

# **Module 5      Educational Theory and Practise**

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**Unit 5.3                  Learning Theories**

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# Introduction

## About this unit

Welcome to this unit on Learning Theories, in the module Educational Theories and Practises. The unit comprises three sections:

- Section 1 examines what is meant by a theory and by learning.
- Section 2 is the main body of the unit and provides an overview of each of the six major learning theories that you will study in this unit.
- Section 3 compares and contrasts the six theories that have been dealt with in section 2 and discusses how they fit into the larger context of learning theories in general.

## How to use this book

This unit is of necessity more theoretical than others you will take in this course. As a consequence you will have relatively more to read and less to do than in other units. The unit introduces many terms with which you may not be familiar. A glossary of terms has been provided at the back of the book and you should refer to this whenever you come across a term that you don't understand.

Assessment tasks will be provided by your tutor to determine if you've achieved the learning outcomes for this unit. These are the tasks that determine whether you pass in the unit.

## How you'll be assessed

To be assessed for this unit you will be given two assignments.

The assignments will be done at the completion of certain sections of the work in the manual.

Your tutor will assist you to understand the requirements for the assignments — do not hesitate to ask for clarification of anything you do not understand.

## Finding your way

As you work through the text you'll see symbols in the left margin of some pages. These 'icons' guide you through the content.



Read



Important- take note!



Activity



Assessment task



## Competency

The resources of the Technical and Vocational teachers curriculum are competency based. The competency for each unit is expressed as a number of learning outcomes and assessment criteria.

Assessment criteria specify what you must be able to do to show you have gained the knowledge and skills needed to achieve each learning outcome.

Each unit has its own assessment criteria specified. Recognition of prior learning is encouraged. If you feel confident you have the necessary level of competence to successfully complete the elements shown below, you may be able to take the assessment without studying the unit.

## **Learning outcomes**

When you have completed this unit you should be able to:

- Identify the main characteristics of six (6) major learning theories;
- Apply each of the theories that have been studied to the teaching/learning process
- Explain the implications of each of the theories that have been studied for teaching

## **Assessment criteria**

Match correctly statements of the principles from six (6) major learning theories with the name of the theory and the type(s) of learning to which the theory applies.

Give an example of one implication for the teaching-learning process of each of the six (6) major learning theories.

Give an example of one application to teaching of each of six (6) major learning theories.





# Section 1



## What do we mean by ‘learning theories’?

### What do we mean by a theory?

The name of this unit, Learning Theories, combines two important terms — ‘learning’ and ‘theory’. What do we mean by each of these terms?

A theory tries to explain and summarise our actions in the real world

A theory isn’t fact. We can work with a theory until we find that the theory no longer applies. What happens then is that the theory is modified to take account of the new information. Alternatively, the theory may be replaced by a new theory that bears no similarity to the theory it replaces.

The reason a good theory is useful is that it provides a more predictable basis for acting in a particular situation rather than reacting to situations as may seem appropriate. If we are guided by a theory we can make predictions based on this theory.

Although we are not likely to be correct at all times, we will however be more accurate than if we are acting on the basis of intuition/ or common sense.

### What do we mean by learning?

Learning theories are theories that try to explain learning. However, this leads us to the question ‘What do we mean by learning?’

Learning is one of the most basic capabilities of all living organisms. Learning is essential to survival. Learning enables us to adjust our actions to the circumstances at the time. We begin learning even before birth. If we could not learn then we would have little chance surviving beyond the first few weeks of life. We learn to find food; we learn not to touch objects that are hot or sharp; we learn to form social bonds. Later, as we grow up, we learn an enormous range of practical skills.

We all say we know when people are learning. Yet how many people have difficulty in saying what learning is.

One way of trying to discover what learning is would be to observe what people are doing when they say they are learning.

Formal learning, such as learning in school, in college or in university, is often very different from learning in everyday life, often referred to as informal learning. In everyday life we usually learn by trying to do something and then either succeeding or failing. If we succeed, we continue to use the approach that led to success. If we fail, we try something different. What is important is that we act.

‘People learn by their mistakes’. Another way of describing this is ‘learning by trial and error’. A person who learns by trial and error tries to accomplish a particular result one way. If that achieves what they are wanting they continue to use it. If it doesn’t they try something else.

Learning by trial and error builds up a wealth of experience. In many cultures this is the accepted way in which children learn. For example, in tribal Aboriginal culture, children are not expected to have a good understanding of the world until they reach the age of initiation.

Learning in traditional classrooms is very different from day-to-day learning out in the real world. It usually involves a lot of sitting and listening. In such classrooms the teacher communicates a great deal of information. If the learner is not expected or required to apply that information in any way then the obvious response for the learner to make is to memorise the information to be able to reproduce it later upon request in an examination. This reduction of learning to memorisation of information is the main reason why in recent years the traditional approach to teaching has been brought into disrepute.

In universities, learning tends to be more concerned with higher level thinking skills and understanding the ways in which things work.

There has been much controversy in the literature regarding an acceptable definition of learning. Definitions from the major theories of learning will be outlined below.

Behavioural theorists: Usually define learning as a relatively permanent change in behaviour, which is due to experience.

Cognitive theorists: View learning as an active, mental, process of acquiring, remembering and applying knowledge to solve problems.

How would you define learning?

With reference to the definition from the behaviourists; a change in a person's behaviour may be caused in many ways. However, not all of these reflect learning.

If a person has drunk a large quantity of alcohol, then their behaviour is likely to change quite noticeably. They may laugh more or they may have difficulty walking. However, these changes are not the result of learning.

They are simply the result of the effect that alcohol has on the functioning of the nervous system. Other chemicals can also alter behaviour. Drugs — whether they are recreational or medicinal — are generally taken because of the effect they have on behaviour.

Increasing maturity also alter a person's behaviour. As a baby develops, its bones and muscles strengthen. For a toddler, being able to stand depends not just on learning to use furniture to pull itself into the upright position, but also on having the strength in the bones and muscles to allow this to happen.

To show evidence of learning, the changes observed in a person's behaviour need to be changes resulting from experience.

If we want to devise a 'strong' theory of learning then we need to develop a theory which is comprehensive and can explain all these different ways in which learning occurs.



### **Check your progress**

Take a sheet of paper and make a list of all the ways in which you learn.

Beside each item on the list, say what it is that you did learn.

Now sort this list into groups of items that bear some similarity to each other.

How many different categories have you generated?

***Discuss your answers with your tutor.***



## Section 2



### Six theories of learning

In this section you will have the opportunity to familiarise yourself with six theories of learning. There are, in fact, a large number of learning theories that we could have chosen and even several other very major theories that we could have selected as alternatives to the six. However, to provide a more comprehensive coverage of learning theories is beyond what can be accomplished in the time available to us.

If, as a result of completing this module, your interest in learning theories has been stimulated sufficiently for you to want to pursue the topic further, then you should turn to a list of references on learning theories at the end of this unit.

We will first look at two behavioural theories.

#### Classical Conditioning Theory - Ivan Pavlov

Ivan Pavlov was a Russian physiologist and Nobel Prize winner who, at the turn of the century, began investigating the physiology of the digestive system. As a result of this work he became interested in the conditioned reflexes that could be demonstrated in association with the secretion of digestive juices. Towards the end of his long life, he became interested in the application of classical conditioning to understanding mental illness and he published an important book on this topic.

Classical conditioning occurs in conjunction with an unconditioned reflex. An unconditioned reflex is a reflex with which we are born. Some examples of a reflex are:

- salivation in response to placing food in the mouth
- jerking of the knee in response to a tap below the knee
- blinking of the eye in response to a puff of air on the pupil

In each of the above cases, the fact that the reflex is built into the design of the nervous system means that the unconditioned response will always be produced whenever the unconditioned stimulus is present.

## **Establishing a conditioned response**

Pavlov's interest related to responses which were not built into the design of the nervous system, but which could be learnt by being associated with these reflex responses. If another stimulus is presented immediately before the unconditioned stimulus, and if this pairing is repeated, then the response is elicited by the new stimulus, which is then known as the conditioned stimulus.

The classic experiment Pavlov performed to demonstrate this type of conditioning involved salivation in dogs. In this experiment, Pavlov would present meat powder to a dog causing the dog to salivate. In this situation the meat powder is an unconditioned stimulus because salivation in response to food is a natural reflex. Salivation is therefore an unconditioned response. The meat powder is then presented again, but this time a bell is rung at the same time. Prior to this, the bell does not initially elicit any salivation when rung alone. However, after the bell has been paired several times with the presentation of the meat powder, salivation occurs in response to the bell. The sound of the bell has become a conditioned stimulus

Some readily recognised examples of classical conditioning in humans include:

- withdrawal of the hand upon seeing a hot object
- forming tears in the eyes upon seeing an onion
- we hear a song that we have not heard for several years and we experience feelings associated with what we were doing when it was popular

The effectiveness of classical conditioning depends on two factors:

- the conditioned stimulus and the unconditioned stimulus must be paired a number of times
- the conditioned stimulus is presented first and then the unconditioned stimulus

## **Extinction**

If, after a response has been conditioned, the conditioned stimulus is repeatedly presented without the unconditioned stimulus, then the conditioned response gradually diminishes and eventually disappears. This is called *extinction*. However, extinction does not result in permanent loss of the response. If all stimulation ceases then the response will return but less strongly. For example, repeatedly pairing a buzzer with presentation of food will produce a conditioned salivary response to the buzzer. If then the buzzer is presented several times on

its own, the salivary response will disappear after a few trials. If the buzzer is presented 24 hours later the salivary response will be found to have returned but not as strongly

### **Generalisation and discrimination**

Pavlov showed that when a response is conditioned, the conditioned response is elicited not just by the conditioned stimulus but also by stimuli that resemble the conditioned stimulus. However, the generalised response will be less strong than the response to the conditioned stimulus. For example, if a fright response is conditioned to a white mouse it will also be produced to a small white stuffed toy. Responding to stimuli, which are similar but not identical to, the stimuli employed in conditioning is known as *generalisation*.

Generalisation and discrimination are important to learning because learning involves responding to classes of objects not just individual examples.

Using Classical Conditioning in the Classroom. Woolfolk (1998) identifies the following practical ways in which teachers can use classical conditioning in the classroom.

- a. Associate positive, pleasant events with learning task.
- b. Help students to risk anxiety-producing situations voluntarily and successfully. e.g. Provide students with small steps towards a larger goal. Students who are fearful of "examinations" can be given upgraded practise test prior to major examinations.
- c. Help students recognise differences and similarities among situations so that they can discriminate and generalise appropriately.

### **Skinner — Operant conditioning**

In the early part of the century most learning theories were developed within the stimulus-response tradition. The theorists who worked within this tradition believed that behaviour could only be explained in terms of responses that occurred as a result of being presented with a stimulus. In other words, if there was no stimulus there was no response. The stimulus may not be able to be identified but it is present nevertheless.

Skinner described a different form of behaviour in which responses were made *in anticipation of* a stimulus rather than in response to a stimulus. Skinner called this type of response an operant. (They are called *operant* because they operate on the environment.) The type of conditioning that gave rise to this type of response he called *operant conditioning*.

In proposing his theory of operant conditioning, Skinner did not say that this should replace Pavlov's theory. Skinner made provision for classical conditioning in his own theoretical framework, although he called it *respondent conditioning*. Nevertheless, he believed that operant conditioning was much more important than respondent conditioning.

In operant conditioning a response is not strengthened by being paired with an unconditioned stimulus but by being followed by a stimulus that has the capacity to strengthen the response. This is the key difference between operant and respondent conditioning and was the reason why Skinner called the type of conditioning Pavlov had described *respondent* conditioning. In respondent conditioning the response is always elicited by a stimulus.

Many examples can be found of operant conditioning in which a stimulus precedes the response. However, in this situation, the stimulus provides a cue. It indicates that if a response is produced at that time it is more likely that reinforcement will occur. The stimulus, which precedes the response, does not *elicit* the response.

The objective in operant conditioning is to increase the frequency of a response. However, for the frequency of a response to be increased, the response has to be produced at least once. A reinforcer is defined by the fact that it is capable of strengthening a response.

Skinner carried out his research on operant conditioning using rats and pigeons. In his experiments Skinner often used food or water as a reinforcer. To increase the strength of reinforcement the rat or pigeon would be deprived of food or water for some hours before the experiment. Skinner was then able to control the behaviour of the rat or pigeon by giving it food or water.

To understand the implications of Skinner's theory for human learning it is more helpful to use as examples, instances of the application of operant conditioning to human behaviour.



Gambling is one form of human behaviour that obeys the principles of operant conditioning. In gambling, a person bets in the expectation of winning. When a person wins occasionally they are more likely to continue betting than if they never win. Their behaviour depends on their pattern of winning and losing and accords with the theory of operant conditioning. Owners of gambling facilities make practical use of the theory of operant conditioning in order to make a profit.

### **Principles of Operant Conditioning**

- (A) **Reinforcement:** As indicated above, the effect of reinforcement is always to increase the probability of a response. However, there are two types of reinforcers — positive and negative.
- a. **Positive Reinforcer** strengthens the probability of a response when it is added to a situation. Winning a jackpot on a poker machine increases the probability that a person will continue to play the poker machine.
  - b. **Negative Reinforcer** strengthens the probability of a response when it is removed from a situation. A painful or irritating stimulus can serve as a negative reinforcer.

Many students learning theory make the mistake of concluding that reinforcement, which is negative, ought to result in a lowering of the response rate. However, reinforcement refers to the strengthening of a response.

### ***Schedules of reinforcement***

In everyday life, reinforcement does not usually occur each time a response is produced. When a person goes fishing they do not expect to catch a fish each time that they throw in their line. If a person plays money into a poker machine they do not expect to receive a payout every time they put money into the machine. Reinforcement is intermittent.

When reinforcement is intermittent, the schedule of reinforcement can have an important effect on the extent to which a response is strengthened.

Skinner examined two types of schedule:

- interval schedules
- ratio schedules

An interval schedule is one that is defined in terms of time that elapses between successive reinforcements. A fixed interval schedule is one in which the time between successive reinforcements is constant. For example, reinforcement may be given every minute. A variable interval schedule is one in which the time between successive reinforcements varies.

A ratio schedule is one that is defined in terms of the number of responses that are given between successive reinforcements. A fixed ratio schedule is one in which the same number of responses must be given before. For example, a fixed interval schedule might result in reinforcement on every tenth response. A variable ratio schedule is one in which the number of responses that are given between successive reinforcements varies.

In many situations, a particular type of response will be given even if there is no reinforcement. However, if the response is reinforced even once, the rate of responding will increase above the natural rate and will remain higher for quite some time before it drops back to the rate prior to conditioning.

The schedule according to which reinforcement is given affects both the rate and pattern of responding.

### **(B) Extinction**

When a response, which has previously been reinforced, continues to be given without further reinforcement, then the rate at which the response is given eventually diminishes. Many responses are given even in the absence of reinforcement. In extinction, therefore, the rate of responding will fall back to the normal level. The number of responses that may occur before the effect of a single reinforcement is fully extinguished may, in fact, be quite high.

### **(C ) Shaping**

Learning as a result of reinforcement alone can take considerable time. Using a procedure known as shaping can considerably increase the speed at which learning through operant conditioning occurs. In shaping, the responses that are reinforced initially include not just the desired response but also any response that bears some resemblance to the desired response. Then as reinforcement continues, the criterion for what will be reinforced is brought closer and closer to the desired response.

Shaping involves a combination of *differential reinforcement* and *successive approximation*. Differential reinforcement refers to the fact that some responses are reinforced but others are not. Successive approximation refers to the fact that the responses that are reinforced are brought closer and closer to the desired response.

### **(D) Punishment**

Some people believe that punishment is the most effective way to make children learn.

Punishment is a procedure in which an unpleasant or aversive stimulus is presented following an undesirable behaviour. If the punishment is effective then it should weaken the behaviour being punished or decrease the chances that the behaviour will occur again in the future. If a teacher sends a disruptive student to the principal's office and as soon as he returns to the classroom he becomes disruptive again, then sending the student to the principal's office is not a punishment. Educators and psychologists are against the use of harsh punishment and this is recommended as a last resort when a student's behaviour is life threatening either to himself or other persons.

According to Mednick et al, effective use of punishment should observe the following:

#### **1. Immediacy**

The sooner an organism (living thing) is punished, the more effective the punishment. Delay in punishment tends to decrease the effectiveness of the punishment.

#### **2. Intensity**

One of the most important effects of punishment is that it suppresses the behaviour that went before it. The greater the intensity of the punishment, the greater its suppressive effects. A word of caution is necessary here, as intense punishment may cause negative side effects, like a child avoiding, hating and attacking the punished.

#### **3. Consistency**

If a response is punished every time it occurs, the effectiveness of the punishment is increased.

#### **4. Suddenness**

Punishment is most effective if it is given at the maximum intended level. There should be no compromises, as it may not be taken seriously.

#### **5. Brevity**

Punishment should be brief. When it is delivered over a prolonged period, it loses effectiveness.

#### **6. Programmed learning**

Skinner believed that operant conditioning could explain most of human behaviour. In the 1950's, he began developing a method of teaching called Programmed Learning and teaching, which embodied the principles of operant conditioning. Programmed learning was based on three main principles:

1. the material presented to the student (in Skinner's terms, the stimulus material) was broken down into small steps or frames;
2. students were required to give frequent responses;
3. students received immediate feedback to their responses.

Programmed learning enjoyed considerable popularity during the 1960s and Skinner himself published a course on introductory psychology using this method. Computer Assisted learning is a modern version of Programmed Learning

### **The practical importance of operant conditioning in human learning**

Betting may not seem to be a very worthwhile activity (unless you happen to be particularly lucky and win the jackpot). However, operant conditioning can be seen in many other areas of human learning. For example, parents modify their children's behaviour by rewarding them for acting in certain ways, sports coaches modify the performance of their athletes by using praise, businessmen increase the sales performance of their salesmen by paying bonuses for making more than their quota of sales.

Although there is much less interest shown these days in operant conditioning in connection with human learning, this theory does account for quite a range of human behaviour. The type of behaviour, which can be explained by the theory, is relatively routine behaviour. As has been indicated, betting behaviour is one example of the type of behaviour that can be explained in terms of operant conditioning.



## Summary

Skinner's theory of operant conditioning described the type of learning that occurs as a result of a stimulus following a response. A reinforcer is any stimulus that is capable of strengthening a response. The pattern of responding depends on the schedule of reinforcement that is employed. A learned response will be most resistant to extinction when a variable interval, variable ratio schedule of reinforcement has been used.



### Check your progress

1. What are the strengths and weaknesses of Skinner's Operant conditioning theory?
2. What are your views on punishing students in the classroom?
3. How would you use Pavlov's classical conditioning theory to help a student with an anxiety producing situation.
4. Describe how you would use shaping to help students learn a complex skill.

*Discuss your answers with your tutor.*



## Piaget — developmental theory

Jean Piaget was a Swiss psychologist who devoted most of his professional career to studying the way in which children and adolescents developed intellectually.

### The concept of cognitive schemata

Piaget's theory was based on the notion of cognitive structures of schemata (Note: the word schemata is the plural of schema). Schemata are the mental structures that control a person's interaction with their environment. A person's schemata cannot be studied directly. They are inferred from the way in which a person acts in response to different situations. Piaget spent most of his professional life studying and writing about the ways in which children and adolescents solve a wide range of problems. From these studies he constructed a comprehensive theory of how intelligence develops.

## **Assimilation and accommodation**

Piaget said that a person's cognitive structure is changed as a result of two processes:

- assimilation
- accommodation

**Assimilation** is the process of placing new stimulus events into existing schemata. Assimilation does not involve a change in schemata, but it does affect the growth of schemata.

**Accommodation** is the process by which new schemata are produced or existing schemata are altered. When a child encounters a new stimulus, they try to assimilate it into their existing schemata. However, if there are no existing schemata into which the stimulus will fit, the child can either create a new schema or modify an existing schema.

## **Learning as a process of achieving equilibrium**

Piaget said that when new material is encountered which the learner cannot assimilate into their cognitive structures, disequilibrium is produced. Piaget said that the mind is always striving to achieve equilibrium so a state of disequilibrium drives the learner to attempt to accommodate the new material.

Learning can therefore be thought of as resulting from a combination of the two processes of assimilation and accommodation driven by the need to achieve equilibrium.

Piaget argued that all learning depended on action. A person acts and as a result of their interaction with the environment their cognitive structures are altered. As a result, the person will act differently the next time they encounter the same or similar situation.

## **The Piagetian stages of cognitive development**

Piaget described a child's cognitive development as through a series of stages (See Table 1). The stages Piaget described are not discrete. One flows into the next.

Piaget's contributions to the understanding of cognitive development are very extensive and it is not possible to offer you more than a very general understanding of the major features. What will be provided here will give you sufficient understanding to enable you to use the theory in those areas where it may be applicable to your teaching.

Stage	Type of Learning	Age
Sensori-motor	Behaviour is mainly motor	0-2
Preoperational	Stage of language development	2-7
Concrete operational	Logical thought is applied to concrete problems	7-11
Formal operational	Logical thought is applied to abstract reasoning	11-15

Table 1. The stages of cognitive development described by Piaget

### ***Sensori-motor stage***

The sensori-motor stage extends from birth to about age two. Piaget further subdivided the sensori-motor stage into six periods. However, we will not go into this level of detail.

In the sensori-motor stage of development all schemata are dependent on the action of the child.

### ***Pre-operational stage***

In the pre-operational stage of development the child starts to represent objects and events.

Various forms of representation are developed:

*deferred imitation:* i.e. the imitation of objects and events that have not been present for some time;

*symbolic play:* i.e. playing with something while pretending that it is something else;

*drawing:* i.e. representing something as an image;

*mental imagery:* i.e. representing past perceptual experiences as internal imitations of perceptions which may or may not bear a similarity to the perceptions themselves; and

*spoken language:* i.e. using words as symbols in place of objects.

By being able to represent the world internally the child starts to acquire the ability to think. However, thinking is still controlled by perceptual experience.

In this stage of development, the child can only see situations from their own point of view. They cannot see a situation as another person sees it. The child at this stage is never able to question its own thinking.

### ***Concrete operational stage***

According to Piaget's use of the term, an operation is an action that is internalised or thought-about and that is mentally reversible; i.e. it can take place in one direction or the opposite direction.

Concrete thought is limited to dealing with tangible concrete problems that are known in the present. On the other hand, a person who has developed the ability to execute formal operations is able to reason about past and future as well as the present. The person can also think about his or her own thoughts and feelings.

People who are at the concrete operational stage of development cannot deal with the complex verbal problems involving propositions. Reasoning is tied to available experience. Each problem has to be dealt with in isolation.

### ***Formal operational stage***

In the formal operational stage of development, the person's cognitive processes become freed from direct experience. The person is able to think abstractly. Formal thought involves reasoning that is

*hypothetical-deductive:* i.e. it involves deducing conclusions from hypotheses; being able to reason from hypotheses which are known to be untrue;

*scientific-inductive:* i.e. reasoning from specific facts to general conclusions

*reflective-abstractive:* reflection resulting from an abstraction to a higher level — at this stage learners can construct new knowledge by this reasoning process.

These are the processes used in scientific thinking.



An adolescent who has reached the formal operational stage of development has the capacity to think as well as an adult. However, their actual reasoning is not likely to be as well developed because they will not have the accumulated experience of dealing with abstract problems that much older person will have had. We can say that their cognitive structures will not be as well developed.

### **The order in which the stages are reached**

Piaget never said that the order in which the four stages are reached is the same in every individual. However, all evidence available suggests that this is the case. On the other hand, the age at which individuals reach the second, third and fourth stage of development differs quite widely. Therefore, while Piaget indicated the ages at which these stages are typically reached these ages should not be regarded as at all fixed.

Piaget's stages of development describe the extent to which a person's cognitive structure has developed. They do not describe an individual's capacity for cognitive development.

The age at which each stage is reached is determined by heredity; and experience.

In Piaget's view, heredity affects a person's development primarily through governing their rate of maturation. Maturation determines the age at which a person had the capacity to develop to a particular stage.

This will depend on their range of experience, which will be a function of context. There is considerable evidence to suggest that people who live in village culture and who have not undertaken formal schooling do not reach the formal operational stage of development. Adolescents and adults may therefore be located in either the concrete-operational or formal operational stages of development. The stage that they are at will have been most determined by their previous experience. Those who are still at the concrete-operational stage of development will still have the capacity to develop to the formal operational stage given the suitable context for learning.

### **Importance for technical education**

From what has been said, it should now be apparent that while the information in Table 1 could be taken to indicate that most students undertaking technical studies will have reached the formal operational stage of development, this may not be the case at all.

However, if a person who is at the concrete operational stage of development is taught in a way that requires them to make formal operations, then they will be unable to make progress. In facilitating the learning at this stage of development therefore it is not sufficient simply to organise materials logically. Students need to be provided with a learning environment in which they can progress to the formal operational stage.



## Summary

Piaget's developmental theory of learning described the stages a person passes through from birth to maturity in their cognitive development. Piaget believed that human cognitive development could be broken down into four main stages:

- sensori-motor;
- pre-operational;
- concrete operational; and
- formal operational.

While the sequence in which individuals pass through the four stages of development does not vary from person to person, not everyone reaches the formal operational stage of development and the age at which individuals reached the second and subsequent stages of development varied considerably.



### Check your progress

1. Explain the cognitive characteristics of the students who are in the grade you teach.

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2. How does knowledge of students' level of cognitive development assist you as a teacher?

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3. Describe two arguments against Piaget's theory.

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4. Describe a classroom scenario in which you either observed or experienced accommodation and assimilation.

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5. Do you think that Piaget's stages give a realistic picture of a child cognitive development? Explain.

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*Discuss your answers with your tutor.*



## Assignment No. 5.3-1

### Unit 5.3 Learning Theories

You are now required to complete **Assignment 5.3 - 1** which you can find at the end of this unit or which will be distributed by your tutor.



## Rogers' Humanistic theory

Carl Rogers was an American psychologist who spent part of his professional career working as a psychological counsellor. He became interested in the issue of personal freedom and wrote several books in this area. He translated his ideas on personal freedom into the field of education in the text, *Freedom to Learn*, which was published in 1969. This was republished in a greatly revised form, in 1983, as *Freedom to Learn for the 80s*.

Rogers argued that we live in a complex world and education needs to prepare students for life in that difficult world. Education therefore needs to prepare students for making judgements, choices and decisions that affect their lives, their families and society. They need experience to prepare themselves for life, for considering complex problems, recognising the pros and cons of each solution and choosing the stand they will take on an issue. They need to learn how to make intelligent choices.

### Rogers' interest in learning

Rogers was not at all interested in the mental processes by which learning occurred. He did not consider that it was necessary to understand how mental processes occurred in order to facilitate learning. He believed that learning was much more effectively facilitated by enabling students to deal with their own learning issues. He said that young human beings are curious, eager to discover, eager to know and eager to solve problems and that this innate curiosity was sufficient to keep them learning.

Rogers believed that everyone had the ability to learn and to learn how to learn. What stopped them from learning was the context in which learning is expected to take place. He said that the contexts in which students were generally expected to learn deprived people of their freedom. He was much more interested therefore in what allowed people to learn than in the cognitive processes that constitute learning. Above all, he was interested in enabling students to learn *how* to learn. Rogers believed that learning how to learn is ultimately what is of greatest value to a person.

Because Rogers wanted to see learners having greater freedom, he was mainly concerned with who had *control* over the learning. Rogers said that in formal educational settings, teachers controlled the teaching-learning situation in ways that greatly restricted learners' freedom to learn. Some of the ways in which he saw this happening were by:

- setting curriculum
- setting all students the same assignments
- using a style of teaching that was based almost entirely on lecturing
- using standard assessment procedures
- giving teacher-assigned grades

The result is that students lose the will to learn. They became bored, frustrated, disappointed and angry.

Rogers believed that if students were to learn effectively then they needed to experience freedom. He said that freedom is used responsibly when it is experienced rather than intellectualised.

Rogers believed that the classroom could be a place where exciting meaningful learning takes place and where live issues are discussed. Rogers described learning as being of two types:

- learning which does not involve feelings or personal meaning
- significant, meaningful, experiential learning

Rogers said that the elements that are involved in experiential learning are that it:

- has a quality of personal involvement
- is self-initiated
- is evaluated by the learner

Rogers' approach therefore has become known as the humanistic theory of learning. Rogers himself referred to it as 'person-centred' approach. By 'person-centred' what Rogers meant was that every student is responsible for their own learning. This is quite a different form of student-centredness from that which was being advocated by proponents of programmed learning. Programmed learning enabled learners to learn in their own time and to proceed at their own pace. However, the nature of the learning that took place was still very much controlled by the teacher. Indeed, it was even more closely controlled by the teacher than is normally the case in traditional classroom teaching.

Rogers' view of learning is very closely connected with his interest in personal development. As has already been mentioned, Rogers was trained as a counselling psychologist. He makes frequent use of his experience in psychotherapy.

Rogers believed that the purpose of education was to enable every individual to become a fully functional person. He describes a fully functional person as a person can live fully in and with all their feelings and reactions. The person is able to express all their feelings without being afraid of any of them.

Rogers had a conviction that the basic nature of the human being when functioning freely is that it is constructive and trustworthy, freeing the individual from being defensive. Defensiveness keeps us from being aware of this rationality.

### **Rogers' view of teaching**

Rogers' belief in the importance of giving the student the freedom to decide what, when and how to learn raises the important question of what he sees as the role of the teacher.

Rogers described the teacher's role as that of facilitator. Rogers believed that the most important function for teachers to perform was to stimulate students' curiosity. Rogers believed that the way students were taught in the traditional classroom stifled students' curiosity. He argued that if students were given more responsibility for their learning then their own curiosity would drive them on to learn.

Rogers' theory was focused on identifying the ways in which students could be supported in learning to learn.

Rogers believed that the most important factor contributing to the quality of the learning environment was how teachers relate to students:

- realness;
- deep empathic understanding; and
- warm acceptance of the person as they are

Becoming real is a process of moving towards a greater awareness of what one is experiencing — to move towards something one can own.

Rogers said that teachers needed to treat students as equal human beings with feelings and potential but also imperfections.

Some of the ways in which Rogers saw that teachers could facilitate students' learning included

- providing access to a wide range of resources that can give students experiential learning relevant to their need
- using learning contracts

- assisting students to draw on community resources
- varying the amount of structure within students study
- forming students into self-managed learning groups

Intensive groups provided an opportunity for participants to grow in their understanding and acceptance of self.

However, Rogers did not stop at this. He also believed that students should have the freedom to choose what they learn, how they learn, how they will be assessed and what grades they ought to receive. This sounds as though Rogers was arguing that teachers should give up all responsibility for their students. However, this is far from being the case. Rogers' saw the task of teachers as being delicate and demanding.

However, he did not advocate 'anything goes'. For example, in the case of grading, he believed that the teacher still needed to decide whether the student-assigned grades would stand. If the teacher thought that the grade that the student had given was not appropriate, then the final grade should be negotiated between the teacher and the student.

Rogers also acknowledged that many students may not feel 'safe' without some degree of structure to begin with. If they have not been accustomed to being responsible for their own learning, they may be made anxious by the lack of directions. He therefore believed that it was appropriate for teachers to provide enough limits and requirements that can be perceived as structure so that students can comfortably start to work. He said that freedom seems to cause less anxiety when it is presented in somewhat conventional sounding terms as a series of 'requirements'.

### **Why has the person-centred approach not been more widely used?**

Rogers did not believe that implementing a free learning was easy. Indeed, he explores in detail the reasons why many attempts at implementing learner-centred programs have failed. The reason, he suggests, is because any attempt to offer students greater freedom will inevitably bring about a backlash from those to whom giving students greater freedom represents a threat. He says that teachers who decide to implement his approach need to be prepared to meet and respond to such reactions.

Rogers said that he believed all teachers and educators prefer to be facilitating meaningful experiential learning, yet the majority of schools are locked into the traditional approach that makes meaningful learning impossible or improbable. Some of the reasons why this occurs are:

- an organisation which is truly democratic and in which people are trusted and empowered to act freely and responsibly poses a major threat to conventional institutions
- there is a lack of a pool of people committed to person-centred education
- organisations tend to develop routine and bureaucratised ways of doing things
- there can never be a codifiable pattern for working in a person-centred environment
- administrators of educational institutions place a higher value on power over people than on the enhancement of learning

It should be pointed out that Rogers' observations on the institutional barriers to implementation of a person-centred approach referred to face-to-face teaching situations. The methods of teaching used in distance education and open learning by their nature demand a more person-centred approach. Nevertheless, distance education and open learning programs are still generally more directive than Rogers would have advocated as being desirable. They typically prescribe what is to be learnt and the way in which learning should be undertaken.



## Summary

Rogers said that in traditional classrooms students are offered only a small measure of control over their learning and that if they are to accept responsibility for their learning then they need to be given much greater control. Rogers was therefore more interested in the nature of the context in which students learned than in the cognitive processes involved in learning. The contextual factors to which he gave greatest attention were the organisational framework within which teachers and students worked and the way in which teachers related to their students. The attributes that he believed were most important for teachers to display were

- realness
- deep empathic understanding
- warm acceptance of students as people





### Check your progress

1. How many of attributes of the teacher identified by Rogers do you possess?

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2. Describe 4 ways in Rogers thinks that students' learning is restricted in formal educated settings.

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3. Do you think it is possible to implement a person centred approach in the context in which you work? What are the factors that will inhibit/enhance the implementation of such an approach.

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4. Explain the role of the teacher/student in a humanistic classroom.

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***Check your answers with your tutor.***



## Ausubel — Meaningful verbal learning

By the 1960s a major battle was raging in the field of learning theories between the advocates of reception learning and of discovery learning.

*Reception learning* describes the situation where what is learned is presented to the learner rather than having to be discovered by the learner. This is the type of situation that is encountered in the traditional classroom.

Theorists such as Carl Rogers and Jerome Bruner said that reception learning diminished motivation. As a result, the amount that students learnt was also reduced.

These theorists said that the way to avoid having students resort to rote learning was to use a discovery learning approach.

Ausubel disputed this argument. He said that adopting the discovery learning approach left learners with the need to locate and organise their own materials from primary sources, interpret the materials independently; and design their own experiments

According to Ausubel, the teacher's role was reduced to that of consultant and critic.

[NOTE: This is not completely accurate. Rogers saw the teacher as an *active* rather than a reactive facilitator of the student's learning.]

Ausubel argued that the very essence of education was:

- knowledge selection
- organisation
- interpretation
- sequential arrangement of learning materials

Ausubel contended that discovery learning was psychologically more involved. It presupposed a problem-solving stage that precedes the emergence of meaning and the internalisation of information. He said that dissatisfaction with the techniques of verbal instruction resulted from the common assumption that meaningful generalisations could not be 'given' to the learner but are only able to be acquired through a process of problem solving. He declared that reception learning was potentially more efficient than discovery learning.

Ausubel argued that by shifting to discovery learning schools abdicated their responsibility for facilitating students' learning.

### **The importance of the learner's knowledge structure**

Ausubel considered that the single most important factor influencing learning was what the learner already knew. He said that teachers need to begin by ascertaining what the learner already knows. They should then build on that.

Ausubel described the way in which a person acquired knowledge in terms of the concept of 'cognitive structure'. A person's cognitive structure represents the organisation, stability and clarity of knowledge in a particular subject matter held at a particular point in time.

Ausubel argued that learning resulted in learners expanding their cognitive structure by increasing the amount of knowledge held in it and developing the interrelationships between different pieces of knowledge.

### **Progressive differentiation and integrative reconciliation**

Ausubel said that meaningful verbal learning involved two distinct processes: progressive differentiation and integrative reconciliation. These complex-sounding names describe two quite simple processes.

*Progressive differentiation* is the process of elaborating information. The most general and inclusive ideas are presented first and these are then followed by material that is more detailed and specific.

*Integrative reconciliation* is the process of integrating new ideas with previously learned content.

### **The difference between rote and meaningful learning**

Ausubel pointed to the large amount of research that had been undertaken on rote learning. He said that it was necessary to make a distinction between rote and meaningful learning

Rote learning is learning verbal information without meaning; for example, memorising a definition well enough to be able to repeat the definition word-for-word without really understanding what the words mean.

For learning to be meaningful, the material that was presented needed to connect directly to the learner's existing cognitive structure. As the learner expands their cognitive structure, connections need to be made with existing material. The key to meaningful reception learning therefore lies in the teacher presenting new material in a way that makes it potentially meaningful.

### **The advance organiser**

To show how instruction should be structured, Ausubel proposed the concept of the 'advance organiser'.

A surprisingly large number of teachers who are familiar with Ausubel's writing believe that the term that Ausubel coined was 'advanced organiser'. This indicates that they have a misconception about what Ausubel meant by 'advance organiser'. Presumably they believe he meant that the organiser should be more sophisticated. However, what Ausubel really meant was that it should go ahead of (i.e. in advance of) the main part of the instruction.

An advance organiser is a small block of material that goes ahead of a block of instruction and serves the purpose of connecting the new material with the student's previous knowledge and cognitive structure.

An advance organiser:

- bridges between what the learner already knows and what they need to know ('ideational scaffolding for the detailed material that is to follow.')
- influence learning in a pro-active way

Advance organisers are sometimes confused with overviews and summaries. An advance organiser is different from an overview insofar as an overview is generally written at the same level of generality as the instruction that follows. An advance organiser is different from a summary in that a summary appears at the end of a block of instruction. By coming ahead of the instruction, an advance organiser brings to the learner's attention that part of their knowledge structure to which new learning is to be attached. It also provides a structure for the new learning.

Ausubel described two types of advance organiser:

- expository organisers
- comparative organisers

Expository organisers are used to facilitate the structuring and meaningful acquisition of completely new material.

Comparative organisers are used to highlight similarities and differences between new learning materials and previously learned material.

### **Meaningful learning is its own reward**

Skinner's theory of operant conditioning placed great importance on the part played by rewards and punishments. Rewards and punishments determined what was learnt.

Ausubel said that meaningful verbal learning did not depend on the teacher providing extrinsic rewards. He said that meaningful verbal learning was its own reward.

The causal relationship between motivation and learning is typically reciprocal rather than uni-dimensional.

### **Using Ausubel's Theory in the Classroom**

Ausubel argued that everyday problems of living are solved through discovery learning. However, large bodies of subject matter are more efficiently acquired through reception learning by those who have the capacity to learn this way. However, he pointed out that reception learning appears later developmentally and depends on the learner having attained an advanced stage of cognitive maturity. Reception learning is not suitable for learners who are still in the concrete operational stage of development. It is also not suitable for teaching adult learners who are relatively unfamiliar with the basic concepts and terminology of a field of study.



## **Summary**

Ausubel's theory of meaningful verbal learning described a type of learning that can occur in a formal educational setting. It applied specifically to reception learning. As Ausubel explained, meaningful verbal learning is only possible when a person has reached the formal operational stage of development. Ausubel argued that for individuals who have reached this stage of development, reception learning can be a more efficient way of learning than discovery learning.

Ausubel described meaningful verbal learning as occurring by means of a combination of progressive differentiation and integrative reconciliation. It is facilitated by use of expository and comparative advance organisers. These enable the learner to integrate new material into their cognitive structures.



### Check your progress

1. Distinguish between rote and meaningful learning.

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2. Prepare an advance organiser for a lesson that you plan to teach.

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3. Choose a concept from your specialisation and describe how you would ensure that students learn this concept meaningfully.

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4. How does prior knowledge influence learning?

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***Discuss your answers with your tutor.***



# Cognitive Learning Theories

## Gagné — Classes of learning

Robert Gagné is an American psychologist who is best known as the ‘father of instructional design’. Most of his more recent writing has been concerned with the development of a theory of instructional design. However, in the early part of his career he was responsible for a number of significant advances in the area of learning theory.

Gagné believed that learning could not be described in terms of a single learning type. Rather, he believed that learning needed to be subdivided into different categories based on the conditions that needed to be provided to the learner for learning to take place. He therefore attempted to develop a comprehensive classification scheme that encompassed all types of learning.

Gagné presented his classification system in *The Conditions of Learning* which was first published in 1965. In the first edition of this book Gagné identified eight classes of learning (see Table 2).

Signal learning
Stimulus-response learning
Chaining
Verbal association
Multiple discrimination
Concept learning
Principle learning
Problem solving

Table 2. Gagné’s classes of learning

In developing this classification of learning types, Gagné drew heavily on earlier theorists. Pavlov’s classical conditioning was included in *signal learning*. Skinner’s operant conditioning was included as stimulus-response learning and chaining. Gagné also drew on the work of a new group of theorists known as information processing theorists. This group of theorists were interested in the similarities between the functioning of the brain and the functioning of a computer. (Computers were then starting to become widely available.) They were particularly interested in the way in which memory functioned. They tried to explain the development of knowledge in terms of memory processes.

## Information Processing Theory

Information processing is a cognitive view of learning that compares human thinking to the way computers process information.

Information processing theory explains how humans acquire, store, recall and use information. Memory provides evidence that learning has taken place. Gagne proposes that a number of processes occur in an "act of learning."

Other psychologists, including Gagne, propose that there are three distinct stages of memory. Sensory information goes into sensory register where memory traces are held briefly before decaying. If we attend to the information much of it is transferred to short-term memory. Information in short-term memory may be displaced if it is not transferred to long-term memory. We need to organise, practise and rehearse the material before it can be transferred into long term memory. Once in long term memories can be retrieved through appropriate search strategies.

In teaching it is important to use steps that correspond to the internal sequence in which the brain processes information.

***Metacognition*** - is a concept used by the information-processing theorist. It means learning about how humans think and learn. To become an effective learner you would need to develop metacognitive strategies. As a teacher, you will have responsibility to help students develop their metacognitive skills.

According to Woolfolk (1998) metacognition involves an awareness of what thinking strategies to use and when and how to use them.

### ***Strategies to help students learn***

1. Organise information into manageable units. (Chunking)
2. When receiving verbal information, link information to what is already known. Try to examine the information from many angles and ask questions about it.
3. Supplement information with mental pictures. (Visual Imagery)
4. Engage in much practise and rehearsal of information. (Over-learning)
5. Use various types of mnemonic devices. For example:
  - Use an acronym - word made from first letters of items to be learned. E.g. ROY G. BIV – the colours of the rainbow (Red, Orange, Yellow, Green, Blue, Indigo, Violet)



## Gagné's revised classification

Much research was undertaken in the field of information processing theories between 1965 and 1975 and Gagné built the findings of this research into later versions of his classification. In the third edition of *The Conditions of Learning* Gagné greatly revised his classification to reflect the results of research that had been undertaken since the first edition was published. The new classification scheme differed from the original in two main respects:

1. it switched to the use of learning outcomes as the basis of classification of learning theories rather than learning types
2. it provided a two-level classification with one of the categories subdivided into four subcategories

Intellectual skill
— Discrimination
— Concrete concept
— Defined concept
— Higher order rule
Cognitive strategy
Motor skill
Attitude

Table 3. Gagné's categories of learning outcomes.

### ***Discrimination***

When a person meets a new type of object for the first time, they will deal with the object on an individual basis. However, in time, they will learn to respond to the object as a member of a class or a category. For example, a person initially learns how to use a ring spanner to tighten a nut. However, nuts of different sizes and types require different spanners. Therefore, to tighten a nut, a person first needs to choose the spanner of the correct size. The person may do this by reading the size off the spanner or simply by trial and error. However, eventually the learner learns to distinguish between spanners of different sizes simply on sight.

***Concrete concepts***

A concept is a category or class.

Concrete concepts are concepts that have a physical existence. Typically they are classes of objects that can be seen — this includes concepts such as spanner. However, concrete concepts also include classes of entities whose existence lies in sounds or odours or textures.

Concrete concepts are learnt by being presented with several examples and non-examples of the particular concept. The examples need to cover the range of variation that is exhibited by all examples of a concept. The non-examples need to be non-examples that might easily be confused with examples.

***Defined concepts***

Defined concepts do not have a physical existence. An example of a defined concept is force. Because it does not have a physical existence, a defined concept cannot be acquired through presentation of examples and non-examples.

Defined concepts are learnt from their definitions. A definition connects the concept to other concepts. The concepts in terms of which a definition is stated must have been acquired beforehand.

***Higher order rule***

Higher order rules are rules produced by combination of the simpler rules involved in learning concepts and learning discriminations.

Higher order rules have been learnt when they can be applied. To learn a higher order rule, a learner must first have acquired the simpler rules from which the higher order rule has been produced. A learner learns a higher order rule by first being given a statement of the rule and then having their attention drawn to the constituent concepts and discriminations. An example of a higher order rule would be ‘the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides. To acquire this rule, a learner would first have to have acquired the concepts, *hypotenuse*, *right-angled triangle*, and *square*.

### ***Cognitive strategies***

Cognitive strategies are strategies that learners acquire in becoming more effective and more independent learners. Some of these strategies include

- reflecting
- analysing
- attending
- retrieving information
- identifying relevant features of a problem

Such strategies are generally considered more valuable than the intellectual skills used in approaching individual problems. The reason for this is that they are the strategies that people need to develop to become independent learners.

*Instructional Activities that teachers can use: (Gagne in La Francois, 1992)*

- Informing learners of the objectives of instructions so that they develop appropriate expectations
- Reminding learners of relevant previously learned material
- Presenting material clearly and distinctly
- Assessing the learner's performance (and the effectiveness of instruction)
- Arranging for future Practise to aid retention and generalisation

### ***Attitudes***

An attitude is a learned state that influences or modifies the individual's choice of personal action.

Gagné saw attitudes as having cognitive, affective and behavioural components:

*Cognitive:* this arises from a person's need for consistency between what they think and what they feel;

*Affective:* the feeling that a person experiences towards an object or situation generally spoken of in terms of a *liking* or *disliking*;

*Behavioural:* a person may express an attitude towards a person or situation but may in fact act quite differently

Gagné pointed out that attitudes may be acquired in three different ways:

- by classical conditioning
- by operant conditioning
- by modelling

You have already met the first two types of learning. Modelling occurs when a person follows the behaviour that they have seen someone else exhibit.

### ***Motor / Psychomotor Skills***

As TVET teachers, you will need to focus on motor skill learning. This refers to the acquisition of action-oriented skills as well as thinking oriented skills. It is difficult to distinguish between these skills, as both are needed.

#### ***Acquisition of motor skills involves:***

- learning about what to do (thinking skills)
- actual practise
- physical activities such as typing, filing require the use of psychomotor skills
- theories about skill learning involves moving on a continuum from a level of unawareness to expert performance where a skill is done with automaticity

Bloom working with Simpson developed the following hierarchy of learning

Psychomotor skills that were examined in Unit 3.4

- Perception
- Set
- Guided response
- Mechanisation
- Complex overt response
- Adaptation
- Organisation



## Summary

Gagné's classification of learning outcomes was an attempt to develop a comprehensive framework to explain learning. In one sense, Gagné's framework was not a new theory but an amalgam of previously developed theories. However, it was an attempt to provide a comprehensive account of how learning occurred.

Gagné has made major changes to his classification since it was first published in 1965. In the most recent version of his classification, Gagné identified four main categories of learning outcomes:

- intellectual skills
- learning strategies
- motor skills
- attitudes

He further subdivided intellectual skills into:

- concrete concepts
- defined concepts
- higher order rules
- cognitive strategies

Gagné was also interested in the ways in which some types of learning are dependent on other types of learning. His description of hierarchies of learning was an attempt to show that it was possible to improve the speed and ease with which a person learnt by optimising the learning sequence.



### Check your progress

1. Describe the process involving in remembering the information in this unit.

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2. Explain how you would successfully teach a skill in your area of specialisation.

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3. Using the information model explain why a teacher's enthusiasm improves student learning and motivation.

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4. Devise some strategies that you could use to become a more effective learner and which you could teach to your students.

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***Discuss your answers with your tutor.***

## Section 3



### Relationship between theories

The theories that have been introduced in this unit can be interrelated in two major ways. The first way is in terms of their evolution. The second is in terms of their applicability to learners at different stage of development.

#### The evolution of theories of learning

Theories of learning have been developed over time. Relationships can therefore be seen between theories that were developed later and theories that were developed earlier. Some theories have tended to replace those that have preceded them. However, a more common pattern is for later theories to incorporate or adapt aspects of earlier theories. This pattern is very evident in the case of the theories that have been introduced in this unit.

Skinner acknowledged the work of Pavlov, building Pavlov's theory of classical conditioning into his own theoretical framework even though he renamed it respondent conditioning.

Gagné's framework incorporated a variety of theories. He made specific provision for classical conditioning, operant conditioning and information processing theory.

Ausubel's theory of meaningful verbal learning was not intended to be a comprehensive theory of learning. Ausubel himself said that the theory of meaningful verbal learning was not intended to deal with learning that could be explained in terms of classical conditioning, instrumental conditioning (i.e. operant conditioning), motor learning, perceptual learning, or discriminant learning.

It might be thought that Rogers' humanistic theory is an example of a theory that represents a complete break with previous theories. However, Rogers himself indicated that he saw value in the use of programmed learning for some purposes. As was explained, programmed learning was an approach developed by Skinner based on the principles of classical conditioning.

## **Relationships with the learner's stage of development**

The second way in which theories interrelate is through their relationship to an individual's stage of development. One of the important results of Piaget's research was the recognition that the way that a person learns changes as they mature. Some learning theories are more applicable to learning at one stage of a person's life than at another. Piaget's developmental theory provides a framework to which we can connect a number of other theories.

The methodology that Piaget used to study learning represented a variety of discovery learning. Piaget gave the person he was studying a task to do and observed how he/she attempted to carry out that task. By asking them to explain what they were doing, Piaget attempted to discover the person's cognitive processes. However, Ausubel's theory specifically related to reception learning. In this sense, Ausubel's theory of meaningful verbal learning is more limited than Piaget's theory.

Gagné's theoretical framework also connects to other theories, although the connections are not as obvious as the connection between Skinner and Pavlov's theories.

## **The relationship between the individual and the learning environment**

The stimulus-response theorists tried to explain learning in terms of changes in the environment in which the learner was placed. On the other hand, the cognitive theorists tried to explain learning in terms of what went on in the learner's mind. A person's actions were thought to be more a product of a person's thoughts and feelings.

One way this difference shows up is in terms of the way in which different theorists interpret the source of students' motivation to learn.

Skinner (as well as other theorists in the behaviourist tradition) believed that learning is controlled by the environment — that reinforcers in the learner's environment lead to strengthening some responses rather than others. Skinner therefore looked to changes in the environment to improve learners' motivation.

The complementary position taken by Piaget, Rogers and Ausubel is that people are naturally curious and that their curiosity will drive them to learn, if the situation in which they find themselves allows it.

Present-day writers generally consider that the learning environment and the person both contribute to the way in which a person learns.





# Assignment No. 5.3-2

## Unit 5.3 Learning Theories

You are now required to complete **Assignment 5.3 - 2** which you can find at the end of this unit or which will be distributed by your tutor.

# Glossary

**Accommodation**

The process by which cognitive structures are modified.

**Assimilation**

The process of responding to the environment in accordance with one's cognitive structures.

**Advance organiser**

A part of the material that is introduced in advance of the main teaching and is more abstract, general and inclusive. An advance organiser is used to explain and integrate the material it precedes.

**Classical conditioning**

The procedure for modifying behaviour in which repeated pairing of a neutral stimulus with an unconditioned stimulus leads to development of a conditioned response that will be given to the conditioned stimulus alone

**Cognitive structure**

An individual's organisation, stability, and clarity of knowledge in a particular subject matter held at any given time. A cognitive structure is presumed to be hierarchical in nature with the most inclusive concept at the apex and increasingly specific concepts towards the base.

**Comparative organiser**

Advance organisers, which are used to highlight the similarities between new learning material and previously learned material.

**Concrete-operational stage**

According to Piaget, the third stage of development extending from about age 7 to age 12. It is the stage during which the person learns to apply logical thought to concrete problems.

**Conditioned stimulus**

In classical conditioning, a neutral stimulus that does not elicit a natural and automatic response.

**Differential reinforcement**

In operant conditioning, the reinforcement of some responses but not others in the process of shaping.

**Fixed interval schedule**

In operant conditioning, a schedule of reinforcement in which the same amount of time elapses between successive reinforcements.

**Fixed ratio schedule**

In operant conditioning, a schedule of reinforcement in which the same number of responses occur between successive reinforcements.

**Formal-operational stage**

In Piaget's developmental theory, the fourth and last stage of cognitive development typically beginning about age 12. It is only once the person reaches this stage that they begin to apply logical reasoning to abstract problems.

**Integrative reconciliation**

In Ausubel's theory of meaningful verbal learning, the principle of reconciling and integrating new ideas with previously learned content.

**Hypothetical-deductive reasoning**

Deducing conclusions from hypotheses rather than from facts.

**Operant conditioning**

Conditioning in which the rate of responding is determined by a stimulus that follow the response

**Operation**

An action that can be internalised or thought about and is mentally reversible; i.e. can take place in one direction or the other.

**Pre-operational stage**

According to Piaget, the third stage of cognitive development beginning at about age 2 and extending to about age 7. During this stage the child becomes increasingly able to represent events externally rather than being dependent on sensori-motor actions.

**Progressive differentiation**

In Ausubel's theory of meaningful verbal learning, the most general and inclusive ideas are presented first and then progressively differentiated in terms of detail and specificity.

**Reception learning**

The situation where what is to be learned is presented to the learner rather than independently discovered by them. The learner is required to comprehend the material meaning fully and incorporate it or make it functionally reproducible for future use.

**Reflective-abstraction**

Reflection resulting in abstraction of a higher level.

**Reinforcer**

A stimulus that strengthens a conditioned response. In classical conditioning (i.e. respondent conditioning) the reinforcer is presented prior to the response. In operant conditioning, the reinforcer is presented after the response.

**Reinforcement**

A strengthening in the response. In operant conditioning, an increase in the probability that a response will occur.

**Respondent conditioning**

The same as classical conditioning

**Schema**

The potential to act in a particular way.

**Scientific-inductive reasoning**

Reasoning from specific facts to general conclusions

**Sensori-motor stage**

In Piaget's theory, the first of the four stages of cognitive development. According to Piaget it typically extends from birth to about age two.

**Shaping**

In operant conditioning, the process by which the time taken to obtain the desired response is reduced by a combination of differential reinforcement and successive approximation.

**Successive approximation**

In operant conditioning, the narrowing of the range of responses to be reinforced in the process of shaping.

**Unconditioned stimulus**

In Pavlov's theory of classical conditioning and Skinner's theory of respondent conditioning, a stimulus which elicits a natural and automatic response.

**Variable interval schedule**

In the case of operant conditioning, a schedule of reinforcement in which the period of time that elapses between successive reinforcements varies.

**Variable ratio schedule**

In the case of operant conditioning, a schedule of reinforcement in which the number of responses between successive reinforcements varies.





## Assignment Number 5.3 – 1

### Unit 5.3 Learning Theories

**To be completed and returned to your tutor for assessment.**

**This is an Open Book assignment and you may refer to whatever references you have at your disposal.**

**To have attained the required competency you need to obtain at least 8 correct responses for Question 1 and 13 correct responses for the remainder of the questions.**

**Name:** \_\_\_\_\_ **Due date:** \_\_\_\_\_

#### Question 1

Answer *true* or *false* to the following statements:

- 1.1. \_\_\_\_\_ Every change in a person's behaviour indicates that some learning has occurred.
- 1.2. \_\_\_\_\_ In Pavlov's theory of classical conditioning the unconditioned stimulus acts as a reinforcer.
- 1.3. \_\_\_\_\_ According to Skinner's theory of operant conditioning, a response which has been reinforced on a variable interval/variable ratio schedule is less resistant to extinction than a response which has been reinforced on a variable interval/fixed ration schedule.
- 1.4. \_\_\_\_\_ According to Pavlov's theory of classical conditioning, a conditioned stimulus produces exactly the same response as the response elicited by the unconditioned stimulus with which it was paired
- 1.5. \_\_\_\_\_ According to Skinner's theory of operant conditioning, a negative reinforcer diminishes the probability of a response when it is added to a situation.

- 1.6. \_\_\_\_\_ In Piaget's developmental theory of learning an operation is always mentally reversible.
- 1.7. \_\_\_\_\_ According to Skinner's theory of operant conditioning, a response is made in anticipation of a stimulus rather than being elicited by the stimulus.
- 1.8. \_\_\_\_\_ In Piaget's developmental theory, the process by which new schemata are altered is called *assimilation*.
- 1.9. \_\_\_\_\_ In Piaget's developmental theory, maturation determines the range of possibilities at a specific stage of development.
- 1.10. \_\_\_\_\_ The two stages of development in which most *adults* operate are the pre-operational stage and the concrete operational stage.

## Question 2

In the following scenario identify the unconditioned stimulus, the conditioned stimulus and the conditioned response:

*A baby is taken to the doctor to receive an injection. When the needle is put into the baby's arm the baby starts to cry. Three months later the baby is taken to the doctor for a check-up. As soon as the baby sees the doctor the baby begins to cry.*

- 2.1 Unconditioned stimulus: \_\_\_\_\_
- 2.2 Conditioned stimulus: \_\_\_\_\_
- 2.3 Conditioned response: \_\_\_\_\_



**Question 3**

In the following scenario identify the reinforcer, the operant and the cue and the operant:

*A small manufacturing company was experiencing a high incidence of absenteeism. A new incentive program was introduced to combat this. Workers were allowed to participate in a lottery if they had not been absent at all for the past month. At the end of each month the names of all the workers who had not been absent were placed in a basket. One name was picked out and that person won a cash prize. Over the eleven months following introduction of the incentive program, absenteeism was 30% lower than for the eleven months before the program was introduced*

3.1 Reinforcer: \_\_\_\_\_

3.2 Operant: \_\_\_\_\_

3.3 Cue: \_\_\_\_\_

**Question 4**

Alongside each of the following statements write the stage of development during which the behaviour first appears, according to Piaget

4.1 making drawings \_\_\_\_\_

4.2 reasoning deductively \_\_\_\_\_

4.3 grasping an object \_\_\_\_\_

4.4 using language \_\_\_\_\_

4.5 explaining why a past event occurred as it did \_\_\_\_\_

**Question 5**

Alongside each of the following statements write the name of the theorist of the three you have so far studied whose theory of learning best accounts for each of the following learnt behaviours:

5.1 driving a car \_\_\_\_\_

5.2 feeling anxious while flying in an aircraft  
\_\_\_\_\_

5.3 estimating how much profit a new business should be able to make in its first twelve months of operation  
\_\_\_\_\_

**Question 6**

Educational theorists generally agree that the purpose of teaching is to facilitate learning. Where they disagree is on what facilitates learning.

Alongside each of the following statements write the name of the theorist whose theory the statement most closely matches:

6.1 learning is facilitated by receipt of a stimulus following a response which increases the probability of the response recurring.  
\_\_\_\_\_

6.2 learning is facilitated by the occurrence of a state of disequilibrium that drives the learner to try to assimilate the new information.  
\_\_\_\_\_

6.3 Learning is facilitated through pairing of a stimulus with another stimulus that already elicits as response.  
\_\_\_\_\_



## Assignment Number 5.3 – 2

### Unit 5.3 Learning Theories

To be completed and returned to your tutor for assessment.

This is an Open Book assignment and you may refer to whatever references you have at your disposal.

Name: \_\_\_\_\_ Due date: \_\_\_\_\_

#### Question 1

Provide, from your own experience, an example of a formal piece of instruction which conforms to each of the following theories:

- Ausubel's theory of meaningful verbal learning
- Gagné's theory of classes of learning

This piece of instruction may be part of a distance education package, a textbook which has been designed as a learning package, an example of a program taught face-to-face.

For each of the examples:

1. Name the program.
2. Give a short (100 words or less) description of the program.
3. Identify the types of students for whom it is intended.
4. Describe the features of the program which indicate that it conforms to the particular theory.

#### Question 2

Describe in less than 500 words how you would set up a learning program in the subject area for which you are responsible that would conform to Rogers' Humanistic theory of learning.

**Question 3**

You are required to develop a training program for TVET students in a subject area for which you are responsible. You know that the majority of students who will be taking the program are still functioning at what Piaget called the concrete operational stage of cognitive development. Describe in 500 words or less what approach you would take to the design of the program in order that the needs of these learners will be met. In describing your approach, refer to the instructional strategies you would employ, the types of instructional aids you would provide, the delivery methods you would use and the types of student support mechanisms you would put in place.

**References List**

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