

# Learning Theories and Curriculum

Fred Biddulph and Ken Carr

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## Why consider learning theories?

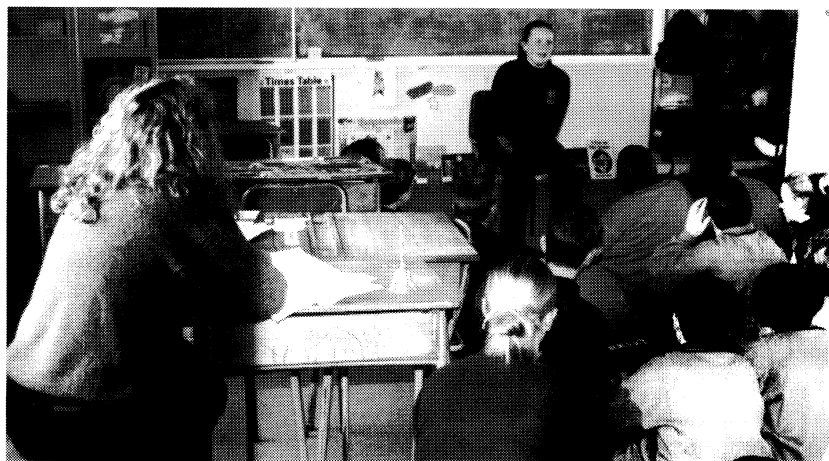
As teachers, all our work with children and older students is influenced by the beliefs that we hold. For instance, if we believe that some children are not *ready* to learn something, then we are unlikely to introduce it to them. If we believe that *all* children are capable of learning then we are likely to explore different ways of helping them to do so. If we believe that science is a body of truths then we will try to instil those scientific truths in our students. The beliefs that influence our teaching are mainly about the nature of knowledge, how students learn, and what our role as teachers is. This paper examines the second of these - ideas about how students learn. It does so for two important reasons:

(i) We are often unaware of the beliefs on which we operate,

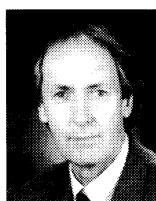
had their origins.

(ii) The curriculum documents which we are expected to implement in our classrooms are usually not explicit about the learning theory or theories which underlie them. The framework which I hope this paper provides should be useful in identifying these implicit theories. This in turn should provide a basis for determining whether they are educationally appropriate. It should enable us to see, for example, whether the form of assessment which we are required to administer is compatible with the way we are advised to teach.

In broader terms, the paper is intended to contribute to the growing professionalism of teachers by enabling us to critically analyse some of our own beliefs about learning as well as official documents and supporting materials.



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partly because we haven't thought about them very much, and partly because we may not have a mental framework that would help us recognise them for what they are. This paper aims to provide such a framework. The framework may also enable us to gain surprising insights into the way we were taught when we were at school, which is where many of our feelings and some of our beliefs about learning

## Some Influential Learning theories and their Relevance for the Classroom

In this paper we focus on four major theories that have been advanced to explain how people learn. There are others, but the four outlined and discussed seem to have had the greatest impact on teachers and children in New Zealand. A summary of these is contained in Figure 1 below.

## SOME THEORIES OF LEARNING

*Building-block idea*

### BEHAVIOURIST

- \* Concepts are broken down into manageable parts.
- \* Prerequisite blocks are needed to build on.
- \* Learning occurs by accretion, that is, the learning of discrete parts is thought to lead to the development of whole ideas.
- \* External rewards are often used to promote learning.

*Staircase idea*

### DEVELOPMENTAL

- \* Learning passes through an identifiable sequence.
- \* Learning is partly dependent upon maturation.
- \* It is necessary to reach one level of understanding before progressing to the next.

*Affective idea*

### HUMANISTIC

- \* Significant learning depends on the perceived relevance to the learner's own purposes.
- \* Much significant learning is acquired through doing experiencing.
- \* Self-initiated learning involving intellect, feelings, and a sense of self-control is the most lasting.
- \* Independence, creativity and self-reliance are facilitated by self-evaluation (not evaluation by others).

*Network idea*

### SOCIAL CONSTRUCTIVIST

- \* Learning is a personal linking of ideas and skills
- \* Learning often involves extending, restructuring or changing present ideas.
- \* Learning can be greatly facilitated through interaction with others.
- \* Learning is influenced by prior ideas (and feelings).

*Ecological idea*

### ENACTIVIST

- \* Learning is experiential, requiring people to act on world.
- \* Learning is evolutionary, having a biological, social and historical basis, and involves a continual process of reinterpretation.
- \* Learning stems from dynamic interdependence of individual and environment, self and others, and hence is not an individual action but a reciprocal process.
- \* Learning is complex (not linear), co-emergent, occasioned (not caused by teaching) and situated.

Fig.1: Outline of some influential theories of learning.

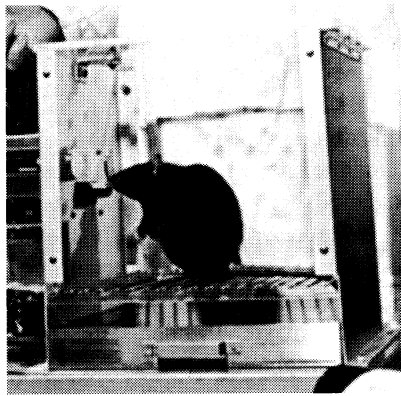
In the remainder of the paper we discuss the main features of each of the theories in Figure 1 and explain their relevance for the classroom.

## Behaviourist Learning Theory

As Carr (1994) points out, behaviourism had its origins in the study of small animals in laboratories. We remember studying the 'learning' of rats in mazes and Skinner boxes during psychology laboratory work many years ago. The principles were then applied to human learning. The major assumption was that if human learners mastered each small piece of knowledge in turn, then the bits of knowledge would somehow merge into a coherent whole (Begg, 1992; Carr, 1994).

Behaviourism has had a significant influence on teaching and learning in New Zealand schools over the years because it seems so reasonable. Most subjects are complex so it seems to make sense to break them down into their component parts and teach students each part in turn. The approach assumes a hierarchy (or levels) of knowledge which is acquired in linear fashion, that is, a learner proceeds along a line of knowledge mastery from the most elementary of ideas to the more complicated, gradually assembling blocks of knowledge in the process. A behaviourist approach typically involves formulating specific learning outcomes or objectives which focus on the elements of knowledge to be learnt. The emphasis is on getting students to some predetermined point of knowledge either by transmitting the knowledge to them or having them work through a text or computer programme which has the knowledge broken down into logical bits. Mastery of the knowledge is usually determined by tests or examinations. A system of rewards and punishments (e.g. social approval or disapproval of students' performance) may accompany the teaching. In any case, the content and learning process is mostly controlled by the teacher.

Although a behaviourist approach is probably appropriate for helping children overcome behavioural difficulties, and maybe for helping some children gain some



initial success in learning, it has been criticised on the grounds that it atomises knowledge, induces a sense of failure in some learners (who may nevertheless have learnt quite a bit), and makes learners dependent on external authorities (such as teachers). The first author can testify to the atomisation of knowledge claim from personal experience. The first university course on statistics that he ever did was based on a programmed text, a typically behaviourist approach. He worked his way right through the text, passed the exam quite easily, and realised that he hadn't a clue what statistics was all about. Obviously the parts did not form a coherent whole for him.

If the goal is to help children become independent and critical thinkers then one should be very wary about accepting behaviourist learning ideas as a basis for classroom activities and interaction.



## Developmental Learning Theory

This theory stems largely from the work of Piaget and will be familiar to many teachers as 'the stages' theory including concrete operational and formal operational stages. Dense, technical-sounding words were used to describe elements of this theory but what it amounted to was that children's learning and intellectual development progressed through a series of stages in a set order. Children had to pass through one stage before they could operate at the next, it was claimed. Thus, children were not considered able to think in the abstract before at least age 12 or 13 years.

Piaget's developmental theory held sway in New Zealand for many years and shaped what and how it was thought children could learn, especially primary children. For example, the Beginning School Mathematics programme which first appeared in the mid-1980's, assumed that children in their first two years or so at school (i) could not handle numbers beyond 10 (because they were not thought to be able to 'conserve' number before age 7 years), and (ii) needed entirely concrete experiences (because they were not considered to be able to think in the abstract). The notion of 'readiness' stems largely from this theory and permeates the thinking of

many teachers. If we try something with children and they don't seem to understand it, then we can easily conclude that they are not ready for it - rather than wondering whether they might understand it if we approached it in a different way.

The major criticism of the 'stages' idea is that they were generated from data gained from children on tasks that held little meaning for them, or the purpose of which they construed differently from the interviewer. This really struck the first author when his own son at age 3 years could conserve length, something he was not supposed to be able to do until about age 8 years, according to Piaget. He did so in the context of knives and forks at the dinner table, something that was quite meaningful to him. Likewise, Donaldson (1978), has shown that even some preschoolers can think in the abstract. It would therefore be unwise for us as teachers to place too much faith in developmental learning theory as a basis for our work with students.

## Humanistic Learning Theory

As we have written elsewhere (Biddulph, 1997), humanistic learning theory stems largely from the work of William Glasser, Carl Rogers and Guy Claxton. It explains that there is an affective dimension to learning (as well as the cognitive) and that this has a powerful influence on the learning process. Most of us can think of numerous examples of this in our own learning experiences so we shall not elaborate here. Whether we take account of it in our classrooms is another matter. If we listen closely to our students and their ideas, and give our students some feeling of control over their

own learning, then we probably do.

One aspect that is worth discussing, although it is not usually considered in the context of humanistic learning theory, is students' feelings about the source of their success or failure. It is commonly known as **attribution theory** (Badger, 1985) and tries to explain why some students, girls in particular, give up learning subjects such as mathematics. The explanation goes like this: Since teachers tend to criticise boys' behaviour in the classroom, rather than their academic work, boys attribute their success to ability and failure to lack of motivation or effort. On the other hand, since teachers tend to be positive towards girls and girls generally try their best in class, they attribute their success to 'luck' and failure to 'lack of ability'. Feelings of inability and luck do not provide a sound platform for continuing with learning so students experiencing such feelings tend to give up trying to learn. It seems a safer option. This sad state has been termed 'learned helplessness'.

## Social Constructivist Learning Theory

In recent years, much has been written about constructivism as an explanation of how people learn - in a cognitive sense. For example, in the area of mathematics education a small sample of articles and collections of papers on the subject are those by Clements and Battista (1990), Davis, Maher and Noddings (1990), Malone and Taylor (1993), Mayers and Britt (1995), Neyland (1995), and Ritchie and Carr (1997).

The ideas of constructivism are not new. Piaget's concepts of assimilation and accommodation, that is, enlarging or changing one's mental schema are central to constructivism. Wittrock's (1974) generative learning theory is very much about constructivism too. Some of Vygotski's ideas about learning are also constructivist in nature (Ritchie and Carr, 1997).

Constructivist approaches in the classroom require a teacher to adopt a very different role to that normally

taken by many teachers. One of the most readable ways of going about teaching using this approach is provided by Deborah Schifter (1996). Schifter describes a classroom situation where a series of mathematics lessons was connected to the Thanksgiving Day holiday in the U.S. This is not, on the surface, an exceptional thing for a teacher to do. But in fact it was - these first grade students were not told how to solve the problem (how 'big' the boat was outlined in masking tape on the classroom floor).

*(the teacher's) behavior will no doubt puzzle readers whose images of teaching derive from the mathematics classrooms in which they themselves once sat as children: the teacher shows her students procedures for getting the right answers and then monitors them as they reproduce those procedures. To ask students a question without having previously shown them how to answer it is actually considered "unfair".*

(Schifter, 1996, 493)

The six-year-olds then drew on their existing ideas, interacted, and eventually arrived at an exploration of the use of rulers and the need to adopt conventional units of measurement. The teacher, of course, played a key part in this as an advisor, supporter and guide.

The above may be thought of as a constructivist-type approach to teaching. The classroom became a community of enquiry, a problem-posing and problem-solving environment. Students were encouraged to think about wider issues (here in mathematics), and this was more valued than remembering the correct procedure for completing an algorithm and getting a correct answer. The way forward was also through using students' questions, students' ideas, and negotiated meaning within the whole group.

Can teachers use this approach when constrained by a national curriculum? Certainly this does



seem possible. Carr and Mannington (1997) suggest that a constructivist-type approach can be adopted in concert with the prescribed content of curriculum 'requirements'.

### Enactivist Learning Theory

This theory of learning is the trickiest to understand because it considers learning in a holistic sense, somewhat akin to the way that alternative medicine considers the health of the whole person. As such, it is a way of explaining how learning occurs that most of us have not considered before.

If we understand enactivism correctly (Davis, 1996; Sumara and Davis, 1997), then it extends social constructivism and humanistic learning theory by locating the learner not as an individual but as a person in constant mutual relationship with her/his physical and social environment. In doing so, it seems to incorporate recent ideas about a biological approach to learning (Schaverein and Cosgrove, 1996). The learner is considered a biological and cultural being who is an integral part of their environment, influencing it through participation and simultaneously being influenced by it. Hence, the use of the term 'ecological' to describe the mutually adaptive process. Learning is seen not as an autonomous process but as a negotiated, contextualised, co-emergent activity. The learner generates knowledge in interaction with the environment. Thus, knowledge is not considered a separate entity but as something bound up with the knowing learner's developing/changing view of their world. Further, much learning cannot be anticipated, and some can remain unformulated within learners.

From a teaching point of view, enactivist learning theory suggests that we consider the learner as a whole biological person with feelings and a history of experiences and ideas which impact upon the person's learning. We need to arrange co-operative learning opportunities, not competitive ones, perhaps by turning our classroom

into a 'community of learners'. We also need to acknowledge that we cannot predict what learning will occur. As a consequence we should listen frequently to our students to learn how they have interpreted the experiences provided, how they feel about them, and what ideas they seem to have constructed from them.

### Conclusion

Of necessity this overview of learning theories is rather short but we hope it provides a useful framework for determining assumptions about learning underlying various curriculum documents and our own beliefs and classroom practices. One group of ideas about learning that we haven't touched upon in this paper is that pertaining to the 'brain'. Our reason for omitting it is that we feel there is much yet to be done to develop a coherent theory from this perspective. One of the first people to consider this was Wittrock (1974) who emphasised the active nature of the brain as it responded to incoming stimuli and generated links with existing ideas, drawing on both short-term and long-term memory. Perhaps the most promising way forward lies in the kind of biological approach to learning proposed by Schaverein and Cosgrove (1996). This approach is a careful amalgam of much of our current knowledge. However, theories of learning that may emerge over the coming years will always need to be judged in the light of classroom practice. Additionally we should try to discern their genesis and *raison d'être*.



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