point. Firstly, it is one thing to rote memorise material that one understands, especially if the material has been well constructed. However, it is quite another thing to rote memorise material which the child finds difficult to understand. The child may find it difficult to understand his learning material because his language competence is not as well developed as it should be, but we have an equally likely culprit for a lack of understanding in the quality of the texts they use. Listen, for example, to 3 sentences in the summary section of Chapter 1 of a general science book:

4. Veld fires can also be caused by air currents.
5. Smoke contains small visible particles of ash and coal.

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1 Our own research and that from Zambia (Trewby, 1982) indicates that teachers may often omit the feedback move in the IRF exchanges, with the result that pupils have to interpret the teacher's silence (i.e. decide whether the silence means that a correct response has been provided or not.

6. Warm air currents have different uses: birds, gliders, hot air balloons.

It is this sort of information that the child will attempt to memorise. And this is a great pity: for one thing, the information is not related; for another there is difficult vocabulary here e.g. currents, visible, particles, hot air balloons. We shall return to the question about comprehensible texts later.

There is a second, more serious long-term consequence of rote learning. That is, that a certain kind of higher-order thinking skills are likely to remain undeveloped: these are called metacognitive processes, that is thinking about thinking. Metacognitive processes are control activities which are important for the solution of tasks or problems. One can identify five classes of process here (Campione, Brown and Bryant, 1985):-

1. Planning the steps used to do the task.
2. Monitoring the effectiveness of the steps taken.
3. Testing one's strategy as one performs it.
4. Revising the strategy as the need arises.
5. Evaluating the strategy for effectiveness.

If one is using a rote learning model, it is likely that the opportunities for developing the skills for thinking about thinking are going to be minimal. In fact, four studies we have conducted over the last two years with Std. 3 children indicates a definite lag in metacognitive development, at a time when it is expected to be blossoming[1] . In other words, we are fairly certain that the rote learning which the children we have been working

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1 The major achievement of middle childhood is expected to be the acquisition of metacognition, i.e. during the long quiet period of concrete operations

with have been experiencing is having distinct and measurable effects on their cognition. There are asects of metacognition and disembedded thinking[1] which are crucial to higher learning, for example, in maths, science and computer studies, but also to effective functioning in a technological society.

Let us now look to another model of learning based on a different view of knowledge and learning. Based on Western educational and psychological literature, it is now commonly believed that the child constructs an ever developing picture of the world and how it works. In psychological terms we might call it a "constructivist" view; in educational terms we might call it an "interpretation" view. The names suggest something about the nature of the process.

In the view of either discipline, learning is seen to be more effective if the pupil is engaged in an active exploration of the material to be learnt. This is true in the field of both language and science learning. Indeed, the demands on language in the generative model (the second model on your handout) are considerable, and this is one reason why it is difficult to implement in the L2 situation.

Let us look at what is expected of the teacher and the child in the generative model. We look at three teacher roles in summary here:

* to find out children's ways of viewing the world, and provide experiences which help children build more effective ones.
* to help children to ask and attempt to answer their own questions.
* to help children reflect on their ideas and their ways of thinking.

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1 There are no opportunities to go into the notion of disembedded thinking here, but it is critically important in these aspects of higher learning too. In Margaret Donaldson's terms (personal communication), the mind becomes able to function without recourse to contexts provided by personal experience. This capacity is tied up with the deeply embedded practice of literacy in a community.

Here we have a very complex role demanded of the teacher. Firstly, the teacher must be inquisitive about how her children think. Secondly, she must provide resources to help change the child's world picture. This second requirement presupposes psychological sophistication on the part of the teacher, and the availability of a variety of resources.

If this looks a little difficult, let us turn to the second role and see what it would require. By and large the teachers I have worked with are not keen to encourage questions; in fact they seem to be happy enough when children don't ask them questions at all, and the fear seems to be that they might not be able to answer questions posed perhaps by the brighter children. We assume that teachers would be more amenable to questions when they themselves are more thoroughly informed. But there may be other constraints operating here too.

However, notice in the second role, that the teacher is supposed to get the child to attempt to answer their own questions. Do they have enough language to do this? If their lower primary English course has prepared them to interact and attempt to solve tasks in English, perhaps they will be able to. But not otherwise.

It is here that I would want to turn the argument about the necessity of language skills for problem-solving groupwork on its head. I should like to suggest that one could consider (as Brown, 1987, has done) that the subject classroom can serve as a context for language development. In this context, we are assuming that language development is not being seen as an end in itself - as it often is in the lower primary - but that language proficiency is best developed in situations where English is experienced as a means to some other, non-linguistic end. In other words, for example, children use English to solve problems that are intrinsically interesting to them.

However in order for pupils to use English in the subject classroom the input they get must

be comprehensible (Krashen 1982). Here we are referring both to the verbal input from the teacher and the texts which the pupils are expected to process. Both of these should be matched to the current level of linguistic competence of the child.

We would like to point to two problems here. By and large pupils are not meeting the demands of their English syllabus, which in any event is not communicatively based. Secondly, even if they were, work that we are doing indicates that the disparity or jump between English as a subject in Std. 2 and English across the curriculum in Std. 3 is such that it could scarcely be bridged by any but the most gifted pupils. This is a very serious problem which is being addressed on our project, and will lead to recommendations about the lower primary English curriculum, as well as the presentation of content subject material in Std. 3.

However, in the meanwhile, teachers can be doing something about their acceptance of their pupils' current linguistic competence: there should be a relative tolerance for linguistic error. As Ellis (1982) puts it:

The sucess of the interaction must be judged in terms of how well the task has been accomplished rather than in terms of the accuracy of the language.

If the teacher is constantly demanding accurate English from the children, they are more likely to focus on formal accuracy rather than on the meaning of what they want to say. In the work we do on our project, we always credit children with what they are attempting to say, and never penalise them for language errors. In the course of time, naturally, one would allow less and less interlanguage. If we focus on what the child is trying to say rather than how he is going to say it, then naturally the teacher's (and school) evaluative criteria are going to have to change. The important point here is that pupils should be active participants and communicators rather than passive recipients.

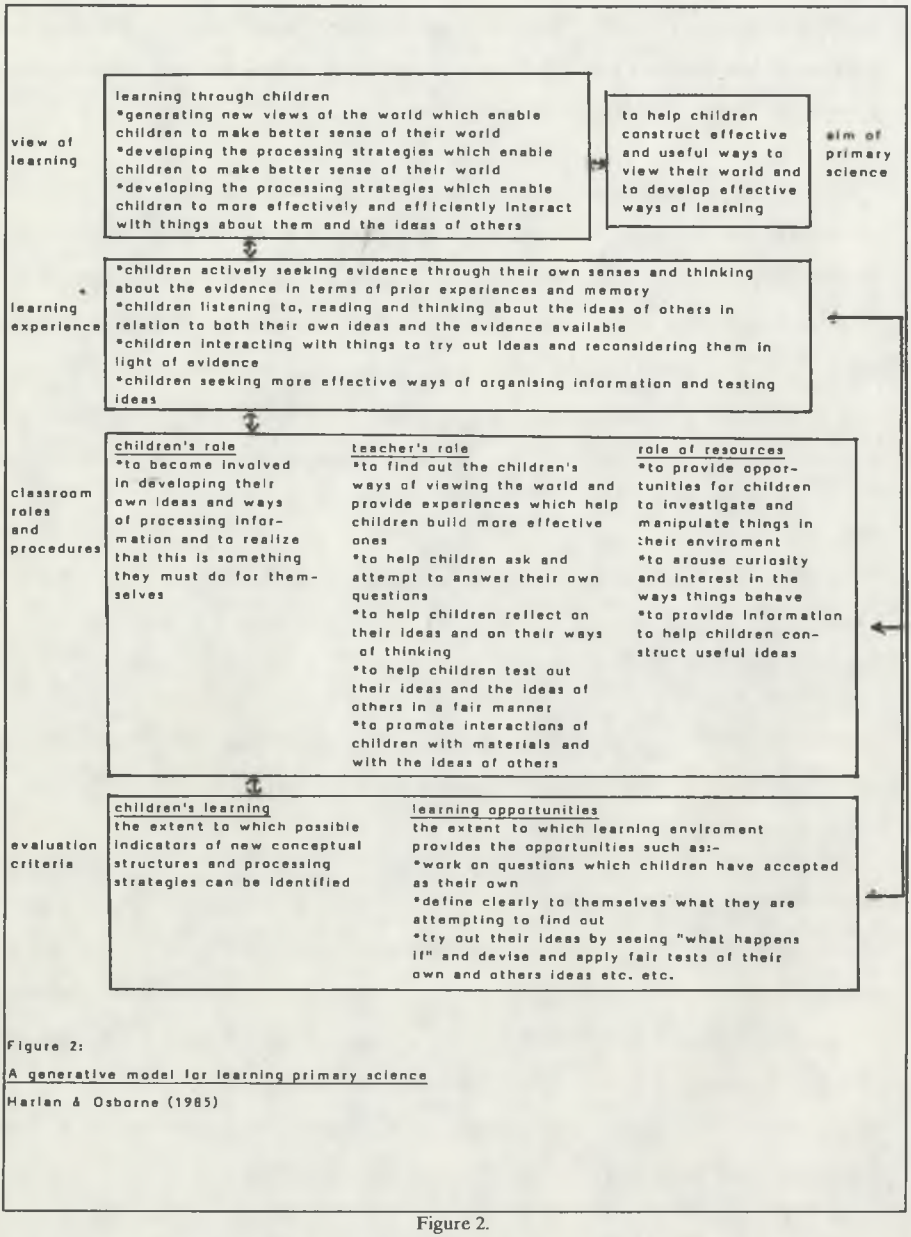

Figure 2:

A generative model for learning primary science

Harlan & Osborne (1985)

Figure 2.

One way in which we can ensure that pupils have comprehensible input, is if they talk to each other. If pupils have the opportunity to do so, they would have the chance to produce extended discourse, to adopt a variety of roles, and to perform a variety of functions, in meaningful contexts (Long and Porter, 1985).

If there is going to be any generative learning going on in Std. 3 we would suggest that pupils will have had to experience groupwork in a course such as Breakthrough to Literacy and continued to learn how to approach across-the-curriculum tasks in English in the lower primary from the Bridge courses developed by the Molteno Project.

In our view, the move from rote learning (which we believe is in practice chiefly because it is consonant with deeply held cultural mores [1]) to a more generative model would not in the first place be easy to effect, nor would it even be necessarily advisable (whatever progressive educational theory would say). Perhaps some intermediate model which will still invest teachers with the type of authority they seek but promote more active thinking on the part of the child can be developed. We hope that the traditional model which we are working on (see Figure 2) will go some way towards this. The essence of our model would be that the teacher herself is drawn into active reflection on her actions and reactions, and that she is given guidance on the first steps in promoting reflective thinking on the part of her pupils. The pupils in turn are drawn into activities which have meaning and purpose, and engage both their science process and communicative skills. The challenge to all of us is considerable.

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1 The argument about the echoes of learning-in-context in traditional societies, nor about the effect of pre-war European missionary teachers has not been developed here

REFERENCES

Brown, J. (1987) The application of applied linguistic theory to school content subjects. In: D. Young (Ed.) Bridging the Gap. Cape Town: Maskew Miller Longman.

Campione, J.C., Brown, A.L. and Bryant, N.R. (1985) Individual differences in learning and memory. In: R.J. Sternberg (Ed.).Human Abilities. New York: W H Freeman.

Ellis, R. (1982) Informal and formal approaches to communicative language teaching. ELT Journal 36/2: 73-81.

Harlen, W. and Osborne, R. (1985) A model for learning and teaching applied to primary science. Journal of Curriculum Studies, 17, 2, 133-146.

Horton, R. (1967) African traditional thought and western science: part l. From tradition to science. Africa, 37, 50-71.

Krashen, S. (1982) Principles and practice in second language acquisition. Oxford: Pergamon Press.

Long, M. and Porter, P. (1975) Groupwork, interlanguage talk and second language acquisition. TESOL Quarterly, 19, 2, 207-228.

Luma, E. (1983) The education of African teachers. Sopecam.