

Professional Development Strand

Unit 2: Human Development

## **Module 2.2 Educational Psychology**



**Lecturer Support Material**

## Acknowledgements

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St Benedicts Primary Teachers College  
Kabaleo Primary Teachers College  
PNGEI  
Gaulim Primary Teachers College  
Dauli Primary Teachers College.

Layout and diagrams supported by Nick Lauer.



*Primary and Secondary Teacher Education Project*

Australian Agency for International Development (AusAID)  
GRM International

*Papua New Guinea-Australia Development Cooperation Program*

## Unit outline

Unit	#	Modules
Unit 2	2.1	Child Development
	2.2	Educational Psychology

## Icons



Read or Research



Write or Summarise



Activity or Discussion



Suggestions for lecturers



Comments

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# Module 2.2 Educational Psychology

## Rationale Introduction

This guide provides additional ideas for teaching and assessing Module 2.2. *Educational Psychology*.

Please take note of the following:

- It is important to read through the module first, to decide what materials you will use, and what tasks and activities you will set for the students. It is also important to see how this module fits within the complete unit.
- It will be necessary to develop a course overview and determine topics to be presented which will take account of the time allocation given to this module.
- The material is written as a resource for the teaching of this module.
- Do not expect students to work through the total module alone. There may be too much material and they will need assistance in determining the tasks required.
- The activities: Many of the activities have a number of questions to discuss and tasks to do. They are included to provide some ideas and stimulus, not necessarily to complete every part of each activity.
- The activities provide a focus for learning, and some may be suitable for developing into assessment tasks, but the activities are not written to be used as the assessment program. Ideas for assessment tasks are provided in the unit guide support material.
- Suggested time allocations are provided to give some idea of how this module fits in with the others in this unit. Lecturers have the flexibility to select material and use it in a way that will fit within the lecture program.
- The Lecturer Support Material is based on the Student Support material, with additional notes in text boxes containing ideas for further exploration of topics.
- Additional readings, where included as an appendix, are included as additional information for lecturers. These may be photocopied for students where appropriate.

## Rationale

This module is one of two in a two-credit point unit. The recommended time allocation for this module is approximately twelve hours of lectures. The actual break-up of topics and time allocation is flexible, and to be decided upon by the individual lecturer.

The preceding module in this unit is:

### **Module 2.1 Child Development.**

The study of Educational Psychology provides a theoretical basis upon which to build understandings of learners and learning. Understanding stages of learning development, the different types and categories of learning, and what can be expected during different stages of development will assist teachers to plan appropriate programs for the classroom.

It is important that students make the link between the theories of learning and their application and relevance in the classroom.

## Objectives

By the end of this module students will be able to

- define learning and explore how people learn.
- recognise that individuals have different learning styles.
- recognise that cultural context influences types of learning.
- describe the characteristics of a number of basic learning approaches. (behaviourist, cognitive) and their application to teaching and learning.
- describe the characteristics of reinforcement and its application to teaching and learning.
- describe the stages of cognitive development and their application to teaching and learning.
- examine and describe a number of other learning theories (constructivism, sociocultural, gender)
- explain the implications for teachers to cater for individual differences and needs.
- discuss the role of motivation in the classroom.

## Topics

- Learning and learning styles
- Behaviourism
- Classical conditioning
- Operant conditioning
- Reinforcement
- Stages of cognitive development
- Constructivism
- Sociocultural theory
- Gender theory
- Motivation

## How to use this material

This module is written as a series of topics, identified in the table of contents, and by their large subheadings. Each topic includes some readings and activities to complete.

It is the lecturer's responsibility to develop a course overview, according to the credit point loading and available time within the semester for each module. As this will vary between colleges running semester programs and those running trimester programs, lecturers will need to select topics which are most relevant to the needs of their students.

## **Assessment**

Assessment tasks should be developed at the unit level, recognising the development of knowledge, skills and attitudes across the three modules that make up this unit.

The number of assessment tasks will be determined by the credit point loading given to the unit. See the unit guide for suggestions.

### ***A Note about the readings***

Due to the theoretical nature of this subject, there are quite a number of readings included in this module. Students should be supported wherever possible to gain meaning from the required readings. Lecturers should use a variety of strategies such as graphic organisers, interactive reading strategies and focused group discussion to assist the students with their understanding. See the unit guide for further ideas.

Students should be encouraged to keep a glossary of terms, as there are quite a number of terms specific to the study of developmental growth and psychology.

### ***References***

Whilst all the readings required are contained in these resource materials, additional references used in the writing of this module are included.

Banks, S.R. and Thompson, C, L. (1995) *Educational Psychology for Teachers in Training*. West Publishing Company. NY.

Barry, K and King, I. ( 1999) *Beginning Teaching and Beyond.*( 3<sup>rd</sup> ed) Social Science Press, Australia.

Berk, L.E. (2000) *Child Development ( Fifth Edition)* Allen and Bacon. Boston. USA

Biggs, J. B. (ed) (1991). *Teaching for Learning: The View from Cognitive Psychology*. ACER: Australia.

Bleus, A. V. (1989). *Psychology for Teachers in the South Pacific*. Goroka Teachers College: PNG.

Briggs, F. and Potter, G. (1999). *The Early Years of School; Teaching and Learning (3<sup>rd</sup> Ed)*. Longman: Australia.

Lambert, B. and Clyde, M.(2000). *Re Thinking Early Childhood Theory and Practice*. Social Science Press: Australia.

Mariko, S. ( 2001) *Human Development*. Professional Development Strand. Madang Teachers College.

# Educational Psychology

*Adapted from Barry, K & King, L. (1998) 'Beginning Teaching and Beyond'. Social Science Press.*

## **What is Educational Psychology?**



In order to define educational psychology we need to define education and psychology.

- Education is defined as the profession that develops, applies and researches methods of teaching and learning in schools
- Psychology is defined as the profession that studies human behaviour.

Therefore, educational psychology deals with a range of human behaviour involved in the educational process including human development, learning, memory, motivation and the evaluation of learning. (Banks, S & Thompson, C, 1995, p.6)

The central role of the teacher is the facilitation of learning. Effective teaching is about helping students to learn, so they become self directed, life long learners. In order to do this, teachers need a sound understanding of how students develop and learn. Educational psychology helps teachers develop that understanding.

There are many theories about learning. Most are soundly based on research, but each explains different sorts of learning. There is no one theory that everyone agrees upon because the human mind is so complex that scientists and psychologists are still finding out about how it works. Still, we do know enough about learning to develop some firm theories about how students learn.

## **What is learning?**

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Encourage students to reflect on what they understand learning to be. Develop a definition as a class, prior to reading the definitions below.

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Learning usually involves a change in behaviour (knowledge, skill, attitude) which lasts for some time and is the result of experience.

Shuell (in Barry & King, 1998 p.18) defines learning in the following way:

"Learning is an enduring change in behaviour, or in the capacity to behave in a given fashion, which results from practice or other forms of experience."

This definition can be illustrated through the example of learning to drive a car. In learning to drive, our capacity to do so starts quite early in that if we live in a city, or large town, we learn about road rules and being a pedestrian. We watch others drive and learn about the mechanics of driving. This knowledge cannot be demonstrated until we reach the legal age for learning to drive. Once we have reached the legal age, the process of getting a licence begins and we must learn the rules of the road in order to pass a driving test. We must also acquire the skill of driving, that is, demonstrating competence at the wheel of a car. When the driving test has been successfully completed, it can then be said that we have learnt to drive.

Learning has clearly taken place for there has been a change in behaviour from non-driver to driver. This change has been the result of experience, and with continuing practice, will last for some time. Learning to drive was made possible through new and previous learning and skills that were developed, extended and applied in new ways.

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## 2.2 Activity 1

*Think of something you have learnt which involved previous learning, developing, extending and applying your learning in new ways. Try to break the skill down into the steps you followed to achieve your learning.*

*Eg: learning a second language, learning a craft, learning to cook.*

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## ***How do people learn?***

People learn best when they can personalise their learning. This module will investigate a number of learning theories and will ask you to develop your own theory about how you prefer to learn.

Many educators believe that people learn best when they maximise the use of all their senses: hearing, seeing, touching, tasting, and smelling.

Some people learn best when they can see and touch the item they are studying. Others prefer interactive learning situations where they work co-operatively with others. Many people prefer a one-on-one teaching-learning situation, when the learning is personalised for the individual. Some are independent learners, preferring to work alone and find information for themselves from books and manuals.

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 **2.2 Activity 2**

*Complete the following activity to determine your preferred learning style.*

*Suppose you have just received a brand new, latest model stereo, with CD and tape facilities. You have a choice of ways to learn about it. Rank the following learning alternatives by giving your first choice a rank of one, down to your last choice, which would receive a rank of nine.*

- 1. Reading a book about stereos*
- 2. Watching a videotape which shows the stereo's functions and operations*
- 3. Listening to an audiotape which tells about the stereo's functions and operations.*
- 4. Reading the owners manual containing detailed pictures and diagrams of how to use it*
- 5. Viewing a live demonstration*
- 6. Participating in the live demonstration*
- 7. Working one-on-one with another person who is familiar with the stereo*
- 8. Working in a group of four people with a person who is familiar with the stereo.*
- 9. Teaching what you have learned to another person*

*After ranking the nine ways to learn about your new CD / tape player, study your top five selections to see if you can recognise a pattern regarding your individual learning style. You may prefer to rely on auditory, visual, tactile or kinaesthetic modes. You may find that you like a combination of all four modalities in which you involve ears, eyes, hands and participatory activities in your learning.*

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 **2.2 Activity 3**

- 1. From your diagnosis of your own personal learning style, write a short note to your lecturer describing how your class should be organised to accommodate your learning style. In other words, how much of the class should be 'tell me', 'show me' and /or 'let me do it?'*
- 2. Look at the diagram below. Decide where your learning style fits on this model. Why is the diagram cone shaped?*

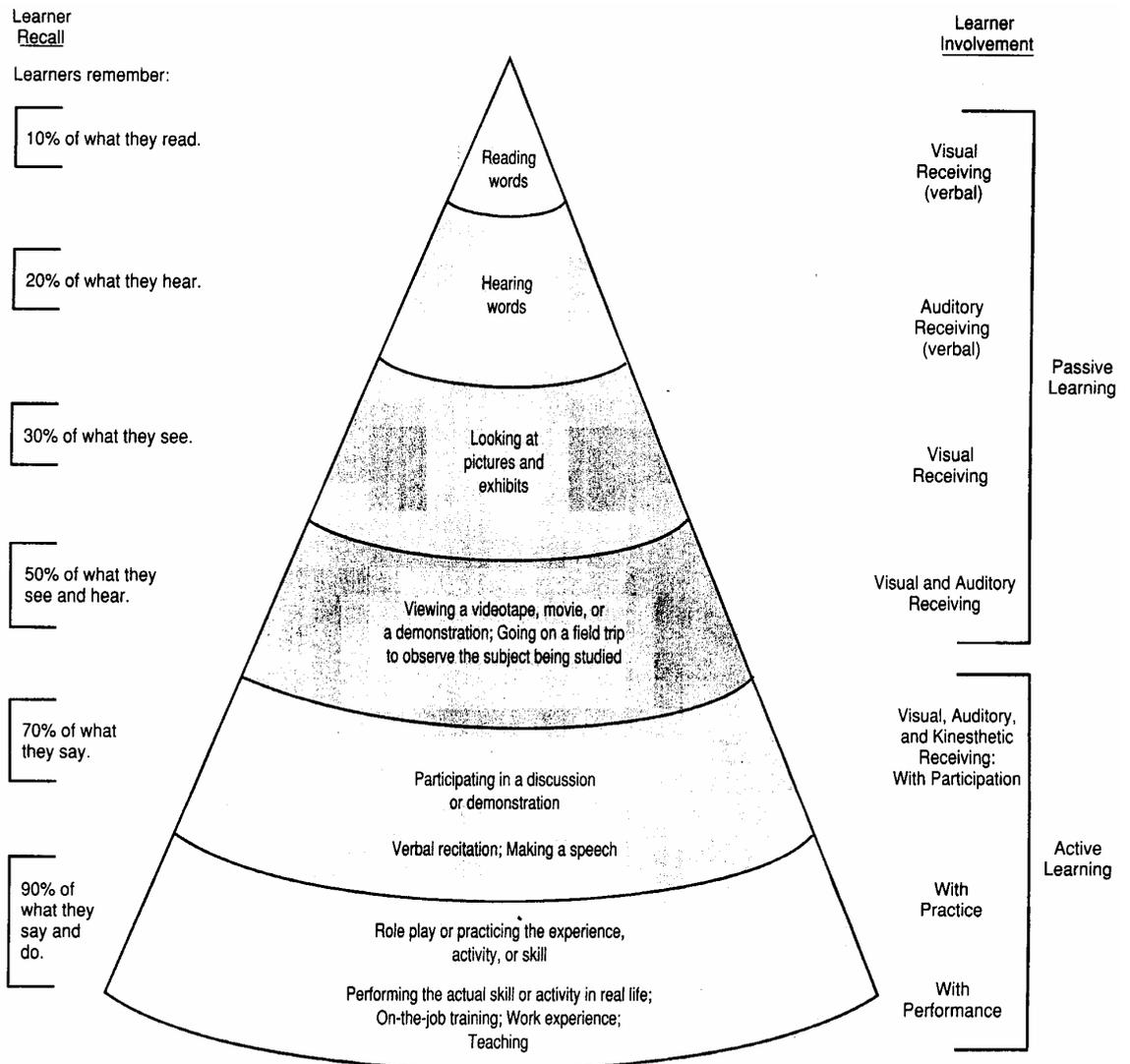


Figure 1. *Experiential Learning Cone* from Banks & Thompson, 'Educational Psychology for Teachers in Training'. West Publishing, NY.



Assist students with interpreting the diagram above. Encourage them to place themselves somewhere in the cone in terms of their learning.

Learning is a continuous process that goes on all day long, often in an unorganised and uncontrolled manner. Learning about learning should help teachers find ways to organise and direct learning into productive channels without stifling creativity.

The question of how people learn divides learning theorists into one of three major groups: **behavioural** (classic and operant conditioning), **cognitive** and **eclectic** (combinations of behavioural and cognitive theories).

The study of learning has created theories which are directly opposed to one another. The **behaviourists** and the **cognitivists** have opposite and extreme views, but just as neither group is completely right, each group can be seen to be partly right.

## Behaviourism

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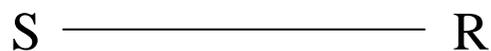
**i** Ask the students to complete the reading section using an interactive reading strategy. 'Summarising Pairs' may be a suitable activity to support understanding. See the unit guide for further information.

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The behaviourists believe that the only behaviour worth describing is that which is **measurable**. If we are able to measure it, we first must be able to observe it. The behaviour must have a cause. Something which leads to a behaviour occurring is referred to as a **stimulus**. A **response** is the behaviour that occurs as a reaction to the stimulus.

The behaviourist model can be represented in this way:



A simple example of this is if you cross one leg over the other, and someone taps you at the base of the kneecap. Your leg will jerk upwards. This is a very basic behaviour, over which you have no control. It occurs automatically, so it is called a **reflex**. The tap on the kneecap is the stimulus and the knee-jerk reaction is the **response**.

### ***Classical Conditioning***

Ivan Pavlov's (1849 - 1936) contribution to education and learning theory came as a by-product from his research on the function of various digestive fluids. While attempting to collect saliva from dogs for his research, he noted that the dogs salivated when they were fed and when they heard any noise, such as the click of opening the gate to the dog pen, that preceded, or came before their feeding. His observation led to further experiments with his classical or respondent conditioning model.

Pavlov's model describing the steps in classical conditioning are illustrated below. This diagram is taken from Bleus (1989) p.129

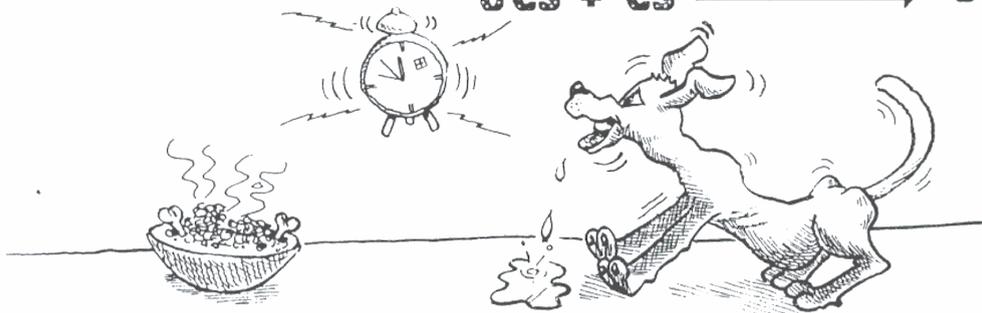
## CLASSICAL CONDITIONING

**UCS** → **UCR**



STEP ONE: The unconditioned stimulus (food) is presented to the animal and produces a reflex or unconditioned response (drooling).

**UCS + CS** → **UCR**



STEP TWO: The unconditioned stimulus (food) is presented at the same time as the conditioned stimulus (noise). The response continues to be produced to the food, but the sound is beginning to be associated. After several pairings -

**CS** → **CR**



The conditioned stimulus presented alone causes the animal to drool. Because this is a learned response, the response is now called a conditioned response.

### Classical conditioning in the classroom

Children's classroom behaviours can sometimes be explained by classical conditioning. The student who has a particular love of a subject, for example, may have developed this simply because that subject was always time-tabled right after lunch time. Perhaps the student had a kind teacher, and the subject taught became associated with the feelings of pleasure the teacher gave.

Much undesirable behaviour can also be a result of classical conditioning. The child who dislikes mathematics may be simply showing behaviour conditioned by an unpleasant teacher who shamed or frightened the child. Fear of attending school can result from a simple response generalisation, such as being punished for being late.

## Operant conditioning

Not many teachers are likely to deliberately use classical conditioning in the classroom, however most teachers use some form of **operant conditioning**.

Like classical conditioning, operant conditioning is an extremely powerful shaper of behaviour and much has been learnt about this from studies of animals.

Professor Skinner, the main proponent of operant conditioning techniques, used to demonstrate this method of learning by releasing two pigeons onto a table in front of him and place a ping-pong ball between them. As his lecture progressed, he would systematically reward behaviours that he wanted with grains of birdseed. By the end of the lesson, the two pigeons would be playing ping-pong, batting the ball back and forth with their beaks.

Operant conditioning is based upon a reward, which is called a **reinforcement**. Operant conditioning teaches a set of behaviours through rewarding after the behaviour has been performed.

Every time teachers say “good work” and put a tick in a child's workbook, they are using operant conditioning techniques.

The steps involved in operant conditioning are shown in the diagram below.

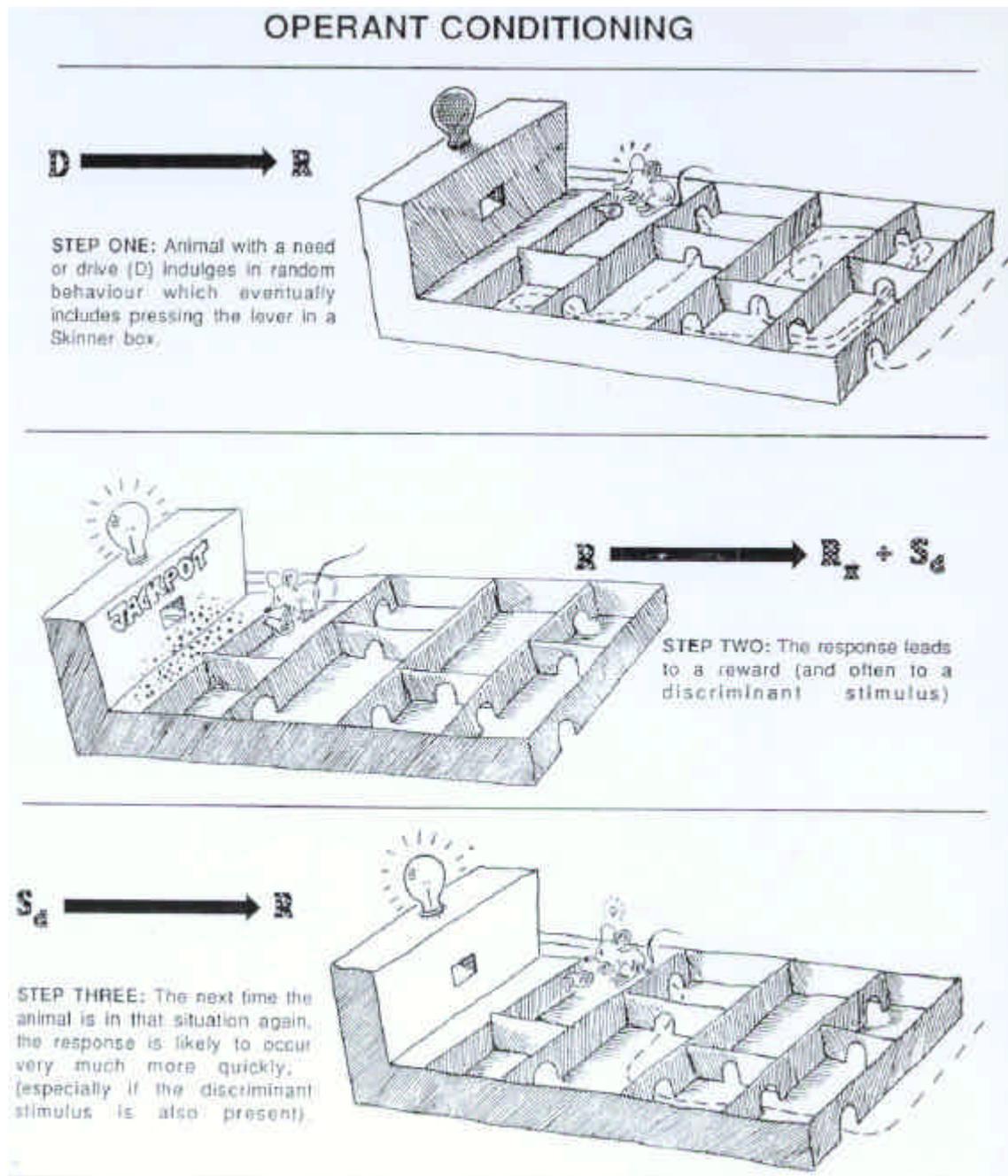


Figure 2: Classical Conditioning: from Bleus, A. (1989). 'Psychology for Teachers in the South Pacific'. Goroka Teachers College. p. 129

There is an important distinction to be made between classical and operant conditioning. Classical conditioning is concerned with existing involuntary responses. In operant conditioning, the behaviour must be displayed first, then rewarded. The behaviour is voluntary, so the person **operates** on the environment to produce the reward. This is where the name “operant conditioning” comes from.

Sometimes if the desired behaviour is slow in forming in the first instance, a technique called **shaping** is used. Shaping rewards **successive approximations** of the behaviour, until the desired response is produced. At first, behaviour close to, but not the same as the desired behaviour is rewarded. Then rewards come only as the behaviour gets more and more like what is wanted. Then eventually, only the desired behaviour is rewarded.

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## 2.2 Activity 4

1. Research and find another example for both classical and operant conditioning.

2. Can you think of occasions when you have learned or performed a task because of rewards? Discuss with your group.

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## Types of reinforcement

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 Students should seek to observe examples of reinforcement in the classroom, and practice reinforcement schedules and skills with each other in micro-teaching and peer teaching situations

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*From Bleus, A. (1989). 'Psychology for Teachers in the South Pacific.' Goroka Teachers College.*



There are two main types of reinforcement used to shape behaviour; **positive** and **negative** reinforcement.

Whereas positive reinforcement refers to a desirable or pleasant event, **negative reinforcement refers to an undesirable or unpleasant event**. The behaviour is strengthened if it leads to the **withdrawal** of the unpleasant event. For example, if the rat in the Skinner box is subjected to a mild, but unpleasant electric shock coming through the floor, the rat may run around in a frenzy and may eventually press the lever in the box. If instead of food dropping down, the lever leads to the electric current being turned off. Next time this situation occurs, the rat will be likely to press the lever more quickly.

Negative reinforcement is not the same as **punishment**. Punishment is when the **consequences** of a behaviour are **unpleasant**. For example, if the electric current was **turned on** when the rat pressed the lever, the rat would be punished for lever pressing.

Reinforcement makes a behaviour more likely to occur, so it must be **pleasant**. Getting fed (positive reinforcement) is pleasant. Turning off the electric current (negative reinforcement) is very pleasant. Punishment, on the other hand, makes a behaviour **less likely** to occur, so it must be **unpleasant**. Giving yourself an electric shock when you press down on a lever is not pleasant, and you would not be in a hurry to do it again if you can help it.

Even if both negative reinforcement and punishment are nasty experiences, **when they occur in relation to the behaviour** is the key.

- Punishment is started by undesirable behaviour
- Negative reinforcement is stopped by desirable behaviour

**Negative reinforcement is for building behaviour; punishment is for getting rid of it.**

## Schedules of reinforcement

Reinforcement may also be defined according to the **timing** with which it is used.

- **Continuous reinforcement** is when the reinforcer is applied every time the behaviour appears.
- **Intermittent reinforcement** is applied at various intervals, such as every second or fifth time the behaviour appears.

**Continuous reinforcement is effective for** establishing a behaviour. For example, if you were teaching your dog to sit, to begin with you would give a reward (some food) every time the dog sits down when you give the command. Once the behaviour has been established, that is, the dog is sitting on command, **intermittent reinforcement** would be used to maintain the behaviour. It is better to reinforce the dog only every now and then for doing so. This way the behaviour will stay much stronger and will be less likely to die out.

**Generalised reinforcers** are those that have been paired with primary reinforcers so often that they have become reinforcing in a number of situations and for a number of different behaviours. These include praise, prestige, money and power. They are learned rather than inbuilt and for most adults they are amongst the most powerful motivators of behaviour.

## Reinforcement in the classroom

Whenever operant conditioning is used **systematically** it is called **behaviour modification**.

There are a number of techniques that teachers can use systematically to change children's behaviour in the classroom.

The teacher should try to determine what is a meaningful reinforcer for each child.

Of all the possible reinforcers, the one most useful of all for school children is the social reinforcer of **attention**. Children seek attention, especially from important adults in their lives. For most children, the teacher is very important.

Every time the child performs a desirable behaviour and is rewarded by a "Well done" from the teacher, that behaviour is likely to increase.

Every time the child is behaving inappropriately and the teacher pays attention to the inappropriate behaviour, that behaviour is likely to **increase**.

Teachers need to be selective about the attention they give to children. It may be far better to ignore bad behaviour and only pay attention to the good behaviour where possible.

Social approval is a very strong motive and should be used wisely. If the only time a teacher pays attention to a child is when they are misbehaving, even the punishment can be reinforcing, as they have gain the teacher' attention.

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## 2.2 Activity 5

1. *In a small group, role play a classroom situation where positive reinforcement is being used. Decide on a reinforcement schedule and the behaviour to be reinforced. ( eg changing the behaviour of a group member who is calling out repeatedly).*
2. *Carry out an observation of a teacher in the demonstration school .Record examples of positive and negative reinforcement over a ten minute period in the classroom.*

During your next practical teaching session, plan to use positive reinforcement to bring about a change in behaviour.

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## **Cognitive Development**

In the area of cognitive development two important theories are those of **Jean Piaget** (1896 - 1980) and **Lev Vygotsky** (1896 - 1934)

### ***Piaget's theory***

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 Ensure students are supported in this reading. Use an interactive reading strategy, (see unit guide) and follow up with a graphic organiser to assist understanding (e.g. information presented as a diagram or chart)

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*From Bleus, A. (1989). 'Psychology for Teachers in the South Pacific.'  
Goroka Teachers College.*

Piaget's theory emphasises that the learner plays a very active role in adapting to the environment. This adaptation begins at birth as a result of natural biological development and experience with the world. The child develops/constructs *schemes* or *cognitive structures* for acting, thinking and knowing the world. These schemes or cognitive structures constantly

change and expand as the child actively makes sense of the world. These structures become increasingly sophisticated with age.

Piaget's theory is a process theory. This means it should help us understand the thinking of children everywhere, no matter what environment or culture they grow up in. It is staged theory, based on qualitative changes in the nature of children's thinking as they grow older. Piaget argues that children's thinking changes not just in amount but also in the nature or quality as they mature. Because the theory allows for the different experiences provided by different cultures, the theory also permits for differences in the **content** of children's thinking, even when children are at the same stage of cognitive (thinking) development.

Below is an example to clarify the difference between cultural context, universal processes and behaviour, and how these affect children's thinking.

Children in all cultures develop the ability during early childhood to internalise their thoughts and to imagine and fantasise in a way that is not quite as logical as adult thinking. This thinking, however, is very real for them. Early childhood is a time of fantasy and fairytales. An Australian child may talk to a teddy bear, and believes it talks back. The thinking is not really logical, but it shows the signs of being **pre-logical**.

According to Piaget's theory and the research literature, this stage occurs in **all cultures**. In Papua New Guinea, Moses, aged four is going through a similar stage as the Australian child. Although he doesn't have a teddy bear, he believes in the spirits of the forest and the sea. If he goes too far into the forest, he will run screaming, pretending fright in case the spirits get him. If he sees his father chop down a sago palm for food, he will worry that the tree is hurting.

Both these children show pre-logical thinking processes which have developed and which will continue to develop in similar ways. What they believe in is different, but the process is the same.

## ***Piaget's view of intelligence***

Piaget believes that the origins of intelligence are largely **biological**. All children everywhere progress through the same stages in the same sequence, according to Piaget, because the tendency to do so is programmed in the genes.

Piaget's view is that intelligence is a changing quality, reflected more in the **processes** people use to **adapt to their environment**.

## **Adaptation**

Adaptation refers to the modifications people make to their behaviour as they respond to the demands of their environment. There are two components to adaptation. These are assimilation and accommodation.

### ***Assimilation***

Assimilation refers to the ways in which the individual incorporates new objects into an existing pattern of behaviour.

For example, the infant is born with an existing sucking reflex. This reflex is well developed even before birth. Almost immediately after birth, the infant will automatically suck on its mother's nipple.

New objects can however, be **assimilated** into this reflex sucking behaviour. The infant can suck on a dummy, or its thumb as easily as the mother's nipple.

### *Accommodation*

Accommodation occurs when an **existing behaviour** is **modified** to fit new demands of the environment.

After a few months of sucking, the child will change the shape of its lips and the action of its mouth, and develop the ability to bite.

According to Piaget, all learning results from assimilation and accommodation. Either new environmental stimuli are assimilated to existing behaviours, or existing behaviours are modified to produce new behaviours.

The built in tendency is moderated through **interaction with the environment**, so that people in different environments are using similar processes in different ways.

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## 2.2 Activity 6

*Can you think of something that you have learnt which involved assimilation and accommodation?*

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## **Stages of cognitive development**

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 The introduction of the following theories on cognitive development should be supported with practical observations to link what is being seen to what is being taught. The child study should support the gathering of practical data which can, in turn be informed by theories introduced.

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Piaget described four basic stages of cognitive development, which represent the basic ways that children construct their understanding of the world. Each period involves a reorganisation in the child's thinking. The ages of children in each stage are approximations of when such changes in cognitive structures occur.

Specifically, the child progresses through the thinking stages of:

1. Sensorimotor thinking
2. Preoperational thinking
3. Concrete operational thinking
4. Formal operational thinking

## Sensorimotor stage

The sensorimotor stage (birth to roughly two years) is characterised by physical actions and sensations, such as touching, hitting, sucking, listening and seeing. At first movements are reflexive rather than planned. As children progress, their actions become more goal directed.

At some point during the sensorimotor stage, children begin to distinguish themselves from the environment, recognising themselves as separate from mother, or bottle or other externals. Children also gain the notion of object permanence, the recognition that something exists even if it not in sight.

Object permanence occurs when a child begins to look for something that is hidden. Before object permanence is attained, the child does not look for or pursue hidden objects. The acquisition of object permanence is a key development in the sensorimotor period.

As children begin to acquire language in the latter part of the sensorimotor period, symbolic activity (using words and numbers to represent objects) is increased.

In summary, children in the *sensorimotor* stage of development

- Use senses and movements to explore the world.
- Begin to identify themselves as being a separate being.

## Preoperational stage

During the preoperational stage (two to roughly seven years), the development and use of internal images are most clearly demonstrated. Children will be preoccupied with their imaginative abilities in the preschool period. They may have imaginary playmates, and see 'things' in the dark.

Children in this stage are described as egocentric. This means they see things from one point of view, their own, and assume everyone else has the same viewpoint as they do. They cannot separate other perspectives from their own view.

The language of preschool children is egocentric, as they often verbalise about what is on their mind without regards to what others are doing and saying.

Another characteristic of the preoperational stage is children's logic, which is described as **transductive**. This means that they draw inferences about the relationship of objects based only on a single attribute. For example, all women are mothers. Children at this stage classify objects by some common feature such as shape, texture, or size, but will seldom use more than one criterion for classification.

During this stage, children are capable of understanding simple rules. They consider rules basic and inflexible.

In summary, children in the *pre-operational stage* are able to:

- Develop and expand their use of language.
- Recognise symbols such as pictures, words and numbers
- Classify objects on the basis of one distinguishing feature (e.g. put all the stones together)
- See that some actions have a cause and effect

## Concrete operations stage

During the period of concrete operations (roughly age seven to eleven/fifteen) a child develops systematic, logical thinking capabilities. These capacities are generally limited to concrete objects and activities. An operation is an activity that is carried out mentally and is reversible. This means that children understand that actions which affect an object (tying your hair up) - if reversed (untied) will return the object to its original state.

Children in this stage develop an understanding of other people's feelings and thoughts. They can use reasoning skills to solve problems and they have conservation skills.

### *Conservation*

Understanding the concept of conservation is a key development during this stage. One aspect of conservation means that the child understands that changing some characteristics of an object does not change other characteristics. For instance, understanding conservation means recognising that the amount of something stays the same even if some other dimension is changed.

Piaget discusses three types of conservation:

- **Conservation of number.** Recognising that the number of objects has not changed by placing them in a different order is an example of conservation of number. For example, if a number of coins are placed side by side in a row, and exactly the same number of coins is lined up next to them, but with a space between each coin, a preoperational child will say that the longer row has more coins. A child in the concrete operations stage of development will successfully recognise that the number has not changed by the new configuration.
- **Conservation of volume** occurs when a child can recognise that the amount of liquid in two containers of different shapes is the same, even if one level is higher than the other. Take two identical containers filled with water. The child will agree that the two containers have the same amount. If, however, water is poured from one into a taller, thinner container and water from the other is poured into a shorter, wider container, the child in the preoperational stage will say the taller container has more.
- **Conservation of area** means that children can recognise that the area within a shape remains the same regardless of the configuration.

Children in this stage have increased capacities for memory, attention, and concentration. They are able to use logical thought in solving problems that are tied to reality.

To sum up, people in the *concrete operational stage* are able to:

- Use logic to solve "hands-on" problems. A hands-on problem is one in which concrete things are manipulated or imagined.
- Conserve: that is, recognise that even though objects have changed their shape the amount remains the same. This same principle applies to number, weight, mass and volume.
- Classify objects into quite complex categories

- Think or work through a sequence from beginning to end- and work back to the beginning. For example, to work sequentially through three objects from small to large and back again from large to small.

The different conservations do not appear all at once, but rather are acquired bit by bit during the preschool years. Tests of conservation, such as the one used in the next activity are illustrated in the order in which they usually appear in western children. We should note that the order may be different in other cultures because the experience of the children are different. This has been found to be the case in a number of different cultures.

Methods of testing conservation should also be culturally appropriate. For example, if testing for conservation of length in PNG, a story about two pigs running down the road would be more appropriate than some western examples found in most textbooks.

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## 2.2 Activity 7

*Study the following page, 'Assessing the Conservations" taken from Bleus (1989) Arrange to try out these tasks on a preschooler and an older child. Write up your findings. How does your findings compare with Piaget's norms and the discussions following on Papua New Guinea studies?*

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**ASSESSING THE CONSERVATIONS** (Adapted from Berger, 1983)

(Ages shown are the usual averages for western children)

**CONSERVATION OF LIQUIDS** (6 or 7 years)

Take two equal glasses of coloured liquid. Pour one into a taller thinner glass. Ask the child which glass contains the more, or are they both the same. Pre-operational children will usually answer "The taller one".

**CONSERVATION OF NUMBER** (6 or 7 years)

Make two even lines of counters, lollies or stones etc. As the child watches, lengthen the spaces between one of the lines. Ask the child which has more or are they both the same. The pre-operational child will answer "the longer one".

**CONSERVATION OF LENGTH** (6 or 7 years)

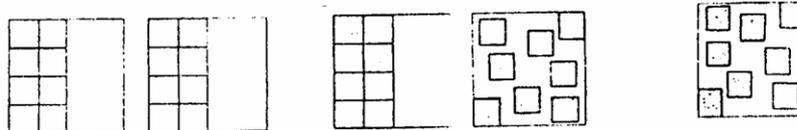
Take two sticks of equal length. Align them parallel in front of the child. Move one stick to one side. Ask the child which stick is longer or are they both the same. The pre-operational child will usually answer "The one to the right".

**CONSERVATION OF MATTER** (7 or 8 years)

Make two equal balls of clay. Squeeze one ball into a long, thin shape. Ask the child which piece has more clay or are they both the same. Pre-operational children usually indicate "the longer one".

**CONSERVATION OF AREA** (9 or 10 years)

Take two identical pieces of cardboard on which are placed the same number of equally sized blocks. Rearrange the blocks on one piece of cardboard. Ask the child which has more cardboard covered up. The preoperational child will usually answer "The one with the blocks not touching".

**CONSERVATION OF VOLUME** (11 or 12 years)

Take two similar glasses with equal volumes of water and two equal balls of clay inside. Remove one of the balls and squeeze it into a long thin shape. Ask the child which piece of clay will displace more water or will the water level stay the same. The pre-operational child will usually answer, "The long one will make the water higher". (Or do the same experiment with two same shaped articles of different weight. The preoperational child will answer the heavier one will raise the water higher.)

**Formal operations stage**

Children in the period of formal operations (roughly eleven, fifteen years through adulthood) are in the most advanced stage of cognitive development. They are capable of systematic abstract thought. This means they can think about possibilities and other types of abstractions. This is the key development during this period.

Individuals in the formal operations stage understand that multiple factors can interact to produce an outcome and they have achieved what Piaget considered the highest level of cognitive functioning.

People in the *formal operational stage* are able to:

- use logic to think about abstract ideas and terms. They can go beyond operations with concrete materials or information to understand abstract ideas " in the head.
- use scientific thought in terms of suggesting and testing hypotheses

The following table summarises Piaget's stages of cognitive development

*Adapted from Berk, L. (2000) Child Development ( 5<sup>th</sup> ed) Allyn and Bacon.*

<b>STAGE</b>	<b>PERIOD OF DEVELOPMENT</b>	<b>DESCRIPTION</b>
Sensorimotor	Birth – 2 yrs	Infants 'think' by acting on the world with their eyes, ears and hands. As a result, they invent ways of solving sensorimotor problems, such as putting objects in and out of containers.
Preoperational	2 – 7 years	Use symbols to represent earlier sensorimotor discoveries. Language and make believe play develop. Thinking lacks logical qualities.
Concrete operational	7 –11 years	Children's reasoning becomes logical. Conservation of number and volume are developed. Thinking is not yet abstract.
Formal operational	11 years on	The capacity for abstract thinking permits adolescents to reason with symbols that do not refer to objects. Thinking can include all possible outcomes in a problem, not just the most obvious ones.

## Piaget across cultures

What has cross-cultural research shown us about children's thinking?

According to Piaget's theories, the sequence of stages should occur in the same order in all cultures. Research has shown that generally this sequence is seen in all cultures, that is, no examples have been found of a child reaching formal operations without first going through the preceding stages (the sensorimotor period, pre operations and concrete operations stages)

Research does show however, that Piaget's expectations about age ranges may have been a little optimistic. In western cultures, there is strong evidence that many adolescents and adults never reach the stage of formal operations. Piaget's theories claim that these stages will only emerge at these ages if the culture supports their emergence.

## Studies in Papua New Guinea

Research completed in Papua New Guinea (Shea 1983) concludes the ages that PNG children acquire Piaget's stages are likely to be somewhat later than western norms. Although he concluded that some PNG adults will reach the stage of formal operations, nevertheless,

teachers should assume that most high school students and perhaps some tertiary students are still developing some of the conservations.

Shea's review also raised the possibility that the quality of schooling the children experienced made a great difference.

Perhaps most importantly, research in Papua New Guinea has shown important differences between levels of cognitive development of children from different regions and with different lifestyles. What seems to be important is the **nature of the culture from which the child comes**. It is suggested that the complexity of the local language, the types of tool classification systems used in the region, and other aspects of cultural complexity make the difference.

One further contributing factor is the difficulty encountered by many Papua New Guineans with English as a second language. Difficulties for second language learners can make understanding far more difficult and cause problems with understanding of the language, rather than difficulties with thinking. Vernacular teaching in the early years may address some of these problems and allow development of thinking in the child's vernacular language.

## ***Criticisms of Piaget***

One of the major criticisms of Piaget is concerned with the stages of development, and the variables found in them. Do children really stay in these stages in such a definitive way?

Researchers have shown (Flavell, Miller and Miller, in Banks and Thompson (1995)) that young children appear to be more competent and older children less competent than Piaget first thought. The researchers found that children in the preoperational period are able to complete more mental activities than Piaget stated, and older children in the concrete operational period and formal operation period are less able to complete cognitive activities indicated by Piaget.

## ***Piaget in the classroom - how does it apply?***

What lessons can teachers learn from Piaget's ideas?

Piaget's work shows us that understanding and thinking develop from two things – **hands on experience** and **social interaction with other children**.



- The emphasis in the classroom should be on **learning by doing**. Students will learn by measuring, making, creating and working in practical real life contexts. This is far more successful than formal lessons where the teacher explains and the student listens.
- Students should be able to mix freely and be active and social learners who can explore, rather than sitting quietly in rows at their desks or on the floor.
- The classroom should be a place where students can experiment discuss and try their ideas, rather than rote learn a particular piece of information.
- Active learning should not be confined to the classroom, and students should make best use of the outside environment to assist their learning.

Secondly, Piaget shows us that **the rate of learning is different for each child.**

In countries like Papua New Guinea, where there is enormous variation in children's levels of thinking in different regions, it is foolish to try to teach all children the same thing in the same way at the same stage of the school year everywhere in the country.

- Teachers should be prepared to assess the level of cognitive development of each child in their class
- Using some the tasks described earlier, and adapting them with local materials, teachers can quickly get the idea what stage a student has reached in their thinking development. They can then structure the experiences that students are ready for, and assist their learning with well planned questions.
- Take advantage of the behaviours and interests your students show. They may be showing you they are ready to learn.

## Other Theories of Learning

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 It is important that students understand there is a variety of learning theories, and no one particular theory is 'correct'. A number of theories are discussed to allow students to become aware of some different viewpoints, and to look at more contemporary theories of learning which may be more relevant to the way children learn today. Try to link any theoretical discussion with practical examples.

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New ways of understanding children and their learning are constantly emerging. These theories build upon the discoveries of earlier theories, and are broadening our understanding of child development.

A number of other models of cognition and cognitive development have been derived from Piaget's work. Other psychologists take another approach, in part derived from Piaget's model. This group emphasises the individual's ability to cognitively construct his own view and understanding of the world. This model is called Constructivism

### ***Constructivism***

Constructivism is a theoretical model that stems from a number of academic areas. These areas are philosophy, philosophy of science, psychology, anthropology, and sociology. In the education field, Constructivism has its foundations in a number of models, including those of Piaget, Dewey, Vygotsky and Montessori.

Some of the common points found when examining constructivist models include the following:

- Constructivism is based on the belief that the cognitive development of a child is due to a continuous process of construction and reconstruction of the child's sense of reality
- The cognitions of children reflect this continuous process of trying to organise and make sense out of the world. This process of organising and constructing cognitive models of the world is inherent in the mental life of humans.
- Once a cognitive model of the external world is created, it undergoes reality testing by the child. Models are discarded when they fail to correctly match the child's actual observations of the external world. New cognitive constructions are created and the process of reality testing continues.
- In applying this process to learning, it is clear that the Constructivist approach encourages an active, creative process in the student

Black and Ammon (in Banks and Thompson, 1995) state that constructivism in education is:

"More concerned with understandings achieved through relevant experience than with accumulated facts received from others, more imbued with meaning, more... situation specific; more influenced by social and cultural contexts, and in general, less purely cognitive and less governed by abstract principles than traditional conceptions of learning."

This model has been applied particularly in the fields of mathematics and science, where learners can develop conceptual understanding and the ability to solve mathematical problems through active involvement. The teacher's role is less of telling and explaining, and more guiding and fostering students' learning by posing problems and asking questions which assist to clarify thinking.

Black and Ammon developed a sequence of how teachers change their attitudes in moving from a more traditional, teacher centred approach to a constructivist approach. This is shown in the table below.

Goals of Instruction	Requirements of Learning	Nature of Teaching
1. A large store of facts and procedures	1. Be able and receptive	1. Telling and showing
2. Essential skills for attaining and using facts and procedures	2. Practice new skills, having first acquired prerequisite skills	2. Giving students practice, with correct feedback and positive reinforcement
3. Correct understandings of concepts underlying facts, procedures and skills in a subject	3. Manipulate and explore relevant aspects of reality, having reached the required developmental stage	3. Giving students opportunities to explore and manipulate developmentally appropriate materials
4. Improved conceptual understandings	4. Use best thinking to construct understandings consistent with present levels	4. Engaging students in thought-provoking activities and guiding their thinking toward better understandings
5. Ways of thinking that can lead to better understanding	5. Reflect on general characteristics of best current thinking	5. Helping students examine their own thinking

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## 2.2 Activity 8

*In your group, discuss each of the columns. Where does your conception of teaching and learning fit? How does the reform curriculum support these conceptions of teaching and learning?*

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## Sociocultural Theory

*Adapted from Berk, L. (2000) Child Development (3<sup>rd</sup> Ed) Allyn and Bacon.*



In recent times, there has been a dramatic increase in studies examining the cultural context of children's lives. Studies which make comparisons across cultures, and among groups within cultures, provide information about whether development of thinking and learning apply to all children, or are limited to particular environmental conditions.

In the past, studies focused upon broad cultural differences in development eg, whether children in one culture are more advanced in motor development.

Today, more research is focusing upon the relationship of **culturally specific practices**. Lev Vygotsky's (1934/1987) work in this field is known as **sociocultural theory**.

This theory focuses upon how culture – the values, beliefs, customs and skills of a social group- is transmitted to the next generation.

Vygotsky believed that dialogue between children and those more knowledgeable in the society, such as parent and elders, is necessary for children to learn ways of thinking and behaving in that community's culture. As adults and more expert peers help children to master culturally meaningful activities, the communication between them becomes a part of children's thinking. When the children internalise such communications, they use the language within them to guide their thoughts and actions and acquire new skills.

A major finding of cross-cultural and multicultural research is that cultures select different tasks for children's learning. Social interaction surrounds these tasks which lead to knowledge and skills essential for success in a particular culture. In some cultures, children learn expert skills informally at an early age through the guidance of adults.

Vygotsky's sociocultural theory reveals that children in every culture develop unique strengths that are not present in other cultures.

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### 2.2 Activity 9

*Discuss, research and list some particular tasks and skills Papua New Guinean children learn from their elders, which helps shape their ways of thinking and behaving.*

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## Gender Theory



The study of gender theory explores the ways gender is constructed, and how we view men and women, boys and girls.

Gender is about what it means to be a woman or a man. Research has been conducted over a period of time and several theories about gender have emerged and then been replaced by newer theories. These theories tried to explain how boys and girls learned to be men (masculine) or women (feminine).

Initially it was thought that the differences between women and men were determined by biology – this was called **biological determinism**

During the 1960s and 1970s the process of socialisation was a key aspect of the explanation to understanding the difference between men and women. This theory was called **sex-role socialisation theory**. Socialisation is the way in which sets of values, beliefs and behaviours which are gender specific are learned. This idea implies that children were explicitly taught ways of being a girl or boy.

The more recent educational research is based on the idea that gender is **socially constructed**.

According to this theory there is no essential characteristic that is masculine ( ways of being a man) or feminine ( ways of being a woman) but rather that men and women can take up a range of different masculinities and femininities. In this way, the construction of gender identities is seen as dynamic, ongoing, changing and changeable. The behaviours and characteristics associated with masculinity and femininity are learned. They are neither biologically determined nor fixed in time.

One of the key ideas about this theory is that men and women are actively involved in constructing their gendered identities. The ways in which we construct gendered understandings vary across different cultures and societies, and are informed by our social class, ethnic background, race and age among other things. Such understandings are learned over time and in different contexts, and are reshaped through changing values and experiences.

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### 2.2 Activity 10

*This activity asks you to think about gender as a social construction.*

*1. Talk with a partner and think about when you were growing up.*

*Think about your first memories of being a girl or a boy and when you realised there was a difference.*

*When did you first remember learning about the way a female/male has to behave or act?*

*2. Discuss with your group whether you have changed some of your behaviours since you were a child.*

*Discuss with your group whether you change some of your behaviours now, in different situations, eg at work/college compared with home.*

*3. What are your opinions on gender as a construction? How did your particular context ( your culture) assist in your personal construction of masculinity or femininity?*

For further information on gender, see the module “ Gender Equity in Education”



Ensure there are opportunities to discuss these points in small groups and as a whole class. The cultural influence on the construction of gender would be an interesting research topic, investigating gender identities in different provinces of PNG.

## ***Psychological influences on learning***

### ***Motivation***



Traditionally, motivation has been viewed as an instinct, drive, need or state of arousal. (Ames & Ames, in Banks and Thompson 1995)

Need occurs when a person is lacking something which is necessary to be comfortable. It could be **primary** and unlearned, such as hunger, or it may be **secondary** and learned, as when a child has learned to value hard work and the school provides the challenges to meet that need.

Some needs can be generated from within. Internalised needs are called **intrinsic**. Hunger is an example, so is curiosity. Needs which come from the outside are called **extrinsic** needs. An example of an extrinsic need is the desire for a new house or a car.

**Achievement motivation** is considered as the drive and energy students bring to schoolwork in a desire to make progress in their learning and achievement. As such, the concept of motivation is critical to effective learning. No matter how refined the teacher’s instructional

skills and how sophisticated the teacher's teaching strategies, they can all result in lesser learning, performance and achievement if little account is taken of the student's nature and level of achievement motivation. ( Barry & King, 1998)

The achievement motivation theory also has wide cross-cultural acceptability. There are wide individual differences and between-culture differences in the need to achieve. Some people are highly motivated internally to succeed, either in competition with others or when working alone. Others are motivated by the fear of failure and are less likely to take the risks which leads to achievement. It is important to note that according to this theory, the extrinsic rewards provided by the society are of little importance. The person does not need reinforcement for achieving as the need to achieve has been internalised as part of their set of values.

Research has shown a strong relationship between the level of achievement motivation in the country and the level of academic development. Countries with higher levels of economic development tend to have citizens with higher levels of achievement motivation. Similarly, low levels of achievement motivation are often considered to be the cause of the failure of development programmes.

High levels of achievement motivation have been found in many countries to be better predictors of success in school than have factors such as levels of intelligence and ability. Children with high levels of achievement motivation will try very hard in school, and therefore will be more likely to succeed.

### **Achievement motivation in the classroom**

Teachers need to think about what they can do to help children achieve higher levels of natural achievement motivation. Some ways of assisting children to become more motivated could include:

- Challenging students with tasks that are neither too easy, nor too difficult.
- Permitting students to make choices in the classroom
- Encouraging students to try new activities just for the experience
- Informing students of their strengths as well as their limitations
- Assisting students to set reasonable goals for themselves.

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## 2.2 Activity 11

*Observe selected students in the classroom during school experience. What appears to motivate the student? Does the motivation appear intrinsic or extrinsic? Talk to the student and try to find out what motivates them.*

*Observe the teacher. Does the teacher use motivating techniques to encourage student learning? What evidence can you see?*

*What motivates you?*

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## Learning Theories in Practice.

The theories studied in this module have offered a number of different viewpoints related to the development of children's learning. Theories are developed from research, and often modified and built upon by subsequent studies. A variety of theories are presented to illustrate the range in opinion, and provide examples for comparison. All the research contributes to our knowledge of how children learn and influences which affect that learning.

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### 2.2 Activity 12

- *Review the main learning theories explored in this module. In your group, make a chart showing the theories covered and main components of each theory.*

*When complete, each group member should explain one part of the chart with other group members.*

- *Answer the following questions firstly on your own, then discuss with your group.*

*Using the learning theories and concepts introduced in this unit (including Module 2.1) explain how they help you to think about the following statements.*

1. *Cultural differences are one of the most important reasons why we can't expect to find 'recipes' for teaching all children.*
  2. *Teaching to the 'average' student in the class is not effective teaching.*
  3. *Most children in a particular age group conform to certain expectations in their thinking.*
  4. *A curriculum written for Grade 3 students in Papua New Guinea will be suitable for all students enrolled in this grade.*
  5. *Motivating activities at the start of a lesson will be sufficient to gain the students' interest and attention.*
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## Summary

“What do I have to teach?” is a question often asked by teachers. Content based curriculum is based on assumptions about what the average child at a certain age needs to know.

Through the study of theories of learning, we have discovered that there is no such thing as an average child. Whilst we can recognise certain developmental stages and acknowledge that all children may pass through these stages, there are many factors which influence an individual’s development and their needs.

“Who do I have to teach?” should be the focus of our thinking. We must teach from a recognition of **individual differences** . We cannot meet children’s individual needs when everyone is being taught exactly the same thing in exactly the same way.

How do we do this?

- Know the individuals in your class. Information can be collected by studying the child and finding out from important people in their lives. After needs are established, these should become goals of teaching.
- Modify what happens in the classroom. If it isn’t meeting the needs of the individuals in the room, change the way you are doing things.
- Motivate students by relating their learning to their individual needs and values. Use things that are relevant and interesting for the student. This encourages intrinsic motivation.
- The more active students are in their learning, the better they will learn. Techniques which require passive responses from students, eg, copying from the blackboard, listening to the teacher tell, do not promote meaningful learning. Children should be encouraged to think and problem solve.
- Teachers should make use of student differences in cognitive style and stimulate creativity.

## ***Key Terms and Glossary***

**Accommodation:** when existing behaviour is modified to fit new demands of the environment.

**Adaptation:** the process or state of changing to fit new circumstances or conditions, or the resulting change .

**Assimilation:** ways in which the individual incorporates new objects into an existing pattern of behaviour.

**Behaviourism:** an approach to the study of psychology that concentrates exclusively on observing, measuring and modifying behaviour.

**Cognitive:** relating to the process of acquiring knowledge by the use of reasoning, intuition, or perception.

**Constructivism:** a theory based on the belief that cognitive development is due to a continuous process of construction and reconstruction of the child's sense of reality.

**Extrinsic:** from the outside.

**Intrinsic:** from within

**Psychology:** the study of human behaviour.

**Learning:** a change in behaviour ( knowledge/ skill/ attitude) which lasts for some time and is a result of experience.

**Motivation:** an instinct, drive, need or state of arousal.

**Operant conditioning:** a form of learning that takes place when an instance of spontaneous behaviour is either reinforced by reward or discouraged by punishment.

**Response:** behaviour that occurs as a reaction to a stimulus.

**Stimulus:** something which encourages an activity or process to begin.