Principles of Teaching Psychology of Learning — Theory 2.3

Laws of learning & Theories of learning

Objectives: At the end of this lesson you shall be able to
- **explain the need for the use of Laws of learning**
- **state the Laws of learning**
- **analyse various theories of learning**
- **identify the importance of human senses in general learning and skill learning**
- **analyse various cause of individual differences.**

Every individual is born with certain unique instincts and learning depends on the satisfaction of these instincts. Individual learner's capacity to learn varies from person to person. In this context, an Instructor must know the learner's attitude towards learning and apply the knowledge of psychology of learning and human behaviour influences in all the phases of training.

One the pioneers of educational psychology, E.L. Thorndike formulated three laws of learning on the early 20th century. The Law of readiness, the law of exercise and the Law of effect. These laws are universally accepted and applied to all kinds of learning. Later on, educational psychologists and pedagogies have discovered, tested some more secondary laws of learning applicable to the learning process and used in practical situations.

We must understand these principles of learning brought out as a result of services of experiments and research. The Instructor should make use of them in training the learners (trainees) in order to maximize their efforts to achieve the goal. In teaching-learning activities the Instructor and the trainees function in cooperation with each other and the goal is achieved adopting/following the laws of learning listed below:

The Law of Readiness

A trainee who is unwilling cannot be made to learn. In fact a ground should be set for acquiring skill or knowledge. The instructor should create an environment that is conducive for making a trainee acquire new skill or knowledge. The trainer must make trainees mentally alert and this alertness can be utilized for creating interest and thus readiness.

The Law of exercise (frequency)

When a particular action is performed repeatedly it becomes a part of the habit. Hence an instructor must be careful in avoiding practice of wrong thing, for otherwise the wrong things get rooted and it is difficult to remove it later. This is also called as the Law of use or newness.

If something is left after learning, it is forgotten. Unless an attempt is made to re-learn it, there is no use. This is called the Law of disuse. Both these laws prove that practice must be continued and repeated exercises must be given to learn and perfect the skills already learnt. Thus intensity of exercise and their repetition makes one to retain longer, knowledge and skills.

The Law of Effect

This is also known as the law of satisfaction and dissatisfaction or Law of pleasure and pain. Any learning that gives satisfaction or pleasure is easily learnt, while the one that gives trouble or pain is not learnt. We have all experienced that once a child burns his fingers in a fire, he is very much afraid to go near to it again.

The Law of Purpose

We are not learning everything that are new or that are useful. We also learn only what is going to be of immediate use to us or what is essential or purposeful. We have keen desire to learn things, which are useful later in life.

The Law of Association

Learning provides new knowledge and skill. We normally learn simple things easier and complex matters are little difficult and so it takes more time. We also learn better about what is known earlier than entirely new knowledge of skill.

The Law of Multiple Learning

Learning cannot be confined to one area. While one is learning a particular lesson he/she also acquires various habits and attitudes that are necessary for meeting the demand of life in general. Discipline, care and maintenance of tools, safeguarding equipment, safety precautions, prevention of misuse of materials and tools, cooperation with others are all other virtues and achievements that are attained along the way.

The Law of Maturity

Learning takes place according to the physical ability of the trainees. An important aspect of skill is to assist the learner to acquire differential control over the body. While one is engaged in skill acquisition, it is better to wait until he is mature enough to learn an act readily, before we attempt to instruct. With enough maturity, he will be able to learn with less time and effort and can enjoy the learning process much more.

The Law Recency

Recently remembered materials are remembered well and reproduced more correctly than remotely learnt thing. But revision has done just half an hour before an examination cannot be recalled well. Perhaps the portions revised the night before can be reproduced better. This emphasizes the need for a thorough revision of portions learnt on the eve of examination if it has to be purposeful.

The Law of Assimilation

Only learning that are assimilated well are retained and reproduced. Not all learning are assimilated, retained and recalled. What is assimilated, retained and reproduced becomes part of learning.

The Law of Active participation

Only when all sensory organs are involved, ensuring better sensation and perception, we say there is active participation. The use of multi sensory educational aids and technique in learning processes and active participation enhanced learning capabilities.

Theories of learning

Learning theories are conceptual framework that describes and guides how the learners absorb, process and retain knowledge during learning.

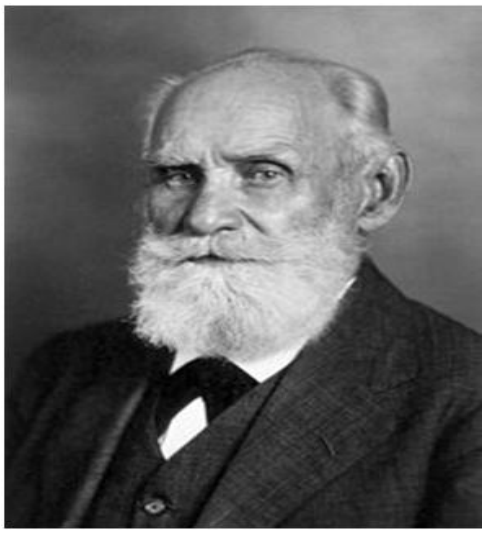
Psychologists, educationists and psysiologists have contributed a lot for the comprehension of the learning experiences which is a complex and complicated process. Results based on the experiments they have contributed to the development of theories of learning. Some of the important learning theories applied in educational and vocational training are as follows:

- Classical conditioning theory (Pavlov)
- Trial and Error theory (Thorndike)
- Insight theory (Kohler)
- Operant conditioning theory (Reinforcement theory) (Skinner)
- Theory of Imitation (Bendura) and so on.

Classical conditioning theory

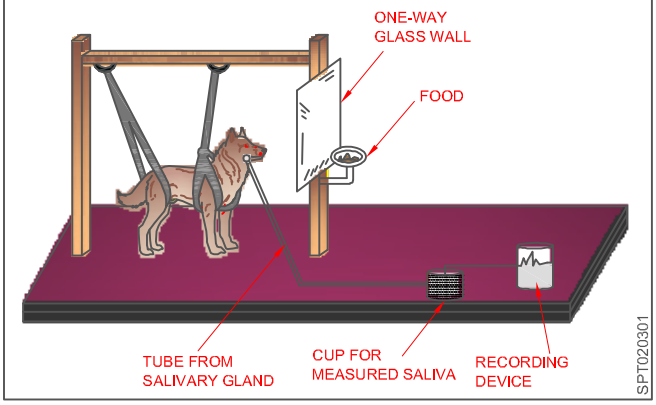
PAVLOV - Ivan Petrovich Pavlov (September 1849 - February 1936) Famous Russian physiologist. Nobel Prize in Physiology or Medicine 1904. Pavlov studied physiology at Leipzig University in Germany for five years.

Pavlov's theory of classical conditioning states that stimulus and response are inter-related while learning process takes place. Pavlov made this theory more clearly by conducting an experiment with a 'dog' as shown in Fig 1. He cut holes in dogs' cheeks and inserted tubes to measure salivation.



Ivan Petrovich Pavlov

Fig 1

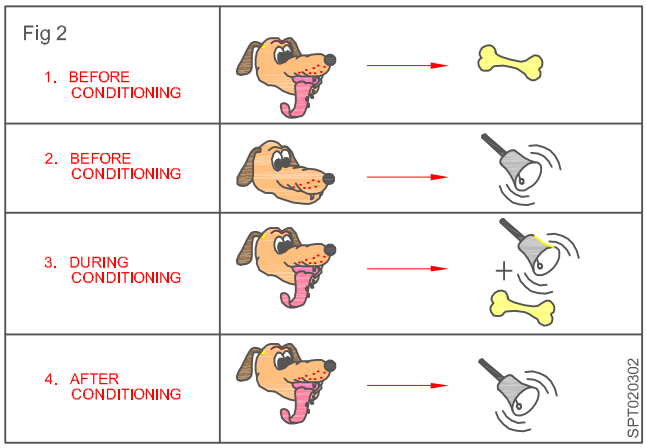


A bell was rung just before food was given to the dog, and after a period of time it was observed that the ringing of the bell alone would increase the rate of the dog's salivation.

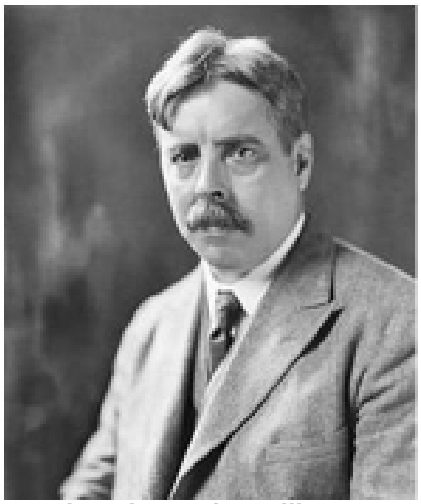
A dog was given food at fixed repeated intervals. A bell was being rung then food was served. This was repeated for many days. One day the bell rang but no food was served. The dog was anticipating for arrival of the food after hearing the ring. It started dripping the saliva. For the dog ringing of the bell was conditioned stimulus and the response of secretion and dripping of the saliva was an unconditioned response. Salivation, Pavlov noted, is a reflexive process. It occurs automatically in response to a specific stimulus and is not under conscious control. The more the stimulus the more the responses shown in Fig 2.

Benefits:

Pavlov's discovery of classical conditioning remains one of the most important in psychology's history, the conditioning process remains important today for numerous applications, including behavioural modification. Classical conditioning is often used to treat phobias, anxiety and panic disorders also.



Trial and Error theory - Edward Lee Thorndike (August 1874 - August 1949)

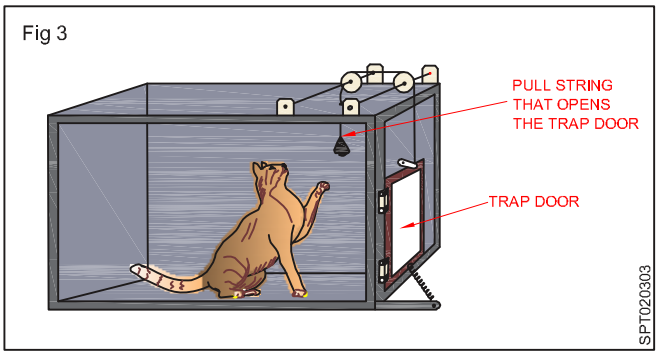


Edward Lee Thorndike

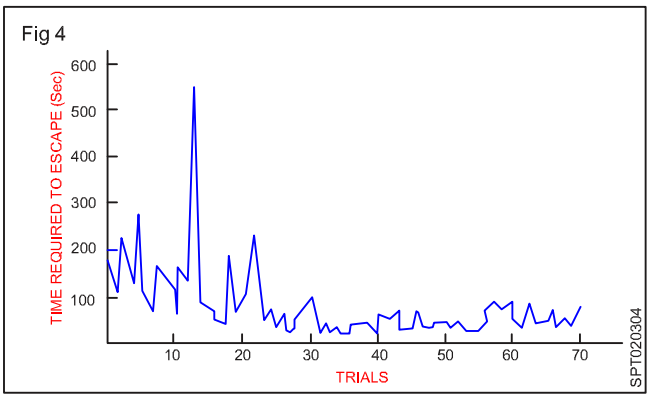
Thorndike - an American psychologist, his work on animal behaviour and the learning process led to the theory of connectionism (a set of approaches in the fields of artificial intelligence and cognitive psychology, helped to lay the scientific foundation for modern educational psychology). He also worked on solving industrial problems, such as employee exams and testing. He has been considered as father of modern educational psychology in US.

In his theory the learners set a goal and he tries to achieve it after making several trails. This theory is known as **Thorndike theory or Trial and Error.** He placed a cat in a cage (Fig 3) and a plate of fish outside the cage. The door arrangement of the cage was such a way that- by stepping on the slot the door opens. The cat tried several time to step on the slot but was not succeeded. Accidentally in one of its attempts stepped on the slot and the door was opened, cat ate the fish. In a similar occasion the cat opened the door easily by stepping on the slot. Similarly we can also learn through trial and error methods.

Thorndike looked at how Cats learned to escape from puzzle boxes.



His finding was that cats consistently showed gradual learning as shown in Fig 4.



Experiment outcome:

- Thorndike's instruments learning curves revealed by plotting the time it took, for an animal to escape the box each time it was in the box.
- If the animals were showing insight, then their time to escape would suddenly drop to a negligible period.
- So it was trial-and-error
- These led Thorndike to formulate first his **Principles of Learning** and then his **Theory of Learning** that became the foundation of modern educational psychology.

Insigt Learning Theory - Kohler Wolfgang Kohler (January 1887 - June 1967)

Wolfgang Kohler

Kohler was one of the founders of Gestalt psychology along with Max Werheimer and Kurt Koffka. He is also famous for his description of insight learning which he tested on animals, particularly chimpanzees. The results of his experiments during the period 1913-1917 were published in German.

When we solve a problem completely, we experience a pleasant feeling called by Kohler the - "AHA Experience". We say as, we suddenly see the answer to the problem. To illustrate the insight learning, observe the following series of numbers. Which number should follow the sequence- 1491625?. If you cannot solve the problem then come back to the problem. Try different arrangement or perceptual organization of the numbers. 1, 2, 3, 4, 5... or odd numbers or even numbers or 12, 22, 32, etc. If you solve the problem you will have a pleasant experience that is AHA Experience!. Note that your solution came suddenly after some time, which you tried, various strategies. Perceptual arrangements helped a great deal. The solution ones you have it can be generalized rather easily or other similar number of problems. These are the characteristics of insight learning.

Insight Learning Theory Experiment:

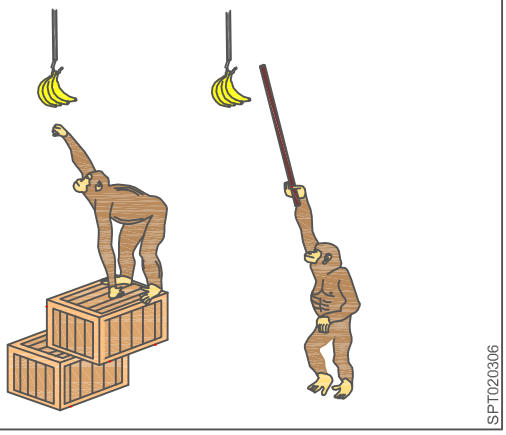
How insight learning occurs? The cognitive answer to the question is the insight involves a perceptual re-organization of elements in the environment. Kohler worked out a number of insight experiments on chimpanzees and summarized the findings.

Kohler employed five types of problems to study how the chimpanzees solve complex problems. The two most fascinating and important problems were the 'stick' problem and the 'box' problem both the problems involved insightfull solution as shown in Figs 5 & 6.

Fig 5

Two hollow bamboo sticks, one long and the other short, were kept inside the cage. Since the sticks were hollow, one stick could be pushed into one end of the other to form a longer stick. However, if the two sticks are joined, banana could be reached. First he tried with a short stick to pull the bananas, he failed. After fidding with the stick for sometime he realized that the stick was too short to pull the bananas, the longer one would solve the problem without fidding. He tired with longer stick, through which he got the banana and ate it. The learner acts according to the situation and achieves success and in a similar situation next time they acts without any problem because of his past experience.

Fig 6

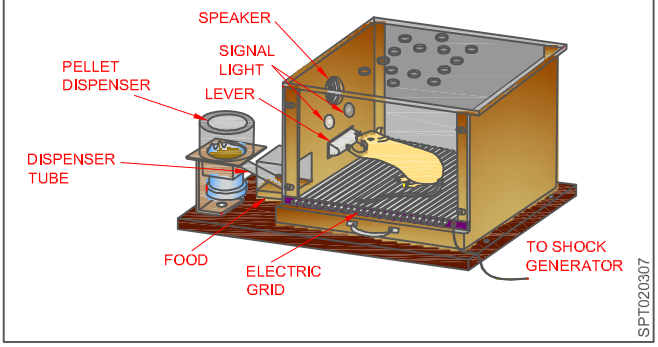


Operant conditioning theory B.F Skinner (Mar 1904-Aug 1990)

An Americal psychologist behaviourist, he was the Edgar Pierce Professor of Psychology at Harvard University. Skinner (1948) is regarded as the father of operant conditioning, but his work has based on Thorndike (1898) Law of effect. Skinner introduced a new term Reinforcement. That is, behaviour which is reinforced tends to be repeated (i.e., strengthened); behaviour which is not reinforced tends to die-out or be extinguished. (i.e. weakened).

Skinner studied operant conditioning by conducting experiment using rats which he placed in a 'Skinner box' similar to Thorndike's puzzle box as shown in Fig 7.

Fig 7



Skinner identified three types of responses or operants that can follow behaviour

- Neutral operants
- Reinforces
- Punishers

Positive reinforcement

Skinner showed how positive reinforcement worked by placing a hungry rat in the above box. The box contained a lever on the side and as the rat moved about the box, it

would accidentally knock the lever. Immediately it did so a food pellet would drop into a container next to the lever. The rat quickly learned to go straight to the lever after a few times of being put in the box. The consequence of receiving food if they pressed the lever ensured that they would repeat the action again and again. Positive reinforcement strengthens a behaviour by providing a consequence an individual finds rewarding.

Negative reinforcement

Negative reinforcement strengthens behaviour because it stops or removes an unpleasant experience. The removal of an unpleasant reinforce can also strengthen behaviour. In fact Skinner even taught the rate by subjecting them in the box with an unpleasant electric current which caused it some discomfort. The rats soon learnt to press the lever when the light came on because they know that this would stop the electric current being switched ON.

Punishment

Punishment is defined as the opposite of reinforcement since it is designed to weaken or eliminate a response rather than increase it. It is an aversive event that decreases the behaviour that follows.

Punished behaviour creates fear and does not necessarily guide towards desired behaviour - reinforcement tells you what to do, punishment only tells you what not to do.

Theory of Imitation

Albert Bondura - Canadian - Americal psychologist, professor at Standfort University - His social learning theroy poists that people learn from one another, via observation, imitation and modeling. The theory has often been called a bridge between behaviourist and cognitive learning theories because it encompasses the attention, memory and motivation.

Theory

We all try to imitate. Children try to imitate action of their elders. Imitation is learnt from school, institute, home and outside environment. Imitation is considered to be one of the natural qualities of human being. From elders/adults imitate like their precedents. Imitation is very useful in attaining skill. The imitation can be effected consciously or unconsciously. Sometime, complex and tough actions either new or difficult to imitate also reduces this specific skill. Imitation helps backward learners. It has some disadvantages some times bad qualities are also learnt through imitation. It is the responsibility of the instructor to guide the learner properly to avoid imitating wrong methods and means instrument or agency to learn a skill or attitude. Many teachers and parents today realize the importance of modelling acceptable behaviour.

In addition to the above theories of learning the following aspects are also to be considered by the instructor.

Senses are avenues of Learning

Human have five basic senses. These sensing organs associated with each sence and information to begin to help us understand and perceive the world around us.

Sensory learning is concerned with perception and sense. Sense organs are generally called the “Gates of knowledge”. A particular type of knowledge is acquired through a particular sense organ. With the associations and reaction to the environment, sense organs grow conscious. They are:

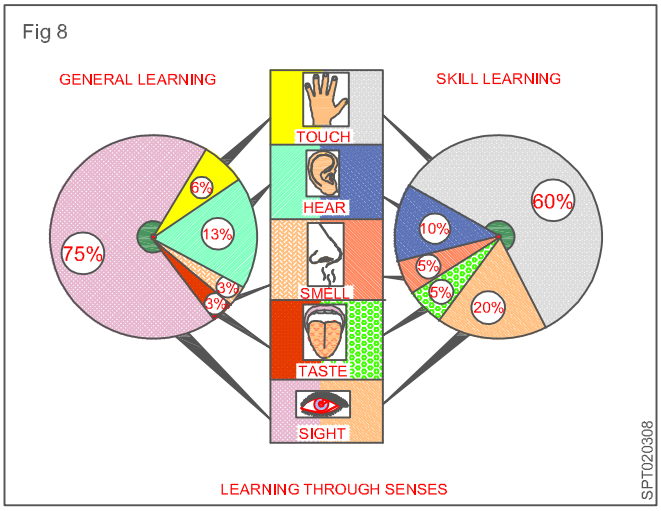
- **Sense of sight (Visual sensation**) is through **eyes.** Colour, similarity, dissimilarity, reading and for all visual stimuli we use with eyes.
- **Sense of hearing (Auditory sensation)** is through **ears.** Sounds of different nature - teacher’s talk, discussions, sounds made by machines and materials or any other voice or sound reaches the ears as a stimuli eliciting responses.
- **Sense of small (Factory sensation)** is through the **nose.** We can identify different oils, burning of rubber insulation or a coil immediately through the smell, as and when proper response occurs.
- **Sense of taste (Gustatory sensation)** is through **tongue.** We use the tongue to know taste and through the taste we find difference between sweet, salt, tea, coffee, cheese, butter etc. In the food processing or catering field, this sense is much in use.
- **Sense of touch (Tactual sensation)** is through links or parts of body. Touching enables one to find out smoothness, softness, hardness and roughness of different degrees. By proper utilization of this sensation even blind men develop strong stimuli to other responses involving other organs.

Kin aesthesis **(Muscular sense)**. We perceive through muscular feel when pressing, pulling, pushing, holding, balancing etc.

All the six senses play important part in acquisition of motor skills and knowledge and they are known as avenues of learning. A good instructor exploits as many senses as possible and each of the sense responds only to its own type of stimuli.

A comparative statement of various sense organs and their effectiveness under general learning (knowledge) situation and Skill learning (practical) situation are graphically shown in Fig 8 and the same is given in the Table.

Fig 8



Individual Differences

All the trainers/learners do not have alike, the difference may be physical, mental and psychological.

- **Physiological differences:** Fatness, leaness, darkness, fairness, tallness, shortness of stature are various physical differences. Some of these have adverse effect on the motor learning.
- **Mental differences:** Intelligence, foolishness, mental backwardness is due to the traits of people, differs from one another.
- **Psychological differences:** Some are liberal while others are not. Some have certain special traits to learn certain subject or doing certain jobs. Some learn quickly while others slowly.

Causes of individual differences

- **Heredity:** Genes are responsible for individual differences. Parents play an important role in the individual differences.
- **Environment:** Environment has various features - Physical and social. Social environment play a more important part in creating individual differences.
- **Age:** Age is another factor to be reckoned in this. Physical psychological and emotional development is caused by the growth in age.
- **Intelligence:** Some have higher I.Q. Some are mentally backward and retarded while some are exceptionally intelligent.
- **Economic condition:** Economic condition of parents does cause individual differences.

The instructor must take into account these differences and pay special attention to those who require the specific technique to bridge the gap.

Sl. No.	Name of the sense	General learning (Knowledge)	Skill learning (Practical)	Remarks
1	Sight - Eyes	75%	20%	
2	Hearing - Ears	13%	10%	
3	Touch - Hands	6%	60%	
4	Smell - Nose	3%	5%	
5	Taste - Tongue	3%	5%	