

CHECK YOUR PROGRESS

Q.8. Who developed operant conditioning?

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Q.9. What is reinforcement?

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Q.10. Explain– Programmed learning, Teaching machine.

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10.6 CONGITIVE THEORY OF LEARNING

We have discussed the behaviouristic theories of learning and their educatonal implications. In this section of the unit, we will study the cognitive learning theories, which give importance to cognition (perception) in learning. In cognitive approach, learning is considered an inner psychological functioning such as perception, concept formation, attention, memory and problem solving. In this approach the learner first perceives the total situation of the problem, finds a relationship between the elements of the object or the problem and finds out a strategy of solving the problem.

The main characteristics of Cognitive Approach are as follows :

- In the cognitive approach, learning is considered as an active and dynamic process.
- Learning requires cognitive effort and accurate conceptual understanding.
- The learner is purposive and interacting within the field of his or her goals.
- It is the most suited form of learning for concept formation , problem solving and higher mental processes.

As we have read, Throndike introduced the concept of reward or reinforcement, educational implication of this is quite obvious in a student's progress in learning. The teacher may use the technique of reward and punishment in strengthening a desirable behaviour and attitude and removing the undesirable one of his students.

Hence, the connectionism theory may not be acceptable into but it cannot be denied that man in his forward march towards higher civilization depends mainly on the trial and error method of learning. This method of learning is greatly responsible for the building up of man's store house of modern scientific knowledge.



LET US KNOW

Connectionism theory of learning was developed by E. L. Throndike. According to this theory learning is a bond connection between stimulus and response. Learning is not sudden. It is a gradual process that results from repetition. The number of errors and amount of time taken are high at the initial stage but gradually errors are eliminated and learning takes place.



CHECK YOUR PROGRESS

Q.1. Who developed the theory of connectionism?

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Q.2. What is learning according to connectionism?

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Q.3. Connectionism theory belongs to _____ approach of learning.

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10.4.2 Theory of Classical Conditioning

The theory of classical conditioning was decovered by Russian Physiologist Ivan P. Pavlov (1849-1936). He was basically interested in studying the process of gastric secretion in dogs. In 1890 Pavlov designed an apparatus that could measure how much a dog's mouth waters in response to food or other things in its environment.

We know that salivation is the natural response to food when it comes in contact with the tongue. This response is immediate and does not require any consciousness or will. It may thus by call a reflex action. Pavlov noticed that the dog salivate in response in response not only to food but also to the sight or flavour of the food. He desired a series of experiments to determine the conditions under which it occurred. As a result of such experiments, a very important principle of learning has been established. It is known as classical conditioning theory of learning.

Classical Conditioning Experiment : As stated above Pavlov restricted his experimental studies to the process of secretion of saliva in dogs. Food in the mouth of the organism produces the saliva. When we put food in the mouth of the dog, the dog salivates. This is a natural response. Here the food is termed as 'unconditioned stimuli and the salivation by the dog as 'unconditioned response'. The stimulus of food is called unconditioned because it means that the response depends upon no special condition. Unconditioned responses are unlearned and imply no pre condition. During his experimentation on dogs, Pavlov introduced the sound of a bell as a natural stimulus or conditioned stimulus. The bell, for example, was sounded at the time when food was presented to the dog or just before. Thus, the sound of the bell was paired with presentation of the food a few times. The dog was found to salivate in response to the sound of the bell. The response which was learned was called by Pavlov as 'conditioned reflex' or 'conditioned response' Model of classical conditioning is given below.

- This approach explains emotion, thoughts and actions entirely by reference only to his overt or observable behaviour.
- In all behaviouristic theories results of experimental studies are derived by studying the animal behaviour only. It is doubtful whether it will yield the same result on human being also.
- The operant reinforcement system does not adequately take into account the elements of creativity, curiosity and spontaneity in the human beings.
- A behaviourist argues that all human behaviour is acquired and it gives no place to the importance of genetic inheritance.
- Skinner's theory of learning dehumanises the learning process on account of its emphasis on the mechanization of the mental process.



LET US KNOW

The Theory of operant conditioning was developed by B.F. Skinner. To understand the process of learning he conducted a series of experiments. The term operant emphasizes that behaviour operates upon the environment to generate its own consequences. For training an organism to learn a particular behaviour or response, reinforcement is necessary. It is also known as 'reinforcement conditioning'. In operant conditioning learning objectives are divided into small steps and reinforced one by one. The most important contribution of this theory in educational practice is programmed learning and teaching machine.

in students and through positive reinforcement; they should be encouraged to improve them further. For example.- encouraging good handwriting, cleanliness, punctuality etc.

- Operant conditioning advocated the avoidance of punishment for unlearning or undesirable behaviour. Punishment proves ineffective in the long run. Therefore, operant conditioning experiments suggest the appropriate alternatives for punishment in the form of rewarding the appropriate behaviour and ignoring the inappropriate behaviour.
- The most important condition of this theory in educational practice is the concept of programmed learning and introduction of teaching machines in teaching learning. Let us elaborate both the concepts.

➢ **Programmed Instruction :** In programmed instruction the subject matter is broken down into small steps and carefully organised into a logical sequence which can be rapidly learned by students. Each step builds upon the previous one. Reinforcement is given in each step. The learner is given rapid feedback concerning the accuracy of his learning. The learner is able to learn at his own pace.

➢ **Teaching machine :** Such machines present items in an essentially predetermined sequence permit the students to respond and give them, immediate feedback. Teaching machines are automatic devices which present questions, provide means of response and inform the student about the correctness of his response.

10.5 LIMITATIONS OF BEHAVIOURISTIC APPROACH

The behaviouristic approach to learning has certain limitations. They are as follows:

- The behaviouristic approach considers human being as a machine which may not be acceptable.

	Stimulus	Response
1.	S1 (Food)	R1 (Salivation)
2.	S2 (Bell)	R2 (Normal reaction)
3.	S1 + S2 (Food and bell)	R1 (Salivaton)
4.	S2 (Bell alone)	R1 (Salivation)

Classical conditioning may be defined as “a process in which a natural stimulus, by pairing with a natural stimulus, acquired all the characteristics of a natural stimulus.” In the above model, salivation in response to the sound of the bell, which was not a natural stimulus, is technically called ‘conditioned response’

Educational Implication of Classical Conditioning Theory : Pavlov brought a revolution in the field of psychology. He explained learning in terms of physiological changes by adopting an objective method of study. Conditioning was accepted as theoretical framework and practical technique of solving a variety of applied problems.

According to Pavlov, all learning is conditioning or de conditioning. The motor driver stops his vehicle at red light and starts at green light. This is not his natural response.

He had to become conditioned so that he might put the brakes upon his vehicle as soon as he saw the red signal, without any prior thought. He knows that the failure to do this is sure to be followed by punishment. The child also learns things in this way. As soon as the teacher steps into the classroom, the child has to stand up. Such conditioning is a must in learning.

Classical conditioning does not have direct application to classroom learning. But the principles of classical conditioning can be such as cleanliness, respect for elders, punctuality etc. Similarly, it can be used for de-conditioning anxiety and fear in the maladjusted children. Classical conditioning can be used to develop a favourable or unfavourable attitude on the part of the learner towards learning, the teacher and the school.



CHECK YOUR PROGRESS

Q.4. Who developed classical conditioning?

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Q.5. What is conditioned response?

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Q.6. All learning is conditioning or de-conditioning. (True/False)

Q.7. All learning is intended to form through repetition and exercise. (True/False)

10.4.3 Operant Conditioning

The Theory of operant conditioning was developed by B.F. Skinner (1904-1990) an American physiologist of Harvard University. Skinner conducted a series of experiments with rats, cats, monkeys and pigeons with a view to understanding the process of learning. He developed his own apparatus known as “Skinner box” and the method of observation to study and analyse behaviour in a systematic and objective way.

The term ‘operant’ emphasizes the fact that behaviour operates upon the environment to generate its own consequences. It means that a response or behaviour is not necessarily depends upon a specific known stimulus.

It is more correct to think that a behaviour or response is dependent upon its consequences. Therefore, for training an organism to learn a particular behaviour or response, it may be initiated to respond in such a way as to produce the reinforcing stimulus. The individual’s behaviour should get the new and or reinforcement and he should act in such a way that he is rewarded again and again. In other words, if the behaviour pays off, it is likely

to be repeated. Therefore the learning process and the environment should be designed in such a way that it creates minimum frustration and the maximum satisfaction in a learner , with proper reinforcement for the desired training or learning.

Skinner’s Experiment with Rats : A hungry rat was put into the Skinner box, which is also known as Operant Chamber. The experimenter delivers some food pellets for the rat to eat by a mechanism from push button switch attached outside the operant chamber. The pellets are delivered one by one; the hungry rat eats each pellet as soon as it drops. In the second step the experimenter stops releasing the Pellets and the rat is left alone in the box with the lever. After an initial period of inactivity, the hungry rat begins to explore the box. Accidentally, it presses the lever and immediately a pellet of food was released, that is positive reinforcement is contingent upon pressing the lever. After eating the pellet the rat continues to explore, stopping from time to time. Then after a while, the rat presses the lever again, and again a pellet was released. Thus the lever pressing response was rewarded and so it continued. In this way ultimately the rat learned to press the lever as desired by the experimenter.

‘*Operant conditioning*’ is also known as reinforcement conditioning. Here, the reinforcement is correlated with the response rather than the stimuli. In this type of conditioning reward or reinforcement is not possible unless the response is emitted. In the above experiment the lever pressing response of the rat was rewarded with food pellets. Thus, reinforcement becomes contingent upon the stimulus.

Educational Implication of Operant Conditioning : Operant conditioning has generated a great amount of research studies all over the world. It has revolutionized the field of learning by putting forward the following practical ideas and implications:

- The principle of *operant conditioning* may be applied in behaviour modification. Good qualities should be identified