



EDUCATION IN  
BOTSWANA:  
A READING TEXT

EDITED BY

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MACMILLAN

**Education in Botswana: A Reading Text**

© Okechukwu C. Abosi & Itah Kandjii-Muraugi 1995

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## FOREWORD

If Education in this country is to play its destined role as an instrument for facilitating Nation-Building, educators must make a convincing case for its relevance and support it with concrete resource materials. *Education in Botswana: A Reading Text* is a bold attempt to help train teachers.

The contributors have carefully addressed in this book all the areas of education which are relevant to our teacher training. This book therefore offers students and teachers a reference source. It also fulfils the crying need for relevant literature in education in Botswana today. This is the first time a book of this nature is written locally. It will be difficult to find a comparative single volume which contains such a compendium of useful information relevant to the culture and local situation in Botswana.

Most of the contributors to this book are well-known names in education in this country, particularly at the University of Botswana. This book therefore constitutes a windfall for students of education at both University and College of Education levels. Serving teachers and all those interested in education and research in education with special reference to Botswana and education in general will also find this book most helpful.

I commend it to them.

Ray M Molomo  
Hon. Minister of Education  
Republic of Botswana


  
CHAPTER EIGHT

# EDUCATIONAL PSYCHOLOGY

## THE CONCEPT OF EDUCATIONAL PSYCHOLOGY

Educational psychology may be viewed as thoughts and actions that are related to how we teach and learn. It deals with principles and methods that can improve teaching and learning and provides methods by which teachers can be more effective in the classroom. Educational psychology makes the educator get the best from students, makes educators understand their pupils' thoughts and get the best from their students. It also helps educators to improve their personality or become more sensitive to those personality traits that can enhance or promote effective learning.

Through educational psychology, students can be made to feel responsible, to become more enthusiastic about what they are taught and to feel good when they have learnt something in the classroom. Educational psychology also assists the teacher to express concepts in ways students can understand.

Educational psychology serves as a foundational discipline in education. It can provide insight into different aspects of educational practice. Through educational psychology, ideas can be offered about learning and the influences of learning on the individual, the family and society. Educational psychology assists in putting into better perspective the instructional process or the tasks involved in teaching which can create problems for both teachers and learners.

Gage and Berliner (1988) recognised five primary tasks involved in instructional processes:

- (a) choosing objectives;
- (b) understanding student characteristics;
- (c) understanding and using ideas about the nature of the learning process;
- (d) selecting and using methods of teaching; and
- (e) evaluating student learning.

Educational psychology can assist the teacher to select which objectives the students should achieve. The students are helped to know what is expected from them as a learning outcome. The teacher in turn takes into consideration a student's characteristics in the choice of his objectives.

Through educational psychology, the teacher is assisted to understand the students. How they differ in abilities, strengths and weaknesses have implications for learning. The teacher has an influence on the learner, and the teacher's understanding of the learner is essential in the learning process.

It is equally important to design teaching procedures that take into consideration what we know about how pupils learn. The learning process should not be difficult and instructions must be interesting and stimulating with suggestions on how to improve.

In addition the teacher should be able to utilise appropriate and relevant teaching methods to convey knowledge, ideas, information and other matters to students. The teacher must be able to design adequate procedures to find out how well the students have learned. The evaluation itself must be fair, with provision for remedial instruction if the need arises.

Thus, educational psychology is the study of learners, learning and teaching. It focuses on the processes by which information, skills, values and attitudes are transmitted from the teachers to students in the classroom. It also focuses on the application of principles of psychology to the practice of instruction. Characteristics of learners are of concern, while the principles of learning and instruction and the application of these principles are all within the domain of educational psychol-

ogy. Various strategies for delivering lessons to the class or groups within the class, strategies for motivating students, making instructions relevant to the different needs of students and ensuring classroom management and discipline are all within the domain of educational psychology.

Educational psychology has as its goal ensuring and improving student achievement, fostering positive attitudes to the learning process, and making the teacher effective in the classroom. It is also imperative for teachers to understand the psychology of learners at different ages and educators must be able to employ effectively the psychological principles of learning and motivation. Educational psychology also aims at assisting teachers to increase their effectiveness in the classroom. This includes knowing not only what and how to teach but also how to motivate and manage students.

### BEHAVIOURAL PSYCHOLOGY

Many different kinds of learning take place under many different conditions and many different theories of learning have been proposed.

Learning may be defined as a process whereby an organism changes its behaviour as a result of experience. Learning is thus what we infer has taken place when the behaviour of organisms (including humans) has changed. Behaviour itself refers to some action, muscular or glandular, or to a combination of actions.

Some psychologists focus exclusively on overt behaviour (behaviour that can be observed) and are often called behaviourists. Other psychologists use overt behaviours as a clue to determining what goes on within the individual and they are called cognitive psychologists. (The cognitive behaviours include thinking, feeling, problem solving, creativity, etc.)

Three relatively distinct theories have been put forward by behavioural psychologists to describe how we learn. These theories all have applications to learning in the classroom and they are:

1. Classical conditioning (respondent conditioning);
2. Operant conditioning; and
3. Contiguity learning.

### Classical conditioning

Ivan Pavlov in Russia and his colleagues in the late 1890s and early 1900s studied the digestive processes in dogs. They noticed changes in the timing and rate of salivation in these animals. Pavlov noticed that if meat was placed in or near the mouth of a hungry dog, the dog would salivate. The meat produced this response (salivating) automatically, without any prior training or conditioning. The meat is, therefore, referred to as an *unconditioned stimulus* (US). Thus, an unconditioned stimulus is a stimulus that naturally evokes a particular response. As the salivation occurred automatically in the presence of meat without any training or experience, the response (salivating) is referred to as an *unconditioned response* (UR). Thus, an unconditioned response (UR) is a behaviour prompted automatically by any stimulus.

Whereas meat produced salivation without prior experience, Pavlov noted that another stimulus (a bell) did not. It had no effect on the dogs' salivation. Hence the bell is called a *neutral stimulus* (NS). A neutral stimulus is a stimulus that does not naturally prompt a particular response.

Pavlov later showed that if a previously neutral stimulus is paired with an unconditioned stimulus, the neutral stimulus becomes a *conditioned stimulus* (CS), gaining the power to elicit a response similar to that produced by the unconditioned stimulus. When this happens the sounding of the bell alone causes the dog to salivate. The process is referred to as *classical conditioning*. Thus, classical conditioning can be described as associating a previously neutral stimulus with an unconditioned stimulus to elicit a conditioned response. In other words, in classical conditioning a neutral stimulus (eg. a bell) that at first elicits no response becomes paired with an unconditioned

stimulus (eg. meat) and acquires the strength of that stimulus to prompt a response (such as salivation).

### Model of classical conditioning

#### (i) Pre-conditioning or learning situation

	unlearned		
US	→	UR	
Stimulus		Response	
(meat)		(salivation)	
CS	OR	NS	
Conditioned		Neutral	→ No response
Stimulus		Stimulus	
(bell)		(bell)	

#### (ii) During learning or conditioning

CS	plus	US	→ UR
(bell)		(meat)	(salivation)

#### (iii) Post learning or conditioning

	unlearned	
US	→	UR
CS	→	CR
	learned	

The UR and CR are very similar.

### Possible classroom applications

A child who is reluctant or anxious about going to school may have his attitude changed by a teacher who provides a caring and affectionate environment for the child when in school. The teacher's smile, hug or compliment may be seen as an unconditioned stimulus, which leads to the child's feelings of pleasure or the unconditioned response. The teacher who previously is a neutral stimulus and the school, the conditioned stimulus when associated with the unconditioned stimulus (ie.

favourable environment), soon come to prompt the same feelings of pleasure (now a conditioned response).

Similarly, if the child perceives the school or the teacher to be threatening, it will lead to dislike of the school by the child.

### Operant conditioning

Skinner proposed another class of behaviours called operant behaviours. These behaviours operated on the environment in the absence of unconditioned stimuli, like food. Here, Skinner focused on the relation between behaviour and its consequences. Skinner's operant conditioning experiments used a box that allowed experimenters to control the stimuli reaching an animal usually a rat. The box also contained apparatus for studying the behaviour of these animals. The box for rats, for instance, comprised a bar, easy for the rat to press, a food dispenser with pellets of food and a water dispenser. The rat could not hear or see anything outside the box, so all stimuli were controlled by the experimenter. In the earliest experiments involving Skinner boxes, the apparatus was set up so that if the rat pressed the bar, it received a food pellet. The experimenters found that, after a few accidental bar presses, the rat would start pressing the bar frequently, receiving a pellet each time. The rat's behaviour had been conditioned to increase the incidence of bar-pressing.

The inference from Skinner's experiment is that if an individual's behaviour is immediately followed by pleasurable consequences, the individual will engage in that behaviour more frequently. The use of pleasant and unpleasant consequences to change behaviour is often referred to as operant conditioning.

### Contiguity learning

Some learning theorists hold the view that simple contiguous association of a stimulus and a response can lead to a change in behaviour. The reason for this assertion is the belief that we learn things because events or stimuli occur close together in

space or time. In the school setting, contiguity learning may take the form of pairing, eg.  $2 + 2 = 4$ . While contiguity learning sometimes takes place in a single trial, in other cases repetition may be necessary

## REINFORCEMENT

Reinforcement is a key element in learning because behaviour that is followed by reinforcement is strengthened. A reinforcer is thus any event that can be shown to strengthen (that is increases the frequency of) a response. Reinforcers can be positive or negative and both can strengthen responses. Pleasurable consequences are generally called *reinforcers* while unpleasurable consequences are called *punishers*. However, it should be borne in mind that no reward can be assumed to be a reinforcer for everyone under all conditions.

### Types of reinforcers

Reinforcers may be divided into two major groups: primary and secondary. The *primary reinforcers* satisfy basic human needs such as food, water, security and so on. The *secondary reinforcers* acquire their value by being associated with primary reinforcers. For example, money or grades given to a pupil may not have value until the pupil is aware that the money can be spent to buy something the pupil needs or until the child is also aware that good grades will attract praise or affection from parents.

Secondary reinforcers can also be subdivided into three sections:

- (a) *Social reinforcers* — for example praise, smile, attention etc.
- (b) *Activity reinforcers* — the pupil is allowed access to pleasant activities or games.
- (c) *Token (symbolic) reinforcers* These are reinforcers which can be exchanged for other reinforcers — examples are money, grades, points etc.

Reinforcement may also be described as positive or negative. A positive reinforcer is any consequence given to strengthen behaviour. A negative reinforcer also strengthens behaviour because it is a kind of release or escape from an unpleasant situation. For instance, the pupil can be released from homework if there is a good performance in class. If the child views homework as an unpleasant task, release from it will be reinforcing.

Some of the reinforcement strategies that can be adopted in the classroom situation include clapping, giving a smile, writing 'Good job' on test performance, giving a token to a well behaved child at the end of a class, access to games after a good performance, or rewarding children for doing things they might not want to do with activities they do like — Premack's principle (ie. using favoured activities to reinforce participation in less desired activities).

Negative reinforcement is not the same thing as punishment. Punishment is using unpleasant consequences to weaken a behaviour. Consequences that are not reinforcing, that is, do not strengthen behaviour, are called punishers.

### Schedules of reinforcement

The effects of reinforcement on behaviour depend on many factors. One important factor, called schedule of reinforcement, is the frequency with which reinforcers are given and the amount of time that elapsed between one reinforcement and another and the predictability of reinforcement.

#### The fixed-ratio schedule (FR)

This is a schedule in which a reinforcer is given after a fixed number of behaviours. That is, the number of responses or behaviours determines when reinforcement is to occur. A pupil for instance can be allowed to go outside to play after completing five problems. The pupil is reinforced as soon as

he or she completes five problems. This is an example of FR five Schedule (five behaviours for one reinforcer).

Another form of fixed ratio schedule is where each behaviour is reinforced. This is known as continuous reinforcement or CRF or FRI because one behaviour is required for reinforcement.

#### Variable ratio schedule (VR)

A variable ratio schedule of reinforcement is dispensing reinforcement following an unpredictable number of correct responses or behaviours. That is, variable number of behaviours is required for reinforcement. Raising up hands by pupils in a class to answer a question is an example. They do not know when they would be called on to give the answer.

#### Fixed interval (FI)

In fixed interval schedules, reinforcement is available periodically. No matter the number of responses made by the pupil, he or she is not reinforced until a certain interval of time has gone by. An example is the final examination. A student may need to wait until end of term or session to be reinforced, after examinations, with good grades.

#### Variable interval (VI)

In a variable interval schedule, reinforcement is available at some times but not at others. There is no idea when behaviour will be reinforced. For example, when the teacher makes spot checks of students during an assignment, students cannot predict when the teacher will check.

### BEHAVIOUR MODIFICATION

Behavioural learning theories hold that behaviours that are reinforced will increase in frequency while behaviours that are not reinforced or punished will diminish in frequency. Persistence of behaviour also suggests that the particular

behaviour is being maintained by a reinforcer. Therefore, to reduce misbehaviour one might need to know the reinforcer which maintains the misbehaviour, or apply specific behaviour modification strategies.

Some students misbehave to get the teacher's attention or approval of peers. For effective classroom management, some behaviour modification methods may be necessary to control various misbehaviours exhibited by students. There are steps involved in the implementation of a behaviour modification programme.

1. The first step is to identify target behaviour and reinforcer. That is, the misbehaving pupil should be observed and a particular behaviour to be changed should be identified. The reinforcer maintaining the observed behaviour should also be identified. It is much easier to deal with one behaviour at a time or a very few related behaviours at a time.
2. The second step in the behaviour modification programme is to establish a baseline for the target behaviour. The pupil should be observed to determine the frequency of the target behaviour. The baseline data forms a base for later progress. To measure behaviour changes, records must be kept. Data collection is necessary to determine the current extent of behaviour and the success of attempts to change it.
3. The next step is to decide on the reinforcer and a criterion for reinforcement. The reinforcer to be used should be identified. There should be a plan of how to change the environment and to reduce the unwanted behaviour while promoting the desired behaviour. Some examples of classroom reinforcers are praise, privileges and tangible rewards. Teachers may employ praise to encourage a particular behaviour; sometimes a teacher may decide to ignore an inappropriate behaviour.



4. In a behaviour modification programme it may be necessary to decide on punishers and criteria for punishment, when the target behaviour does not respond to the designed reinforcement programme. A punisher is any unpleasant stimulus to the individual. In the school setting, examples of punishers include reprimands, sending out of class, detention or depriving students of recess. Corporal punishment is administered in some cases, but its effectiveness to prevent misbehaviour is in doubt.

Some of the principles to take into consideration for effective and humane use of punishment as suggested by O'Leary and O'Leary (1977) include:

- (a) Use punishment sparingly.
- (b) Make it clear to the child why he or she is being punished.
- (c) Provide the child with an alternative means of obtaining some positive reinforcement.
- (d) Reinforce the child for behaviours incompatible with those you wish to weaken.
- (e) Avoid physical punishment.
- (f) Avoid punishing while you are in a very angry or emotional state.
- (g) Punish when a behaviour starts rather than when it ends.

Time-out is a punisher that is employed in schools, by removing a student from a situation in which misbehaviour was being reinforced. The student concerned can be sent to an empty room, a separate part of the class or the headmaster's office. The student is thus removed from the attention of his or her classmates.

Home-based reinforcement strategies can also be encouraged. In this instance, the student's school behaviour is reported to parents, who supply rewards. Parents can give more effective rewards than the school. Parents could also

- be involved in giving punishers they consider effective. Teachers who use home-based reinforcement programmes may need to set up a daily report card so that a student's work and behaviour can be assessed and reported to the student's parents.
5. After the decision on punishers and the criteria for punishment, the next step in the behaviour modification programme is to observe the behaviour of the pupil and compare it to baseline. It is important to assess the effectiveness of the programme. Different reinforcers could be adopted if target behaviour is not improving.
  6. If the behaviour management programme is effective, the frequency of reinforcement should be reduced. Initially, reinforcers could be applied to every instance of appropriate behaviour, selective reinforcement may be adopted later.

#### PROBLEMS OF CURRENT CONCERN TO BOTSWANA

School children exhibit a variety of behaviours which may interfere with the objective of schooling. Some of these behaviours have adverse effect on the academic progress or health of the pupils in schools. Some of the problems of school children of concern to parents and teachers in Botswana include:

1. School failure.
2. AIDS amongst school children.
3. Teenage pregnancy.

#### School failure

The performance of pupils in schools is crucial to academic success. It is essential to be aware of and prevent factors which could lead to school failure among children. Students also need to be motivated to achieve in schools and to avoid failure.

Some children experience school failure because of perceptual and motor problems which they have. The background of some

children may predispose them to school failure because the children have not been prepared to understand or made comfortable in the classroom.

Children who experience school failure at an early age may also suffer severe damage to their feelings of self worth and may be socially isolated from peers. Some children may have *dyslexia* (meaning that they have trouble reading), others may have specific learning disabilities (SLD) or language/learning disabilities (L/LD) some children, early in life, also show a pattern of high activity level with behavior problems, sleep disorders and impulsivity. They also exhibit learning problems, attentional problems and low tolerance for frustration. Such children may be described as hyperkinetic or hyperactive or are even said to show a pattern of minimal brain dysfunction.

#### Class structure and attributions

Children when young usually think about their performance without thinking about how another child is doing, later they begin to compare their performance with that of others to determine how well they are doing. High ability children are likely to be comfortable while low ability children will feel otherwise especially when they fail after making a strong effort. Failing in a competitive setting could elicit a strong negative effect directed to oneself. The school teacher may want to encourage individual learning so that the child can assess his or her performance using personal guidelines.

*Co-operative learning* may also be adopted, where high ability students and low ability students of the group work together to achieve a grade, mark or reward. In unidimensional classrooms where all students are engaged in similar academic tasks most of the time, social comparisons appear common and the concept of ability is also narrowed compared to a multidimensional classroom — where students are often engaged at different academic and social tasks in which they can achieve. The multidimensional class structure thus allows different kinds of ability to be recognised.

School failure has caused a lot of concern for the affected children, teachers, parents and the government. In Botswana, the proportion of students moving from junior to senior secondary schools has been a subject of discussion. The percentage of students who move between these two levels has also been debated from time to time. One of the reasons usually given is the inadequate performance of students seeking admission to senior secondary schools.

Marope (1992) investigated the determinants of academic achievement of three levels of the junior secondary schools' organisation: the student, the classroom and the school. Two separate two-level hierarchical linear models (HLMs) were used to explain the variance in mathematics achievement. Some of the findings revealed that certain classroom practices could account for a gender gap, for instance, in mathematics achievement.

School failure affects not only the students, the parents are involved and the community itself could have its share as a result of frustration created by the failure. It may also lead to other chains of reactions if adequate plans or alternatives are not provided for the pupils adversely affected.

It is important for all concerned with learning to be aware of factors that affect academic achievement which could be any or a combination of the following:

- (a) factors within the child (organismic)
- (b) factors not within the child.

Factors within the child could be a combination of the following: intellectual ability, personal defects, memory fault, personality factors, social psychological factors and so on. Factors that lie outside the child may include: parental influence, the influence of the teacher, the examination itself in terms of the preparedness of the student, the level of difficulty of the examination, the conditions under which the examination was conducted, how the examination was graded in terms of expected standards of success.

Many factors affect school failure and the school should not be quick to see the student as the culprit. Students should be encouraged and motivated to succeed in school as the consequences of failure will not be borne only by the child.

### AIDS amongst school children

Acquired Immune Deficiency Syndrome (AIDS) is a deadly disease spreading at an alarming rate. The disease is also regarded as a very serious health problem by many nations. Discussions on AIDS usually focus on adults or men or women in their prime of life. The discussion on AIDS and the consequences for school children is usually not given the same recognition compared to adults. However, it is a fact that a substantial number of school children now may be regarded as adolescents with rapid development including secondary sexual characteristics. The sexual behaviour of some of the school children is such that they can be described as being sexually active.

Merson (1991) remarked that the World Health Organisation (WHO) has estimated that during the 1990s, 10 million children worldwide will be orphaned as their mothers die of AIDS. There is implication here for the survival of the children so orphaned.

In a WHO (1991) publication the world case total on AIDS has risen from 203 599 in December 1989 to 314 611 by December 1990, an increase of 5 per cent. Data available from industrialised countries suggest that in the 1990s, AIDS and other HIV-related diseases will become an important cause of morbidity and mortality among young adults living in many large urban centres.

The Ministry of Health's *Gaborone AIDS Update* of June 1992 noted that the first AIDS case was reported in Botswana in 1985. The cumulative number of AIDS cases reported as of June 1992 was 353 of which 190 were females. It is noteworthy that the ministries, various associations and non-governmental organisations are showing keen interest in the problems of AIDS in

Botswana. Specifically, the National AIDS Control Programme (Ministry of Health) has produced documents on AIDS prevention and care. Some staff in the Department of Nursing Education and Campus Clinic at the University of Botswana have shown keen interest in AIDS education and prevention. Social Work Students Against AIDS (SWSAA), a voluntary group of concerned social work students and the Department of Social Work, University of Botswana have also shown interest in the problems of AIDS within the University student population. The University of Botswana has also established a Counselling Centre which would also provide counselling to students in various aspects of life including problems related to AIDS.

The concerted efforts of individuals and organisations interested in problems of AIDS led to the International Conference on Research on AIDS Prevention in Southern Africa held in Botswana in August 1993. There is the recognition of the need for AIDS education and prevention in Botswana.

### Teenage pregnancy

Pregnancy and child birth are increasing among all groups of female adolescents in various countries, and Botswana is not an exception. Adolescent girls engage in sex and in many cases have children. Adolescents who cannot continue their schooling or get jobs because of their early childbearing, may perpetuate the cycle of poverty more especially if the adolescent mothers themselves are from poor family backgrounds.

Many organisations and associations have shown interest in the prevention of teenage pregnancy in Botswana, through seminars, dissemination of information and counselling. The National Family Life Education Committee (NFLE) comprises government departments and non-governmental organisations involved with health and education of youth which include the Ministry of Education, Ministry of Labour and Home Affairs, Botswana Family Welfare Association (BOFWA), YWCA, Red Cross and the University of Botswana. NFLE provides, among other things, Family Life Education for teenagers.

The Botswana Family Welfare Association, for instance, has a youth counselling centre which among other things, provides opportunities for youths to discuss problems related to their emotional, sexual and psychological development.

A pamphlet (undated) produced by the Family Health Division of the Ministry of Health titled, *Which is Your Goal Certificate or Pregnancy?* noted that teenage pregnancies are increasing in Botswana. The following observations were also made that:

- (i) Between 1980 and 1984 at least 1 205 students dropped out of school because of pregnancy.
- (ii) In 1971, 15 out of every 100 teenage girls were mothers. In 1981, 20 out of every 100 teenage girls were mothers. The Family Health Survey showed that by 1984, 23 out of every 100 teenage girls were mothers.
- (iii) About 5 600 teenage girls fall pregnant every year. Research shows that for most of these girls the pregnancy was accidental.

There is apparent danger for the teenage mother and the baby of the teenager. Teenagers, their parents, the school, various organisations and the community at large must all co-operate to curb the problem of teenage pregnancy.

### RELEVANCE OF EDUCATIONAL PSYCHOLOGY TO TEACHING

Many factors affect learning in the school, the disposition of the learner, the instruction itself, and the teacher and his or her classroom environment are some of the factors which are crucial in learning outcomes. The teacher must display certain qualities in the classroom for effective learning to take place. The effective teacher is the one who gets the best out of his or her students. He or she must also spend time trying to understand the students, must be able to make the students feel worthwhile after a learning experience.

The teacher should make learning seem easy by putting things in ways the students would understand. The teacher must be enthusiastic about what he or she teaches, with a sense of humour, fairness and with a sense of responsibility. The teacher must also be well organised and he or she must also encourage responsibility for learning among the students.

Many problems are encountered during teaching and the learning process. Educational psychology enables teachers and all educators to deal with problems that may arise in the process of teaching. In some cases teachers with a knowledge of educational psychology know what to do in the process of learning to solve problems associated with learning.

Teachers may need to utilise their knowledge from educational psychology with what is good for the student in the classroom, how the student can learn best, what is good for the school and the community at large and the relationship between education and government.

Knowledge of educational psychology will make the classroom teachers develop awareness of many aspects of educational practice. It helps the teacher to understand better important ideas about learning, educational administration and curriculum development. The teacher, through educational psychology, is able to deal with problems that arise in teaching.

Teaching usually begins with the purpose or objective that the students should be assisted to achieve. The differences among students, that is their characteristics, are also taken into consideration in teaching. The teacher must also ensure that his or her teaching has taken into consideration how students learn and how they are motivated. Appropriate teaching methods must be utilised and the teacher must be able to evaluate what and how well the students have learned.

Educational psychology also involves research and investigation of effective teaching methods and practice and learning. Educational psychology assists the teacher to know how children learn at various levels with consideration of develop-

mental aspects of the learner. It involves what to teach the students and how to teach them and how to arrange the classroom for effective instruction.

### LEARNING HOW TO LEARN

The ideas and theories guiding research on learning and memory have changed in recent times. Earlier studies focused on learning in terms of associations or connections. Recent studies on human learning have placed more emphasis on memory.

Learning involves information processing and memory. An understanding of how people process information and acquire new knowledge and skills is essential in the practice of instruction. Teaching must also take into account the information processing capacities of students and their limitations.

#### Sensory register

Information constantly reaches us through our senses. The first component of the memory system that the incoming information from the environment meets is the sensory register. The information or sensory input is held for a very brief time (for several seconds at most) in the sensory register. The sensory register is associated with the sensory channels such as vision, hearing, touch etc.

#### Perception

As soon as the stimuli are received by the senses, the mind immediately begins to work on them. Information that is to be remembered must first reach a person's senses, then be attended to and transferred from the sensory register to the short-term memory and then proceed for transfer to long-term memory.

#### Attention

This is the process of focusing on certain stimuli while ignoring others. Information from the sensory register after being

attended to is passed into the short-term store where some of the information is processed in what is called a rehearsal buffer.

In the classroom setting, the teacher must make students pay attention and at the same time sustain their attention for effective learning. The teacher can also adopt various strategies to gain the attention of the students.

#### Rehearsal

Rehearsal means that attention is focused on an item of information, perhaps it is repeated over and over or perhaps it is processed in some way to link it up with other information which has already been stored in the memory.

Information processed in the rehearsal buffer may be passed along to the long-term store (memory). Information not so processed is lost or forgotten. Rehearsal is important in learning because the longer an item remains in the short-term memory, the greater the chance that it will be transferred to long-term memory.

#### Organisation

When items of information are placed in the long-term store, they are put into organised categories where they reside for days, months, years or a lifetime. In the classroom situation, materials that are well organised are much easier to learn and remember than materials that are poorly organised. Materials must be well organised when a complex concept is to be taught. Hierarchical organisation in which specific issues are grouped under more general topics, seems particularly helpful for student understanding (Van Patten et al, 1986). For example several items in a shopping list that would be difficult to remember in a random order can be organised into a smaller number of familiar categories making the list easier to recall. The list for instance, could be arranged under categories such as food, beverage, dessert etc.

### Elaboration

Reigeluth (1983) defined elaboration as the process of thinking about material to be learned in a way that connects the material to information or ideas already in the learner's mind. Elaboration is a means of 'anchoring' new ideas in existing schemata (mental networks of related concepts) that influence understanding of new information. The principle that elaborated information is easier to understand and remember can be applied to help students comprehend a lesson.

### Comprehension

This may be explained as the ability to receive what is being communicated and make use of it without necessarily relating it to other materials or seeing its implications. This is what we mean when we say we 'understand' something. Comprehension of information encourages its remembrance.

### Retrieval

Storing information is of little use unless we can get it back or retrieve it later. Retrieving information stored in the long-term memory is aided by reminders or retrieval cues which direct the search through long-term memory.

Anderson and Bower (1972) remarked that an item to be remembered is given a 'tag' at the time it is encoded for storage at an appropriate place in long-term memory. A cue or reminder thus starts the retrieval process. If the search is successful we will find the tagged word and recognise it.

Some theorists have divided long-term memory into at least three parts:

- (a) *episodic memory*: a part of long-term memory that stores images of our personal experiences;
- (b) *semantic memory*: this is the part of memory that stores facts and general knowledge; and

- (c) *procedural memory*: this is a part of long-term memory that stores information about how to do things.

Memory is central to learning in the classroom as it helps the student to study effectively.

### INDIVIDUAL DIFFERENCES

Pupils in schools are different in many ways, they may exhibit different skills and learning rates in the classroom and their personality traits and ability levels may also differ.

#### Expression of differences

Students in any given class differ in a number of ways, they come from various socio-economic backgrounds, some differences may also be ethnic, religious or racial. The differences may also be in cognitive abilities and learning rates which are of great concern to educators. Some children also have physical problems which could affect their rate of learning. Some of the impairments could be hearing and visual, while other children may also exhibit disorders such as neurological impairments or congenital problems.

Differences in prior learning can also create problems in instruction. The teacher should attempt to find out how much the students know or understand about a particular topic to be learnt. Differences amongst students may also be in their learning styles. That is, the students exhibit differences in their approach to learning tasks and the processing of information. Witkin et al (1977) noted that some individuals who are regarded as field dependent, tend to see patterns as a whole and have difficulty separating out specific aspects of a situation or pattern, while field-independent people are more able to see the parts that make up a large pattern. Field-independent subjects have been observed (by Shuell, 1981; Witkin and Goodenough, 1981) to do well with numbers, science and problem solving tasks. Field-dependent subjects have been observed to be better at reading such as social information notably conversations and

relationships, prefer subjects such as history and literature and work best in groups.

Learners also differ in impulsivity and reflectivity. That is, the degree to which tasks are completed, slowly with high emphasis on accuracy (reflectivity) as opposed to speed (impulsivity).

### Techniques of dealing with differences

The school and the teacher must take into consideration student differences in order to make learning meaningful not just to a few students but to all the students in the class. Making instruction accommodate student differences has been the concern of teachers and of policies formulated by ministries of education and governments.

### Handling differences in prior learning

When students exhibit differences in prior learning, or have different levels of skills, these distinctions must be taken into consideration. Lessons should be presented in such a way as to cater for students at different levels and to bring the weaker students to more or less the same level as the stronger students.

### Learning rate

The teacher has to be patient with slow learners as some students learn more easily and rapidly than others. Some students have the motivation to learn a particular subject or topic better than others.

### Learning style of student

Some students learn better when things are written down because they are visual learners. Such learners could be encouraged to read. Some learn better by hearing if they are auditory learners. The teacher should make instructions available in verbal and written form to cater for the needs of the students. Verbal presentations can be reinforced with visual

cues such as writing on the chalkboard and showing pictures or diagrams.

### The impulsive and the reflective learner

In the learning situation, the impulsive students work and make decisions quickly and finish assignments early while the reflective students concentrate on accuracy.

Meichenbaum (1977) suggested that impulsive students can be taught to be reflective by means of self-instruction training by talking to themselves while they attempt to pace themselves appropriately during work and reinforcing themselves for step-by-step progress.

### Differences in ability of students

Differences in ability among students may be accommodated by grouping them according to ability. Various ability grouping methods may be adopted such as:

- (a) **Between-class ability grouping**  
A system in which students are assigned to classes according to their achievement and abilities.
- (b) **Regrouping**  
A method of ability grouping in which students in mixed ability classes are assigned to reading or mathematics class on the basis of their performance levels.
- (c) **Within-class ability grouping**  
A system of dividing a class of students into two or more ability groups for instruction in certain subjects, to take care of student differences.

### Provision of special education

The teacher and the school can also provide programmes that cater for the needs of students with mental, emotional or physical handicaps. While an individual education programme which is designed to meet the needs of the handicapped child is

now in practice, mainstreaming or the placement of handicapped students with non handicapped peers in regular classes for all or part of the school day, is also practised.

Students with mild vision or hearing problems may be seated at the front of the class. Instructional aides, tutors or parent volunteers may be employed for exceptional children.

For effective learning to take place the teacher must recognise differences among students and take appropriate steps to accommodate the identified differences.

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