

---

## UNIT 2 BEHAVIOURISTIC SCHOOL OF THOUGHT

---

### Structure

- 2.1 Introduction
- 2.2 Learning Outcomes
- 2.3 What is Behaviourism?
- 2.4 Learning through Stimulus-Response (S-R)
  - 2.4.1 Pavlov and Classical Conditioning
  - 2.4.2 Watson's Learning Theory
  - 2.4.3 Guthrie's Theory of Association by Contiguity
  - 2.4.4 Thorndike and Connectionism
  - 2.4.5 Skinner and Operant Conditioning
  - 2.4.6 Gagne's Learning Theory
  - 2.4.7 Social Learning Theories
- 2.5 Application of Behaviourism in Instructional Design
- 2.6 Let Us Sum Up
- 2.7 Check Your Progress: Hints to Answers

---

### 2.1 INTRODUCTION

---

In the previous Unit of this Block, we have discussed about how learners learn? To find out the answers to this question you have to read the different perspectives of learning discussed in the previous Unit of the Block. By now, you are clear about the concept of learning, relationship between instruction and learning.

The various theories of learning attempt to explain the mechanism of behaviour involved in the learning process. Various psychologists have formulated different theories of learning, which have evolved over a period of time. These learning theories fall under different categories such as Behaviourism, Constructivism and Cognitivism. Theories of learning presented in the Units of this Block are considered as foundations for designing instruction.

The origins of Behaviourism can be traced back to the early 20th Century. At that time it was thought that human activity or learning could be predicted and explained by studying the behaviour of animals. The essentials of the work involved animals responding to stimuli, that is Stimulus-Response. The learning model became more refined with the study of the effect of conditioning.

This Unit discusses the learning theories of five main Behaviourists, namely, Ivan Pavlov, J.B. Watson, E.R. Guthrie, Edward Lee Thorndike, R.M. Gagne, B.F. Skinner, and Albert Bandura. The purpose of this Unit is to introduce you to some behaviouristic theories so that you can understand how these theories had an influence over our understanding of human learning. This Unit has certain activities for you to do that ensure your understanding of the content presented here, as well as to help you reflect upon your experiences related to distance education.

---

## 2.2 LEARNING OUTCOMES

---

After going through this unit, you should be able to:

- differentiate between different schools of behaviouristic learning theories;
- explain the main features of behaviourist theories;
- explain the main features of social learning theory;
- list the behavioural objectives for an area of instruction; and
- describe the application of behaviouristic principles.

---

## 2.3 WHAT IS BEHAVIOURISM?

---

Behaviourism is concerned with observable and measurable behaviour. For behavioural psychologists, learning is the modification of behaviour brought about by experience. Behavioural psychologists observed the way animals learned and believed that this provided insight into how humans learn. They tried to find rules to explain and predict how learning would occur in every learning situation. They explained learning in terms of changes in the subject's behaviour. The prominent Psychologists who developed the behaviourist approaches to learning were Ivan Pavlov (1849-1936), Edward Thorndike (1874-1949), John Broadus Watson (1878-1958) and Burrhus Frederic Skinner (1904-1990). These behavioural psychologists focused on conducting controlled laboratory experiments and objectively recording observations. These methods provided the basis for psychology to become a respectable science that used scientific methods of research and experimentation. The focus was directed on the observable forms of behaviour, which included not only on the bodily movement as seen by an observer watching a subject, but also on the internal physical processes related to overt behaviour. Ultimately, this model of learning developed into a theory of learning called Behaviourism.

In the following sections, the contributions of the behaviourists to the school of learning are discussed with suitable illustrations. The behaviouristic learning theories can be broadly classified into the followings two categories.

- i) **Stimulus-Response (S-R) theories without reinforcement:** These include Pavlov's Classical Conditioning Theory of Learning, and Watson's and Guthrie's Learning Theories.
- ii) **Stimulus-Response theories with reinforcement:** These include Thorndike's, Hull's and Skinner's learning theories.

---

## 2.4 LEARNING THROUGH STIMULUS-RESPONSE (S-R)

---

In behaviourism learning is viewed as the ability to perform new behaviours, which are established as goals. There is an effort to create conditions, which will enable the learner to demonstrate these behaviours, and to continue performing them over a period of time. One creates these changes in behaviour by manipulating the environmental conditions, usually in a consistent manner. Attention is given to these environmental changes both before and after a response from the learner.

### 2.4.1 Pavlov and Classical Conditioning

Simple observations of animals led to several different theories of learning. Ivan Pavlov (1849-1936), a Russian physiologist and psychologist, using simple experimental

techniques, demonstrated how to teach an animal to give natural responses to neutral stimuli. A neutral stimulus is a stimulus that produces no automatic response other than catching attention. The method of associating or pairing a potent stimulus with a neutral stimulus is called classical conditioning. Pavlov demonstrated the simple relationship between stimulus and response in instructing (conditioning) an organism to modify its behaviour. Pavlov used certain technical terms to explain the process of conditioning. These are:

- CS - Conditioned stimulus,
- US - Unconditioned stimulus,
- UR - Unconditional response, and
- CR - Conditional response.

### I) How does learning occur according to classical conditioning?

Pavlov carried out an experiment on a dog in his laboratory. Pavlov conditioned a dog to salivate by linking a neutral stimulus namely the sound of a bell to an unconditioned stimulus i.e. food. Therefore, the response salivation to the ringing of the bell is called conditioned response (CR). So, by the process of conditioning an association is formed between conditioned stimulus (CS) and conditioned response (CR).

A new stimulus is presented in association with the original stimulus. After a time when the original stimulus is withdrawn, it is found that new stimulus now elicits the original response. The response has been conditioned to the new stimulus.

For example, given the sight of food, a hungry dog will naturally salivate. In this case food is the stimulus, and salivating is the response. Normally, a 'neutral' stimulus, like the sound of a bell ringing, will have no such effect on the animal. However, if, on a number of occasions the bell is rung just before food is presented to an animal, the sound alone will eventually make the dog produce saliva, or, in the language of behaviourism, to 'evoke the salivation response'. In other words, any stimulus that readily leads to response can be paired with a neutral stimulus in order to bring about the type of learning described. It is important to note that the learner is typically unaware of this growing association. The conditioned stimulus should precede the unconditioned stimulus. Conditioning depends on the intensity of the stimulus.

This process can be illustrated as below:

US (Food)	—————→	UR (Saliva)
CS (Bell)+US(Food)		UR (Saliva)
CS (Bell)		CR (Saliva)

### II) Principles of Conditioning

To explain his theory, Pavlov has stated the **principles of conditioning**, which are as follows:

- **Principle of Reinforcement**

The term reinforcement refers to the following of the conditioned stimulus by the unconditioned stimulus. i.e. food following the bell. Without reinforcing the bell with food, no conditioning could be developed. Food was reinforcement. This is applicable to a student's learning where the learning becomes effective when the students are rewarded immediately. Quite often unconditioned stimulus reduces a drive or tension. So, the term reinforcement also refers to a reduction in drives or tensions.

- ***Principle of Sequence and Time Intervals***

There is an optimal time between the presentation of the conditioned stimuli and the unconditioned stimuli. If there is any variation, i.e., an increase or a decrease in the optimal time, then there is no conditioning and a bond or an association cannot be formed.

- ***Principle of Stimulus Generalization***

If we are conditioned to one thing, say a bell, then we would be conditioned to all sorts of bells. In earlier stages of learning by conditioning, the animal responds to a number of stimuli, which accompany the exact conditioned stimulus. The response is the greatest to the conditioned stimulus and goes on decreasing to the other stimuli, which are less similar to the original one.

- ***Principle of Differentiation***

When two stimuli are sufficiently distinguishable, the organism can be conditioned to respond to one of them. This is done by regularly reinforcing one stimulus and not reinforcing the other.

- ***Principle of Extinction***

If the sound of the bell is not followed by food, it implies that there is no reinforcement. A stage is reached when the dog stops to secrete saliva. This stage is called extinction.

- ***Principle of Spontaneous Recovery***

This explains that there is no complete extinction on account of the time interval, but there is inhibition of the Conditional response (CR), when the dog is brought out of the experimental set up and again put in the set up. After a lapse of certain amount of time, the dog responds to conditioned stimulus (CS), which is called spontaneous recovery.

- ***Principle of Inhibition***

Pavlov mentions two types of inhibition:

- I) *External Inhibition:* Once the dog was conditioned, it was found not to give a Conditional response, in the presence of some stranger.
- II) *Internal Inhibition:* Pavlov observed that if a complete extinction of Conditional response is obtained by not providing food to the dog and it is then given a period of 24 hours rest, the Conditional response will show spontaneous recovery when the dog is tested again. The spontaneous recovery proves that the conditional response while in extinction did not represent dying of the reflexes or any real weakening of the already learnt stimulus-response connections. It was blocked by some internal inhibitory process.

- ***Principle of Higher Order Conditioning***

When conditioning is done to a new stimulus on the basis of a previous conditioned stimulus, it is designated as a higher order conditioning. By this process conditioning can be done by associating one stimulus with another.

- ***Principle of Secondary Reinforcement***

Conditional Response is established to some stimulus other than the primary one (food-elicited salivation). By repeated presentation, it was found that sight of food led to salivation or a partial response. This is called secondary reinforcement.

- **Principle of Age and Conditioning**

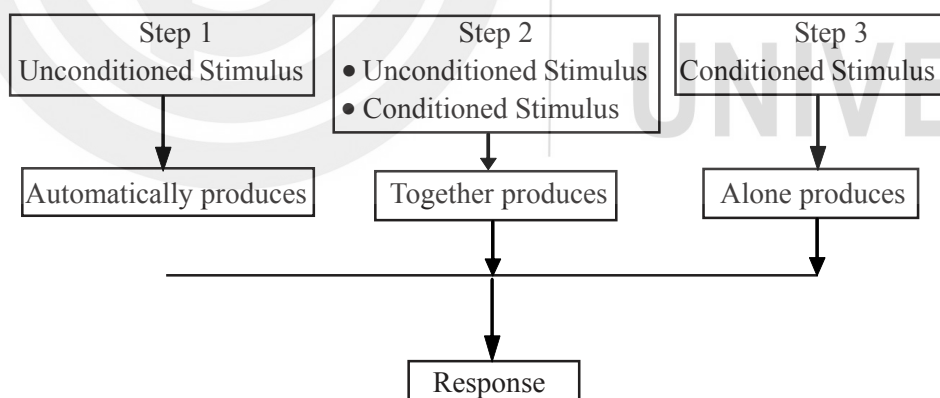
The process of conditioning is valuable at all ages, especially in early childhood. From these observations several learning theories grew, which include classical and operant conditioning. We have discussed them in the subsequent sections.

**The application of Classical Conditioning theory for designing instructional materials for the distance learners are as follows:**

- Assessment of the entry behaviours of the distance learners before designing instructional materials.
- Statement of learning objectives, which decide what to present and how to assess a student's learning.
- Analyse what is involved in the learning tasks of distance learners.
- Develop a sequence of learning tasks that move from simple to complex.
- Design assessment strategies to measure a student's learning in relation to the stated objectives.
- Use guidance, feedback and rewards to reinforce the key points of learning and the process of learning.

### 2.4.2 Watson's Learning Theory

John B. Watson (1878-1958) was a behavioural psychologist, who expanded Pavlov's work. He suggested that human activities could be explained as learnt habits. The work by Watson and Pavlov is called classical conditioning and can be summarized as 'S-R' (Stimulus-Response theory). Watson drew heavily upon Pavlov's work and became convinced that learning was a process of building conditioned reflexes through the substitution of one stimulus for another. Watson put forward the law of frequency or exercise. To him when stimulus and response occur at the same time in close contiguity, the connection is strengthened without reinforcement or reward. Fig. 2.1 shows how the various types of stimuli produce an automatic response.



**Fig. 2.1: Stimulus-response theory**

### 2.4.3 Guthrie's Theory of Association by Contiguity

Edwin R. Guthrie (1886-1959) developed this theory of learning similar to that of Watson. Guthrie suggested that animals learn to associate stimuli and responses merely through their contiguity. Learning, in other words, depended on a response occurring close in time to particular stimuli. Reward was not necessary. The essence of his theory is as follows:

- Impact of Reward:** The function of reward according to Guthrie is not to strengthen the Stimulus-Response connection, but rather simply to change the stimulus (S) situation. When an individual is rewarded, the stimulus is changed, thereby preserving the previous Stimulus-Response connection.

- ii) **The Function of Punishment:** The function of punishment is to elicit other responses, any one of which may become associated with the preceding stimuli.
- iii) **The Importance of Practice:** Learning of Stimulus-Response connections occurs in one trial only. The fact that the learnt behaviour changes with practice is due to individuals attending to different aspects of the stimulus environment on each trial, and/or to associating different components of a complicated response with the stimuli on each trial.

**Check Your Progress 1**

**Note:** i) Write your answers in the space given below.  
ii) Check your answers with the answers given at the end of this Unit.

1) Define the following terms in your own words with examples:

- a) Unconditioned stimulus
- b) Neutral stimulus
- c) Unconditioned response
- d) Conditioned stimulus
- e) Conditioned response

.....

.....

.....

.....

.....

.....

.....

.....

2) Explain the process of stimulus and response theory in classical conditioning. Discuss how this is applied in distance learning.

.....

.....

.....

.....

.....

3) What are the similarities and differences that you find between the theories of Watson, Pavlov and Guthrie?

.....

.....

.....

.....

#### 2.4.4 Thorndike and Connectionism

About the time Pavlov was observing dogs in his laboratory, an American psychologist named Edward L. Thorndike was in his laboratory observing cats. Thorndike (1874-1949) made a very significant contribution to behavioural theory in exploring the effect of consequences of behaviour on subsequent behaviour. He was the first psychologist who is credited with recognizing the importance of reinforcement in learning. Thorndike conducted a series of experiments on the length of time it took a cat to escape from a cage. In one of his earliest experiments, he placed a hungry cat in a cage with a door that would open if the cat properly manipulated a release mechanism. A dish of food was placed outside the cage to motivate the cat to attempt to get out of the cage. Through the trial and error process, the cat eventually learnt to open the cage door quickly whenever it was hungry by pulling the string. Thorndike noted that the cat had been conditioned to associate pulling a string to escape from the cage. Earlier experiments conducted on animals had convinced Thorndike that reinforcement was of central importance for learning. He demonstrated that the consequences of a response can strengthen the connection between the stimulus and response. The reward for learning, not the simple occurrence of stimulus and response, was seen as determining how rapidly learning took place. He formalized his research as the law of effect. This law states that if a stimulus was followed by a positive response, then the stimulus-response connection would be strengthened. For example, a response is strengthened if it is followed by pleasure, and weakened if followed by displeasure (or pain). This principle has become a keystone of behavioural theory and is known as reinforcement. Based on the above, Thorndike propounded the following laws of learning:

- i) **The Law of Readiness:** This law states that, “when any conduction unit is ready to conduct, for it to do so is satisfying. When any conduction unit is not in readiness to conduct, for it to do so is annoying.”
- ii) **The Law of Effect:** This law states that, “if a stimulus is followed by a positive response, then the stimulus-response connection would be strengthened and the desired behaviour is more likely to occur.”
- iii) **The Law of Exercise:** It states that “any response to a situation will, other things being equal, be more strongly connected with the situation in proportion to the number of times it has been connected with that situation and to the average vigour and duration of the connection”.

#### Educational Application of Thorndike’s Theory of Connectionism

- For applying the first law to the educational situations, the distance education specialist/instructional designer should make sure whether the students are ready to receive the knowledge mentally. For this, the created materials are to be based on a learning environment where the students can spontaneously participate. The teachers should arouse the link between the experiences of students of everyday life with the knowledge to be taught.
- The law of effect can be realized in distance learning materials by providing the experiences to the students, which are satisfying and meaningful in the form of examples. They should organize following the principle of ‘simple to complex’. According to the law, learning takes place when it results in satisfaction and the learner derives pleasure out of it. In the situation when the learner meets a failure or gets dissatisfaction, the progress in learning is blocked. Therefore, the satisfaction, or dissatisfaction, pleasure or displeasure obtained as a result of some learning ensures the degree of effectiveness of that learning.

- For applying the third law, more opportunities should be provided to the students to use and repeat the experiences they undergo while studying the materials. The drill strengthens the bonds of Stimulus-Response and review of the unit maintains connections and reinforces learning.

Thorndike's work established the base for almost all subsequent theorizing about learning in America. While early behaviourist theorists such as Watson and Thorndike hoped that their explanations of learning would be useful in understanding the human learning process generally, their models fell short of explaining the complex nature of learned human behaviour.

### 2.4.5 Skinner and Operant Conditioning

B.F. Skinner (1904-1990) is the psychologist who has done the most work to develop and apply the ideas originally proposed by Thorndike. Skinner continued and expanded Thorndike's work and is credited with developing the theory we now call Operant Conditioning. In his first experiment, Skinner enclosed a rat in a small box, which contained a food tray and a lever. When a hungry rat is first placed in the box, it emits a wide variety of responses or Operant (e.g., getting up on its hind legs, sniffing around, and trying to climb the walls). Eventually, more or less by accident, it presses the lever. Later it presses it again and again. This shows how often (the frequency) the rat presses the lever. This is the rat's baseline behaviour. In this example, pressing the lever is the unconditioned stimulus. Whenever the lever is pressed, the animal is reinforced immediately by the application of a reward such as food. By progressively reinforcing the operant that come closer to the goal behaviour, a process called shaping, the animal is gradually taught to perform quite complex behaviour. Hence, in the initial stages of conditioning an animal to press a lever or peck a button, the animal's response is reinforced each time it turns in the direction of the lever or button. This is called continued reinforcement. Subsequently, reinforcers are only administered when the animal adds to the response (e.g., by moving closer to the lever or button). Over a number of trials, the animal progressively acquires the desired behaviour (e.g., pressing a lever). At this point, reinforcement is moved to an intermittent schedule, and secondary reinforce (such as lights and buzzers) may be introduced to facilitate behaviour. When primary reinforce is no longer effective (even a rat becomes satiated with food pellets), intermittent reinforcement may be presented in a fixed ratio, that is, after a specified period of time when a response occurs; or at a variable interval, at any time subsequent to a correct response. In general, continuous reinforcement is necessary to establish responses. Once the response is established, an intermittent schedule enhances the retention of behaviour. If a response is not intermittently reinforced, it will gradually fade. Similar results of training may be achieved by using negative reinforcement. For example, the floor of the Skinner box may be mildly electrified. On the performance of the appropriate operant, the current is turned off. A bright rat would quickly learn to sit on the lever. In general, positive reinforcement is found to be more effective than negative reinforcement and avoids side effects.

Operant conditioning has been demonstrated in the behaviour of many other animals, such as a pigeon pecking a key, a dog raising its paw, a horse nodding its head, etc. In principle, any operant behaviour can be made more frequent by being reinforced soon after it occurs.

In human beings, the same model applies. An infinite variety of human behaviour can be made more or less frequent or probable by the use or non-use of reinforcement, contingent or some response. The response can be anything – such as an action, a statement, or even inaction. As we have seen in the preceding sections, a key to the success of operant conditioning lies in the application of reinforcement and punishment.



For a distance learner, reinforcement may be in the form of timely receiving study materials, positive grades in assignments, and the successful completion of a course. Often this type of reinforcement is called extrinsic reinforcement.

The following activity is designed to help you think and write about the ideas associated with classical and operant conditioning.

<b>Check Your Progress 2</b>		
<p><b>Note:</b> i) Write your answer in the space given below. ii) Check your answer with the answer given at the end of this Unit.</p> <p>Compare and contrast the ideas of classical and operant conditioning by completing the following table.</p>		
<b>Think about</b>	<b>How are Operant Conditioning and Classical Conditioning alike?</b>	
Concept of learning		
Role of reinforcement		
Principle of association		
<b>How are they different with regard to</b>	<b>Operant Conditioning</b>	<b>Classical Conditioning</b>
Person's control of initial behaviour		
Factors influencing learning		
Type of reinforcement		

#### 2.4.6 Gagne's Learning Theory

Robert M. Gagne was involved in the structural analysis of the learning processes and the design of instruction. By devising a systematic approach to instruction his theories strongly influence the design of many instructional programmes. For Gagne it was important to recognize the importance of process in learning, and outcomes were seen as the main criteria of successful instruction. Robert M. Gagne distinguishes between two types of conditions namely internal and external. The internal conditions can be described as states and include attention, motivation and recall. The external conditions can be thought of as factors surrounding ones behaviour, and include the arrangement and timing of stimulus events. Gagne's learning theory consists of five major categories of human capabilities as provided in Table 2.1.

**Table 2.1: Categories of Gagne's Learning Theory**

<b>Categories</b>	<b>Examples</b>
Verbal information	Learning the alphabet
Intellectual skills	Addition and subtraction
Cognitive strategies: inductive and deductive reasoning	Exploring the physical and chemical changes
Attitudes	How one feels about protecting the environment
Motor skills	Drawing, typing and driving

Gagne proposed that all learning must proceed from simple to complex in well-defined stages. Each step of the evolving content or skill is to be defined by a careful examination

of the entire learning sequence. These learning types are arranged from simple to complex. The hierarchy suggests that lower steps must be acquired before higher steps are learnt because the mode of instruction is sequential.

Gagne's eight types of learning are discussed below.

- **Type 1. Signal learning:** The individual acquires a conditioned response to a given signal (a red traffic light for example); the learning is involuntary.
- **Type 2. Stimulus-Response learning:** Repeating words or numbers, for example, the individual responds to specific stimuli; the correct response is rewarded.
- **Type 3. Chain learning or chaining:** Using a pencil to copy and writing numbers in a sequence. Two or more previously learned Stimulus-Response connections are linked together.
- **Type 4. Verbal association learning:** Writing numbers by 100s and 500s. Chains that are verbal e.g., a learner identifies an object and calls it by its proper name (e.g., 'the red ball'). Or, finds a Hindi or French equivalent for an English word.
- **Type 5. Multiple discrimination learning:** Interpreting and constructing simple graphs. The learner learns to distinguish between motor and verbal chains, which she/he has already acquired.
- **Type 6. Concept learning:** Interpreting simple graphs. A common response to a class of stimuli; in learning a concept the learner responds to stimuli by identifying its abstract characteristics like shape, colour, etc.
- **Type 7. Rule learning:** Cognitive ability to apply relationships between two or more concepts. For example; 'at 100° C water will boil'. Here temperature and boiling point are two concepts related by a rule.
- **Type 8. Problem solving:** The learner uses the rules learned to achieve some goals; problem solving is the combined product of two or more lower order rules. It thus requires an internal event i.e., thinking to take place for solving a problem. For example, a learner is posed with a problem to prove that air has pressure. For solving this problem she/he has to learn a few lower order rules, such as: (i) air can support a column of water; (experiment with the help of a tumbler, a piece of card board and water), (ii) the weight of air is approximately 15 pound per square inch on every surface in every direction; (iii) air pushes upwards as well as downwards.

Gagne's (1965) theory of conditions of learning has several implications for instructional design in the distance education system. The design of instruction should involve:

- analyzing requirements.
- selecting media and designing the instructional events. Additionally the instructional designer must keep in mind the following points when developing methods of instruction.

Skills should be learned one at a time and each new skill learned should build on previously acquired skills.

The analysis phase must identify and describe the prerequisite lower level skills and knowledge required for an instructional objective:

- Lower level objectives must be mastered before higher-level ones.
- Objectives must be stipulated in concrete behavioural terms.
- Positive reinforcement should be used in a repetitive manner.

### Check Your Progress 3

- Note:** i) Write your answer in the space given below.  
ii) Check your answer with the answer given at the end of this Unit.

Provide examples from your personal experiences as a distance learner for Gagne's Rule learning and Problem solving levels of learning.

.....  
.....  
.....  
.....

Behaviourists were unable to explain certain social behaviours. For example, adult learners do not imitate all behaviour that has been reinforced. Furthermore, they may imitate new behaviour after their first initial observation without having been reinforced for the behaviour. Because of these observations, Albert Bandura (1977) departed from the traditional operant conditioning stating that an individual could model behaviour by observing the behaviour of another person, which is known as social learning.

### 2.4.7 Social Learning Theory

Social learning theorists believed in the use of controlled laboratory experiments to find out about learning, but they did not believe that they could find out about human learning from experiments on animals. Social learning theory builds upon operant conditioning principles, but concern themselves primarily with the ways in which people acquire behaviour appropriate to their social context and to their immediate circumstances. One of the main social theorists is Albert Bandura, who expanded on behavioural principles, while acknowledging the importance of cognitive processes such as thinking, memory, and problem solving. Bandura stresses the role of internal cognitive structures, which are thoughts or memories of the brain which allow people to learn through observation or imitation of others. Bandura and others believed that the major incentive for learning is identification with other people. It is called social learning because it concerns itself mostly with the ways in which people acquire behaviour appropriate to their social context and to their immediate circumstances. Learning occurs through observing and copying other people's behaviour. Social learning is also sometimes referred to as observational learning theory.

Three principles are applied to the social learning theory. These are:

- Much human learning is a function of observing the behaviour of others.
- We learn to imitate by receiving reinforcement for performing certain behaviour, and maintain this imitative behaviour through continued reinforcement.
- Imitation or observational learning can be explained in terms of operant conditioning principles, provided it is correct to say that people can imagine both the reinforcement and the behaviour of models.

#### How does learning occur?

Bandura distinguishes between the acquisition of knowledge (learning) and the observable performance based on that knowledge (behaviour). He suggests that we all may know more than we show. Students may have learned how to add simple fractions, but perform badly on a test because they are anxious or sick or misread the question. Bandura notes that there are four important elements or processes associated

with observational learning. These are the desired behaviour (attention), retaining information or impressions (retention), producing the behaviours (motor reproduction), and wanting to repeat these behaviours (intrinsic motivation). We have explained these concepts below:

- **Attention:** You may have noticed how the sound (volume) of the television increases to attract attention during the commercial breaks. Like that, anything that attracts our attention is going to have an effect on observational or social learning. If the illustration/graphic presented in instructional material is interesting and novel, we are likely to turn our attention to learning.
- **Retention:** The ability to store information is an important part of the learning process and retention of the newly learned behaviour is essential for social learning. You store both verbal and written representation (such as step-by-step instructions or labels that describe the actions to be performed).
- **Reproduce:** In this step you actively perform the behaviour that has been observed. However, attention paid the observation and retaining the information has an impact on procreation imitating and duplication of information by a learner.
- **Intrinsic motivation and reinforcement:** Though we may acquire a skill or behaviour through observation we may not perform that behaviour until there is some motivation to do so. If we anticipate being reinforced for imitating the actions of a model, we may be motivated to pay attention, remember and reproduce the behaviours. Reinforcement is a significant component in learning. But in social learning theories, the value and role of reinforcement is expanded to include the social aspects of the environment. For example, social learning theory allows psychologists to explain why learners learn different skills in different countries or cultures. Social learning theories also include direct reinforcement, vicarious reinforcement and self reinforcement.
  - i) *Direct reinforcement* occurs during the process of modelling. For example, after you receive a good grade from your tutor, you receive praises from your counsellor or peers.
  - ii) *Vicarious reinforcement* occurs when we see others being rewarded or punished for particular actions and then modify our behaviour as if we had received the consequences ourselves.
  - iii) *Self reinforcement* is one of the most important academic reinforcers. Here, the students are reinforced by their personal goals, standards or criteria they have set for themselves; they don't depend on the reinforcement of others. For example, students may read and learn French literature because they enjoy reading or because they have discovered that such reading is essential to earn a good grade. Therefore, learning French is reinforcing for them because of their personal values.

**Check Your Progress 4**

- Note:** i) Write your answer in the space given below.  
ii) Check your answer with the answer given at the end of this Unit.

Describe the processes involved in Bandura's Social Learning.

.....  
.....  
.....

## 2.5 APPLICATION OF BEHAVIOURISM IN INSTRUCTIONAL DESIGN

In the previous sections, you learnt about behaviourist views on learning. This section will examine the implication of a behaviourist perspective on learning for designing instruction. To use the principles of operant conditioning a teacher has to plan and design instruction in precise steps, which are as follows:

- Define the desired behaviour.
- Identify the successive steps that are required if the student is to reach this standard.
- Immediately reinforce approximations to the desired behaviour.
- Communicate your ideas with your students.
- Change the frequency of your reinforcement as the students' behaviour changes (fading).
- Provide rewards for achieving desired behaviour.

In using operant conditioning to design instruction the steps could be adopted as presented in Fig. 2.2.

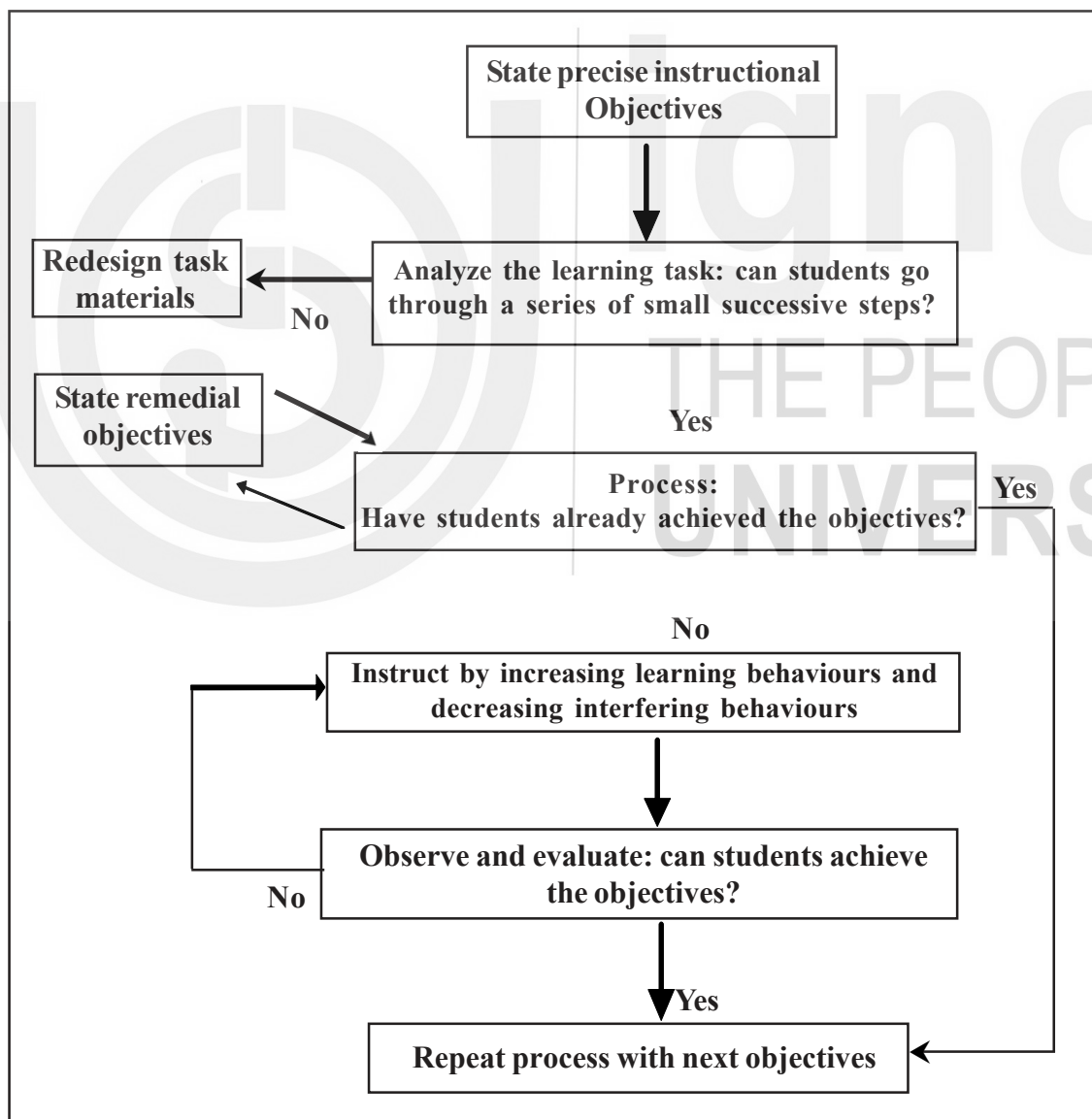


Fig. 2.2: A model of instructional design using the principles of operant conditioning

As illustrated, the principles of learning derived from behavioural theories can potentially affect instructional design decisions in many ways. One important implication is arranging schedules and types of reinforcement to optimally enhance learner motivation and achievement. Note that, although “reinforcement” sometimes consists of extrinsic rewards such as stars, verbal praise, or points credited toward grades, it often takes the simple form of feedback about the correctness of the response.

A second broad implication of behavioural theory is the need for designers to perform a task analysis before developing instructional materials. A task analysis defines the content needed to address the key instructional problem, thereby guiding the identification of objectives and development of instructional strategies, lesson material, and test items and creating smaller steps and increased opportunities for reinforcement.

Third, behaviourism strongly supports the usage of instructional objectives, particularly the behavioural type proposed by Robert Mager in 1984. Such objectives clearly identify the overt responses reflecting mastery of the content, the level of achievement indicating acceptable performance, and the conditions under which the evaluation takes place. Using such objectives, the instructor can assess objectively and reliably the degree of learning attained for each lesson goal.

Fourth, behavioral theories have inspired the development of several influential and evidence based instructional strategies and broader course designs. These include classic approaches such as Programmed Instruction by Skinner, Personalized System of Instruction (PSI) by Keller, Mastery Learning by Bloom, and Direct Instruction by Englemann & Carnine. These models and their many derivatives incorporate task analysis, precise content objectives, highly sequenced instruction, active responding, and reinforcement linked directly to performance.

### **Specifying behavioural objectives**

From a behaviorist perspective, the planning of instruction would start from an initial statement of the change of behaviour. This change in behaviour can take the form of the attainment of new knowledge, the acquisition of a new skill or a change of attitude. These three types of behaviour are: Cognitive, Affective and Psychomotor.

In 1956 Benjamin Bloom and his colleagues began development of a taxonomy in the cognitive, attitudinal (affective) and psychomotor domains. Robert Mager stated that the use of instructional objectives prompted interest in learners and educators. Gagne and Briggs who also had backgrounds in military and industrial psychology developed a set of instructions for writing objectives that was based on Mager’s work. By the late 1960’s most units were presented using behavioural objectives.

Behavioural objectives state that successful learners should be able to demonstrate what that they have learned. Each objective should have an outcome that can be easily measured and should state the conditions under which this behaviour will be achieved. We have discussed the three domains of human behaviour in detail, and a list of general and specific objectives in Unit 13 of Block 3.

There are three rules to follow when specifying an objective in behavioural terms:

- i) The objective has to describe behaviour that is observable and measurable or assessable;
- ii) The objective has to describe the desired direction of the change in behaviour;
- iii) The objective should describe the behaviour in the context of the content that has to be measured.

**Programmed Instruction:** B.F. Skinner proposed the Programmed Instruction, which is a major educational practice based on operant conditioning. Programmed Instruction is used as individualized instruction, which is developed keeping in view of individual learners and their learning pace.

The special features of programmed learning are as follows:

- A logical sequence of information is presented, one small unit at a time to the individual student.
- The student makes an active response to each unit.
- The student gets immediate knowledge of whether his or her result is correct or not.
- Each student works at his or her own pace.
- Programmers aim to get the student to perform in a very specific way.

Based on operant conditioning, Skinner's teaching machine was developed requiring the learner to complete or answer a question and then receive feedback on the correctness of the response.

Programmed instruction is no longer based exclusively on operant conditioning, mainly because work with different programmes has shown that instructional design principles are more important than the principles of reinforcement. It has been found that the factors basic to a good instructional package include the scope and sequence of the programme, the presentation mode, the sequencing of the frames, the difficulty of the steps between frames, and the assumptions made about students' pre-existing knowledge, motivation and capacity for independent work.

Gagne's work has made significant contributions to the scientific knowledge-base in the field of instructional technology, particularly in the area of instructional design. He outlined several steps that should be used to design instruction, which include:

- Identify the types of learning outcomes.
- Each outcome may have prerequisite knowledge or skills that must be identified.
- Identify the internal conditions or processes the learner must have to achieve the outcomes.
- Identify the external conditions or instruction needed to achieve the outcomes.
- Specify the learning context.
- Record the characteristics of the learners.
- Select the media for instruction.
- Plan to motivate the learners.
- The instruction is tested with learners in the form of formative evaluation.
- After the instruction has been used summative evaluation is used to judge the effectiveness of the instruction.

With the advent of behaviouristic approaches to instruction and the later developments in the field, individualized instruction took shape in the context of the open and distance learning system. Self learning materials are prepared, which are individual paced. The planning of designing instructions materials was preceded by behavioural objectives, sequencing and organizing the instruction etc. The behaviouristic approach to learning aimed at mastery learning, which includes continuous evaluation of competencies followed by remedial teaching where the students had failed to master the competencies.

Educational technology and Computer-Assisted Instruction (CAI) were also based on the behaviouristic principles that involved drill-and-practice controlled by the programme developer rather than the learner. Self instructional programmes were designed that included pre-test and post-tests and the self-directed assessment of students after completing the course.

---

## 2.6 LET US SUM UP

---

In this Unit we have described the Behaviouristic learning theories. The theory of behaviourism concentrates on the study of overt behaviours that can be observed and measured. Some key theorists in the development of the behaviourist learning theories were Pavlov, Watson, Thorndike and Skinner.

Behavioural learning theories offer us some insights into designing instruction effectively. Behaviourist theories emphasize the role of reinforcement in shaping students' behaviours. The applications of behaviouristic learning theories have had an impact on instruction. This may be seen in planning instruction, which begins with the specification of objectives followed by the teaching-learning process and evaluation, which tends to measure the attainment of the objectives.

Further, the learning theories have influenced the instructional methods, which are individualized in nature. The concept of programmed learning was evolved with the significant features of behaviourism, like prescribed objectives to be mastered, and concepts to be learnt in the form of frames followed by reinforcement, self assessment and remediation. Educational technology and computer-assisted instruction later came into the instructional scene, which were based on the behaviouristic principles.

---

## 2.7 CHECK YOUR PROGRESS: HINTS TO ANSWERS

---

### Check Your Progress 1

- 1) Please see sub-section 2.4.1.
- 2) Application of the process of stimulus and response theory in classical conditioning:
  - Assessment of the entry behaviours of the distance learners before designing instructional materials.
  - Statement of learning objectives, which decide what to present and how to assess a student's learning.
  - Analyse what is involved in the learning tasks of distance learners.
  - Develop a sequence of learning tasks that move from the simple to complex.
  - Design assessment strategies to measure a student's learning in relation to the stated objectives.
  - Use guidance, feedback and rewards to reinforce the key points of learning and the process of learning.
- 3) Similarities and differences that you find between the theories of Watson, Pavlov and Guthrie. Please read sub-sections 2.4.1, 2.4.2 and 2.4.3.

### Check Your Progress 2

- 1) Please see sub-section 2.4.1 for classical conditioning and sub-section 2.4.5 for operand conditioning and compare them.



### Check Your Progress 3

- 1) Please see sub-section 2.4.6 type 7 rule learning and type 8 problem solving.

Type 7. Rule learning: : Cognitive ability to apply relationships between two or more concepts.

Problem solving: The learner uses the rules learned to achieve some goals; problem solving is the combined product of two or more lower order rules. It thus requires an internal event i.e., thinking to take place for solving a problem. For example, a learner is posed with a problem to prove that air has pressure.

### Check Your Progress 4

- 1) Please see sub-section 2.4.7 and write about three principles of Bandura's social learning.

