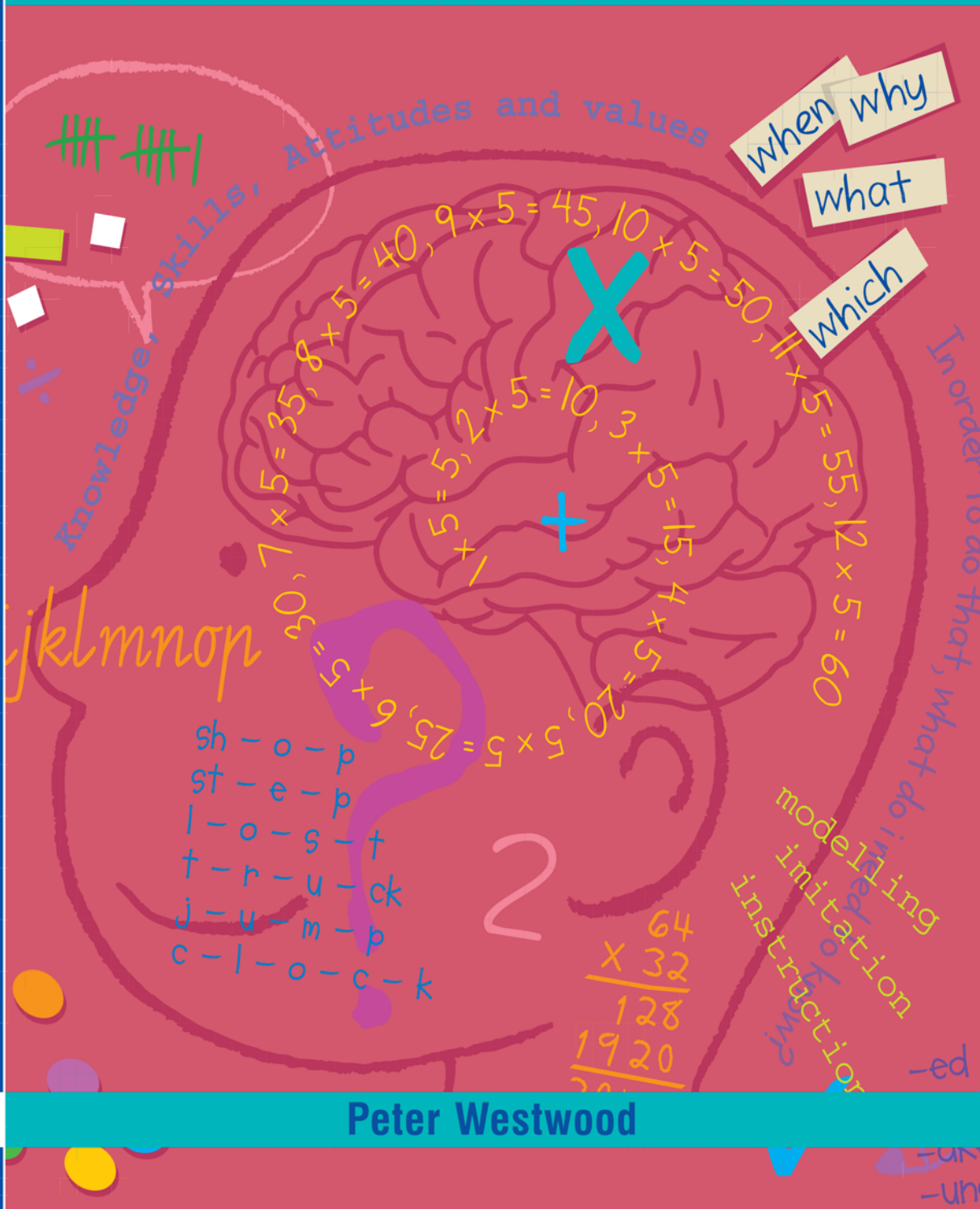
Learning and Learning Difficulties

Learning and Learning Difficulties

A Handbook for Teachers



- Why do problems occur?
- Identify and address gaps
- Problem solving strategies

David Fulton Publishers

Peter Westwood

Learning and Learning Difficulties

Other titles of interest:

Spelling
Peter Westwood
1 84312 193 X

Reading and Learning Difficulties
Peter Westwood
1 84312 196 4

Numeracy and Learning Difficulties
Peter Westwood
1 84312 194 8

Learning and Learning Difficulties

Approaches to teaching and assessment

Peter Westwood

David Fulton Publishers

David Fulton Publishers Ltd
The Chiswick Centre, 414 Chiswick High Road, London W4 5TF

www.fultonpublishers.co.uk

First published in Australia in 2004 by ACER Press
Australian Council for Educational Research Ltd
19 Prospect Hill Road, Camberwell, Victoria, 3124

First published in Great Britain in 2004 by David Fulton Publishers

David Fulton Publishers is a division of Granada Learning, part of ITV plc.

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the Britsh Library.

ISBN 1 84312 195 6

Typeset by RefineCatch Ltd, Bungay, Suffolk
Printed and bound in Great Britain

Contents

For my dear friend Chan Wing Yan (Carol).
An excellent student and teacher.

Preface

In writing this book I have attempted to place the phenomenon of learning difficulty within a much wider context than is usual by exploring a variety of learning processes, learning theories, and concepts about learning. An understanding of the way in which learning occurs is fundamental to an understanding of how and when problems in learning may arise. By painting this broader canvas I hope to help teachers and others appreciate that problems in learning are not all due to weaknesses within students or to lack of motivation on their part. Indeed, many learning difficulties are created or exacerbated not by factors within the students but by influences within the environment in which they live and learn. Many such factors in the learning environment are amenable to modification and improvement, whereas deficits within learners are not so easily changed.

Two of the most powerful influences in the learning environment are the school curriculum and the approaches to teaching. It is argued here that teaching methods and materials must be selected carefully to suit the types of learning involved in specific lessons, and to accommodate the learning characteristics of the students. Many learning problems are prevented or minimised by matching teaching methods and lesson content to learners' current aptitude and prior experience.

Of course, some learning problems are indeed due to deficits or impairments within students themselves and discussion focuses on such causes in later chapters of the book. However, the point is made that some commonly observed weaknesses or 'deficits' (for example, poor attention to task, limited concentration, poor retention and recall of information) are often the outcome of learning failure, not the cause. The impact of inappropriate curriculum, insufficient teaching, and persistent failure is discussed, with particular reference to the detrimental effects they can have on students' affective development and motivation.

Readers will identify a number of recurring themes running through the chapters — including the need to catch and maintain students' attention, the importance of explicit teaching and guided practice, and the value of teaching students effective task-approach strategies. Also emphasised in many chapters is the importance of addressing students' personal and emotional needs, as well as working toward cognitive and academic goals.

I have drawn widely on international literature to support my arguments and to present contemporary perspectives on learning and learning difficulty. There is universal agreement that early prevention of learning failure is much more effective than later attempted cures.

Peter Westwood
Faculty of Education
University of Hong Kong

1 Perspectives on learning

> When people are asked what schools are for, a common reply is: 'To help children learn'. (Santrock, 2001, p. 238)

Many experts suggest that children are born with intrinsic motivation – a natural desire to make sense of the world and become competent (for example, Seligman, 1995; Smilkstein, 2003; West, 2002). The mastery orientation displayed by young children in the preschool years suggests that they enjoy informal learning for its own sake, and they gain satisfaction from completing tasks they have set themselves. Even when faced with difficulties, they will still persist rather than give up, and will constantly tackle new challenges (Hauser-Cram, 1998). Children exhibit such mastery orientation in almost every facet of their exploratory play in the preschool years.

Slavin (1994) indicates that almost all children, regardless of social class or other factors, enter school for the first time full of enthusiasm, motivation and self-confidence, expecting to succeed. But before the end of Year 1 some of them lose that confidence because they are not experiencing success. Lack of success reduces mastery orientation, weakens a child's feelings of self-efficacy, lowers self-esteem and diminishes motivation (Neal and Kelly, 2002; Rosner, 1993). Linden (2002, p. 76) states, 'Already in their first year in school some pupils will have had traumatic experiences of not being able to cope [and] the loss of a feeling of competence can create unhappiness, fear and disappointment.'

Why does this situation arise? Do the children suddenly become incapable of effective learning once they enter the school environment? Does the fault lie with the children, or is it related to the nature of the educational programme and the manner in which it is implemented?

To answer these questions, teachers need to know much more about human learning and the factors that can enhance or impede it. It is hoped that this book will help increase teachers' understanding of learners, learning processes, and learning difficulties.

Teaching should be based on a knowledge of learning

Understanding *how* children learn is of fundamental importance for teaching and for effective curriculum planning. An understanding of theories and principles

of learning can help teachers select the most appropriate methods of instruction to suit different types of subject matter, different types of learning, different educational outcomes, and different characteristics of learners (Gagne and Wager, 2002). A thorough knowledge of curriculum content, together with an appreciation of the steps and processes involved in learning that type of content, can help teachers implement sound educational programmes.

Knowledge of learning processes can also help teachers anticipate the difficulties some students may encounter in certain school subjects. Teachers can then consider how best to prevent or minimise learning problems and how to motivate their students to learn (Brophy, 2001; Penso, 2002; Sasson, 2001).

Teachers' deep understanding of these issues is often referred to as *pedagogical content knowledge* (Shulman, 1987; Tan *et al.*, 2003) and the most effective teachers in our schools are usually those equipped with a great deal of this professional know-how. The other essential element of pedagogical knowledge is an awareness of the learning characteristics of the students they teach, including those with special educational needs. Learners have many common characteristics at various ages and stages, but individual learners also differ in many educationally significant ways. Teachers need to understand both the commonalities and the differences in order to meet students' needs.

Learning defined and described

It appears to be a simple task to define what we mean by the term 'learning' – after all, we have spent our entire lives learning new things. When asked to provide a definition of 'learning' teachers usually offer such responses as:

- Knowing something you didn't know before.
- Gaining knowledge and skills.
- Acquiring information that you can use in new situations.
- Benefiting from instruction.
- Developing your intelligence.
- Acquiring a different perspective on the world.

There is, of course, a great deal of truth and value in all these suggested definitions. But how do psychologists define the phenomenon of learning? Some of the common (and a few less common) definitions of learning from the field of psychology include the following.

Key concepts embodied in some of these definitions will be discussed and applied in this and later chapters.

- Learning is the process whereby an organism changes its behaviour as a result of experience (Driscoll, 2000).
- Learning is a relatively permanent change in capacity for performance, acquired through experience (Good and Brophy, 1990).

- Learning is a relatively permanent change in mental associations due to experience (Ormrod, 2003).
- Learning is a potential change in behaviour resulting from experience in processing information (Walker, 1996).
- Learning is the way that human beings acquire new skills, knowledge, attitudes and values. The outcomes of learning are the new capabilities possessed by the learner (Gredler, 2001).
- Learning consists of the acquisition of increasingly automated schemata held in long-term memory (Sweller, 1999).
- Neuroscientists define learning as two neurons communicating with each other (Sprenger, 1999).

Types of learning

Many years ago the psychologist David Ausubel (1968) argued that it must not be assumed that all types of learning involve the learner in precisely the same set of mental, emotional or physical processes – in other words, different types of learning may well involve quite different psychological processes and require different methods of teaching. Any false assumption that all learning is in some way 'the same' can lead to the erroneous notion that one general method of teaching will serve all educational purposes and will suit all learners (Gregory and Chapman, 2002). It has become popular to say of teaching methods, 'one size does not fit all'.

Ausubel (1968) suggested that if instructional programming for different curriculum areas is to be truly effective, teachers need to identify the different types of learning involved in each area, and then select teaching methods that are most likely to facilitate that type of learning. As Galton *et al.* (1999) have indicated, a theory of pedagogy requires that teachers identify the nature of what it is the child is expected to learn, and then decide on the most effective instructional principles for bringing about the required learning processes.

Categories of learning

There have been many and varied attempts to categorise examples of learning. The most obvious categories that appeal to common sense comprise:

- Knowledge
- Skills
- Attitudes and values.

These three broad categories or domains have provided the basic framework for planning a wide variety of learning objectives within school curricula, as reflected in the vast literature on educational programming and curriculum design (for example, Gunter *et al.*, 2003). Most schools would readily acknowledge their responsibility to facilitate learning in the three domains.

There are other more detailed ways of analysing learning that subdivide the three broad domains into specific categories of learning. For example, Robert Gagne (1984 *et al.*, 1992; Gagne and Wager, 2002) developed a taxonomy for categorising different forms of learning. His early model was complex and contained a variety of sub-types such as *signal learning*, *stimulus-response learning*, *discrimination learning*, *chaining*, *verbal association*, *rule learning* and *concept learning*. These categories served a useful purpose in contexts where psychologists were carrying out controlled experiments in human learning, but the categories were more difficult to apply in school contexts where most episodes of learning involve simultaneous and integrated use of several subtypes of learning within one task or lesson. However, Mastropieri and Scruggs (2002) still advocate a very similar taxonomy of learning for use when designing effective instruction for students with special needs. Their taxonomy comprises: *discrimination learning*, *factual learning*, *rule learning*, *procedural learning*, *conceptual learning*, and *problem solving and thinking*. Some of these categories will be discussed in more detail in this and other chapters.

In a later analysis, Gagne, Briggs and Wager (1992) moved toward a much broader system of classification using five main categories of learning – physical skills, information, intellectual skills, cognitive strategies, and attitudes. The writers also gave a brief indication of the type of instruction required for facilitating each type of learning and the conditions that must be established if optimal learning is to occur. Gagne used the term 'capabilities' to describe each of these categories; and it will be noted in the definitions of learning quoted above that other writers also favour the word 'capabilities'. Gredler (2001, p. 405) defines a human capability as 'the outcome of learning'. Robert Gagne's (1992) categories of human capability are summarised below.

Learning physical (psychomotor) skills

Psychomotor skills are learned capabilities that involve the coordination of brain, muscles, hand and eye. Psychomotor skills include such diverse activities as cutting with a pair of scissors, getting dressed, swimming, walking, eating with a spoon, using a computer keyboard, writing, riding a bicycle, and driving a car. Children, without direct teaching, acquire very many physical skills through imitation and trial and error, but most of the physical skills associated with performance in school need to be directly taught and frequently practised. It is generally accepted that very large amounts of practice are needed in order that motor skills can eventually be performed with a high degree of automaticity (Howe, 1999).

In the early stages of teaching a new motor skill, modelling, imitation, and precise verbal instruction are extremely important. Sometimes direct physical

guidance of the learner's movements is required, when helping a young child or a child with a physical disability to form the numeral 7, for example; or an older child to experience the movement for a backhand stroke in tennis. It is also clear that corrective feedback is necessary to help learners improve their motor skill performance. Some of this feedback comes from the instructor, but an even more essential component of feedback must come from the learner's own internal self-monitoring of performance, resulting in self-correction.

Acquiring information

This type of learning involves the acquisition of factual information (knowledge) that the learner is able to state and use. Examples include factual knowledge such as, 'Bus number 91 will take me to Aberdeen'; 'The shops in my street open at 8.00am'; 'Paris is the capital of France'; '7 + 2 = 9'. This type of knowledge is known as *'declarative knowledge'* to differentiate it from *'procedural knowledge'* which involves knowing the steps in carrying out a procedure (see below).

A sound knowledge-base of information provides much of the raw material utilised in the performance of intellectual skills – for example, thinking and reasoning usually require the retrieval and application of some factual information (Hirsch, 2000). When used in combination with cognitive strategies and intellectual skills, information enables an individual to reason, reflect, solve problems, explain, and generate new ideas.

Information is of most value (and is most easily accessed) when it links with related information also stored in the learner's memory. This issue will be discussed more fully later in the section describing the formation of *schemata* and the role of *working memory*. Isolated fragments of information are often easily forgotten or are difficult to access. Information is more readily remembered when it is linked directly to prior learning and when students are encouraged to process it actively.

Students acquire huge amounts of factual information incidentally in daily life, particularly in this era of communication technology. In school, teachers still need to set high priority on making sure students are building a deep and relevant knowledge base. A teacher's task is to make key information available to students and to help them make appropriate connections with prior knowledge and experience. Sometimes, important curriculum information needs to be conveyed to students by direct teaching and through use of appropriate texts and computer programs. At other times, information is readily acquired through students' independent study, group work, and discussion. The currently popular *constructivist* theory of learning suggests that the acquisition of information occurs best when learners actively engage in exploratory modes of learning. Constructivist theory will be discussed fully in Chapter 2.

Some instances of learning difficulty can be traced to lack of automaticity in the retrieval of essential declarative knowledge, or in the application of procedural

knowledge. A learner who lacks automaticity has to expend inappropriately large amounts of concentrated effort in recalling information or remembering the simple lower-order steps in a cognitive process. He or she is therefore hampered in engaging in higher-order thinking. An example might be difficulty in comprehension when reading due to lack of automaticity in word recognition and phonics. The reader's efforts have to be focused on basic decoding of the print on the page rather than reading for meaning. Similarly in mathematics, poor automaticity with recall of simple number facts, or a weakness in recalling steps in a multiplication algorithm, will distract the student from reflecting logically upon the features of a contextual problem. Gage and Berliner (1998, p. 262) suggest that, 'A student's failure to perform well, or a teacher's failure to teach well, may be due to inadequate declarative knowledge, inadequate procedural knowledge, or both.'

Developing intellectual skills

Intellectual skills represent the cognitive abilities that enable individuals to interact successfully with their environment and tackle new tasks effectively. Intellectual skill development involves the acquisition of concepts, rules, routines, and symbol systems. Learning an intellectual skill usually means learning how to perform the cognitive processes involved in thinking, reasoning and problem solving.

Robert Gagne (1984) indicates that much human behaviour is 'rule-governed'. Basic rules include principles such as understanding that printed language in English is sequenced from left to right, that in oral language words must be produced in a particular sequence to obey the rules of grammar, that traffic lights operate in set sequence, and that birds and animals can be classified into species according to their specific characteristics. Learners create higher-order rules as they attempt to work out solutions to problems. They draw upon concepts and basic rules already known and combine them in new ways. For example, a preschool child solves the problem of how to assemble the track for a new toy train by combining prior knowledge about the ways in which some objects can be linked together with prior knowledge that the tracks provided for other moving toys often form a circle. In carrying out this task the child has combined fragments of prior knowledge and utilised previous experience in a unique way to solve a new problem. In doing so the child has acquired a set of principles that might be used again in similar circumstances (in other words, can be *generalised* or *transferred*).

Teaching lower-level intellectual skills (discriminations, simple concepts, symbol recognition) usually involves direct explanation, demonstration, and guided practice. Basic rules are also best taught through direct instruction, followed by application. However, higher-order rules have to be constructed by the learner, who therefore needs to be given opportunity to solve problems and apply accumulated knowledge to new situations. This level and type of learning

suggest the need for an enquiry or problem-solving classroom approach. Robert Gagne *et al.* (1992) indicate that what is learned in this domain of intellectual skills is mainly *procedural skills* – knowing *how*, rather than knowing *that*.

Learning cognitive and metacognitive strategies

Cognitive strategies can be regarded as mental plans of action that learners develop to help them approach any learning task or problem. An effective cognitive strategy enables learners to plan what they will do, and then monitor and modify their own thoughts and actions as they proceed. We refer to this ability to 'think about our own thinking' as *metacognition* (Kershner, 2000). For example, a student trying to solve a problem may think, 'This isn't working out correctly – I had better try a different way.' This student is effectively monitoring and adapting his or her own performance. The child who thinks, 'I need to write this down to help me remember it', is also illustrating a metacognitive *self-regulating strategy*.

Metacognitive processes that supervise and control our cognition are sometimes termed *internal executive processes* (Gourgey, 2001). These executive processes enable us to plan, monitor and evaluate performance throughout the execution of a task. It is now believed that all academic and intellectual tasks, like writing an essay, reading with comprehension, solving a mathematical problem, analysing data for a project, are most easily and effectively accomplished through the application of cognitive and metacognitive strategies. It is also believed that many learning difficulties are caused by students' lack of appropriate cognitive strategies and relative absence of metacognition (Bradshaw, 1995; Chan, 1991; Smith, 1998).

Practical methods for improving a learner's ability to use cognitive and metacognitive strategies are currently receiving much attention from educational researchers (for example, Hartman, 2001; Pressley and McCormick, 1995; Taylor, 2002). It is proving to be possible to teach students to use cognitive strategies more efficiently, thus resulting in an improved rate of success (for example, Graham and Harris, 2000a; Pressley, 1999; Swanson, 2000a; Xin and Jitendra, 1999). In general, cognitive strategies are taught by direct explanation and modelling, with the teacher 'thinking aloud' as he or she demonstrates an effective strategy for a given task. The learners are encouraged to observe and develop similar 'self-talk' to help them apply the new strategy effectively. Guided practice is then provided, with feedback from the teacher. Deliberate efforts are made to help the learner recognise other contexts in which a particular strategy can be used (the principle of training for transfer and generalisation of learning). The learners are also encouraged to monitor and reflect upon the effectiveness of their own use of specific strategies.

Developing attitudes, beliefs and values

Robert Gagne *et al.* (1992) define an attitude as an internal state that affects an individual's choice of personal action toward some object, person, or event. Many of the most important goals of education deal with the development of positive and productive attitudes, beliefs and values in students. The methods of instruction to be employed in establishing desired attitudes differ considerably from those applicable to the learning of intellectual skills, information, or cognitive strategies because attitudes cannot be taught directly. They may be acquired through a combination of observing a model displaying the particular attitude, reflecting upon the outcomes from the actions of self and others, from peer group pressure, and to some degree through active persuasion and the use of incentives (rewards). Once they are acquired, attitudes tend to be reinforced when others agree with and support them.

Some of the most significant beliefs and attitudes learners develop are associated with their own competence and efficacy as learners; and these beliefs are shaped by the extent to which they succeed or fail in school (Eccles *et al.*, 1998; Galloway *et al.*, 1995). This important issue of self-efficacy will be discussed fully in Chapter 2.

While the five categories of learning identified by Robert Gagne *et al.* (1992) are extremely useful for analysing learning in a school context and for identifying appropriate methods to facilitate learning in the five domains, there are other ways of classifying human learning.

Intentional learning and incidental learning

Good and Brophy (2002) make an important distinction between two broad categories of learning, *intentional* and *incidental* learning. Intentional learning operates in a situation where the learner is deliberately setting out to acquire some particular knowledge, skill or strategy, and is putting focused effort into the task. Incidental learning, on the other hand, occurs when an individual is not making any conscious effort to acquire information or skill but is merely exposed by chance to some experience – such as passively observing the actions of another person, watching a film, or over-hearing a conversation. It is believed that many of the attitudes, beliefs, and values we hold are acquired mainly through incidental learning rather than from deliberate instruction.

Some contemporary classroom approaches rely fairly heavily on children's incidental learning capacity to acquire basic skills and concepts. Advocates of these approaches regard incidental learning as preferable to direct instruction because it is considered to be a more 'natural' way of acquiring information and skills. For example, in many English-speaking countries in the 1980s and 1990s

teachers employed the 'whole language approach' to the teaching of reading and writing, believing firmly that children would all acquire word recognition, phonic knowledge, spelling skills and the rules of grammar through incidental learning by engaging in reading and writing activities each day (Goodman, 1986). Similarly, it has been argued that basic number skills and concepts will be discovered effectively through activity-based, problem-solving methods, rather than from direct teaching, drill and practice.

In recent years these views have been challenged and the current belief is that indirect methods used exclusively are inappropriate for the types of learning involved in the initial acquisition of basic literacy and numeracy skills (Birsh, 1999; Hirsch, 2000; Pressley, 1998; Sasson, 2001). Many psychologists and educators now believe that important facts and skills are taught most effectively in the early stages by direct instruction (for example, Kauffman, 2002). The current view is that effective teaching of basic academic skills requires a careful combination of student-centred activity and direct teaching. It is also believed that certain students make significantly more progress when directly taught than when left to discover important concepts for themselves (Graham and Harris, 1994; Mastropieri and Scruggs, 2002). One potential cause of learning difficulty for some students is lack of direct instruction in curriculum areas where and when it is most needed.

Observational learning

Observational learning, as the term implies, is learning that occurs when a person observes and imitates someone else's responses or behaviour, or when information and concepts are acquired without active participation. In many instances, learning by observation and imitation is a quick and effective process, and many typical lessons in classrooms rely on some degree of observation and modelling by the learners.

Learning by observation requires the activation of four processes (Santrock, 2001):

- *Attention*: the learner must obviously be attending to the actions of the model and taking in the information presented.
- *Retention*: the learner must store the observed actions or information in memory.
- *Reproduction*: the learner can recall and imitate (albeit imperfectly) what they have seen.
- *Reinforcement or incentive*: the learner needs to be motivated to want to reproduce and carry out the observed behaviour or recall the information.

Observational learning can be intentional or incidental. When modelling and imitation are used as teaching strategy – for example, when teaching a new skill to students with intellectual disability – the behaviour to be learned may need