

# Learning theories in medical education

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## Abstract

There are many theories which has explained it in one or the other way. Mainly they are explained on the basis of behavioural, cognitive and constructivism. Behavioural theory emphasises mainly on the environmental stimulus for the learning process and ignores role of memory. On the other hand constructivist theory admits the environmental effect as well as the role of memory. Further it also explains ability of the memory to manipulate the learning experience at variable conditions.

**Keywords:** Learning, Behaviourism, Cognitivism, Constructivism, memory.

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## INTRODUCTION

Learning has been explained in various ways by number of educationists and researchers, there is no agreement on a single definition. Many theories explain learning process differently, they differ on a single theme i.e. what are the factors influencing the learning and how they affect it<sup>1</sup>. Shuell has defined learning process as “Learning is a n enduring change in behaviour or in the capacity to behave in a given fashion, which results from practice of other forms of experience”<sup>2</sup>. There are two primary theories explaining the process i.e. *empiricism* and *rationalism*. Empiricism opines that primary source of knowledge is experience and we learn through interactions and association with the environment. Empiricism has strong belief that knowledge in the end result of sensory inputs which are processed together as complex ideas. Rationalism differ with above learning theory and opine that the complex ideas are derived through reflection on the prior knowledge and not mere a result on number of exposures. They recognise ability of

human brain to *think in action* and *think on action*.<sup>3,4</sup> In the modern theories empiricism and rationalism are synonymous with behaviourism and cognitive theories respectively. Although learning theories are mainly divided in two categories- Behavioural and Cognitive; a third category- Constructivism is added here which is more relevant and believes knowledge is the end result of how the individual create meaning from his or her own experiences.

## BEHAVIOURISM

Behaviourism advocates the importance of environment which gives stimulus for leaning. Further the repetition of that stimulus builds concrete idea<sup>5</sup>. The key elements are the stimulus, response and association between the two. Learning is accomplished when a proper response is demonstrated following the specific environmental stimulus. Behaviourism does neither consider the structure of students prior knowledge nor relates the mental process necessary for it. Behaviourism is a theory of learning which believes learning is a measurable change in learner and ignores the mental process involved for that change. This change in behaviour is called as ‘conditioning’, there are two types of conditionings there are Classical and Operant<sup>1,2,4</sup>.

### Classical Conditioning

Rhythmic behaviour in response to specific stimulus after repetitive enforcement is considered as classical conditioning. Ivan Paolav, Russian Psychologist has proved it in dogs experiment in which the dogs salivates in response to sound of bell before the food. Paolav has emphasized classical conditioning in four stages-

acquisition, extinction, generalization and discrimination<sup>4</sup>. Acquisition is adopting the response for stimulus. Extinction is withdrawal of the same response when stimulus did not give same reward. Generalization responding in similar way to all the stimulus in same line. Discrimination is higher level of conditioning where the learner has ability to discriminate for similar stimulus under different situation, it is exactly opposite to the generalization.

### Operant Conditioning

In 1930, Skinner, a psychologist has worked on operant conditioning in America. Skinner proposes that reward and punishment modifies the behaviour<sup>1</sup>. Key points on which operant condition is explained are as follows: reinforcement which could be positive for making expected change in behaviour or negative reinforcement which is used to stop the undesired behaviour. In this conditioning reward plays an important role and considered as positive reinforcing factor, it can work in negative way also where undesirable behaviour can be stopped by punishment. Behaviorists relates response to stimulus as habit but little importance is given how these habits are acquired and stored for future use. Forgetting is explained as outcome of 'nonuse' of those response over a time, transfer of knowledge in result of generalization. Behaviourists attempt to prescribe strategies that are most useful for building and strengthening stimulus-response association including the use of instructional cues, practice and reinforcement. This theory proven reliable for explaining the demonstration of recalling facts. However it is generally agreed that behavioural theory fails to explain the acquisition of higher level skills like language development, problem solving and critical thinking. *Implication in medical education:* For designing competency based curricula which emphasizing development of clinical skills.

### COGNITIVE THEORY

In the late 1950s, learning theories started shifting away from the behaviourism to cognitive science. Psychologist and educators began to de-emphasize a concern with overt observable behaviour and stressed instead more complex cognitive process such as thinking, problem solving, concept formation and information processing<sup>6</sup>. Cognitive theories focus on conceptualization of learning process and emphasises how information is received, organized, stored and retrieved by the brain, hence recognizing the importance of memory<sup>4</sup>. Cognitivists are not concerned about what is the behaviour of learner but focuses on what they know (prior knowledge) and how they apply it (critical thinking). Knowledge acquisition is described as a mental activity that entails internal coding and structuring by the learner. The learner viewed as

active participant and more importance is given to learner than environment in the learning process.

### Memory Processing Model

Memory is given significant importance in learning process. Atkinson and Shiffrin proposed this model explaining how information is processed, stored and retrieved<sup>3</sup>. At the given time we are exposed to number of sensory impulses unless we give attention to these stimuli it does not enter in short term memory. When the same stimulus is given repetitively, then information get registered in the long term memory which not only stores the information but also registers correct understanding of the same.

### Schema theory

Units of knowledge used for understanding and acquiring new skills are referred as 'Schemas' by psychologist, they are stored in long term memory<sup>1</sup>. Individual's current knowledge is considered as existing Schemas which are used for further understanding and acquiring new knowledge hence the Schemas are continuously updated. Forgetting is the inability to retrieve information from memory because of interference or missing or inadequate cues needed to access information. Understanding is seen as being composed of a knowledge base in the form of rules, concepts and discriminations. Prior knowledge is used to establish bounding concepts for identifying the similarities and differences in newer information. Cognitive theories are considered more appropriate for explaining complex form of learning i.e. reasoning, problem solving and critical thinking. While the behaviorist uses feedback (reinforcement) to modify behaviour in the desired direction, the cognitivist considers feedback (knowledge of results) to guide and support accurate mental connections, emphasizing on the active involvement of learner in the learning process<sup>4</sup>.

### Implication in medical education

Concepts maps are extremely useful in clinical case studies and problem based learning. Reflection in action is useful articulating concepts about ant particular case and reflection on action is ability to use that particular experience in further clinical practice. Cognitive theories advocates making knowledge meaningful and helping learners organize and relate new information to existing knowledge in memory.

### CONSTRUCTIVE THEORY

Constructivism is not a new approach to learning it has multiple roots in the philosophical and psychological view-points of the modern era, specifically the work of Piagets, Bruner and Goodman<sup>1</sup>. According to Constructivists, knowledge is a end result of his or her experiences. Although Constructivism is considered to be a branch of cognitivism, it differ from it in many ways.

Cognitive psychologists believe that mind is a reference tool to the real world; Constructivists think that mind filters inputs from the world to produce its own concepts. Constructivists recognize the existence of the real world but contend that what we know of the world stems our own interpretations of our experiences<sup>3</sup>. Constructivists deny that knowledge is mind-independent and can be mapped onto a learner. They emphasize that learners do not transfer knowledge from the external world into their memories; rather they build personal interpretations of the world based on individual experiences and interactions<sup>2</sup>. Hence the knowledge is constantly open to change and it emerges in contexts within which it is relevant. Both learner and environment factors are important to the constructivists as it is the specific interaction between these two variables that creates knowledge. Constructivist recognizes importance of memory and believes it is always under construction as a cumulative history of interactions. The emphasis is not on retrieving intact knowledge structure but on providing learner an experience to create novel and situation specific understanding, by assembling prior knowledge from diverse sources. The three most crucial factors essential for successful and meaningful learning are activity (practice), concept (knowledge) and culture (context)<sup>4</sup>. Currently Constructivism is considered the dominant educational theory, various constructivist theories such as social constructivism, situated learning and connectivism are the foundation for number of teaching methods. Piaget, a psychologist who has worked on child development is one of the early proponent of constructivist approach. He considers learning as adjustment to the environmental conditioning and coined two key processes in acquiring this adjustment these are *assimilation* and *accommodation*<sup>4</sup>. Assimilation is a process of acquiring new knowledge in the mental structure and accommodation is process of getting acquired to the new experience of knowledge. When there is no conflict between the existing and new knowledge it is called as stage of *equilibration*.

### Social Constructivism

Vygotsky, is a pioneer worker on Social Constructivism which is focused mainly on the interaction between the learner and surrounding environment. In the intellectual development communication has got the highest priority

in the form of dialogue<sup>1</sup>. To have deeper understanding of this process we need to understand the concept of zone of proximal development. It is a level above the understanding of given concept where the student will move next. At this level the learner can work effectively under the guidance. *Situated learning*: It is one more subdivision of constructivist where the emphasis is given on the context. *Implications for medical education*: For developing doctor patient relationship constructivist approach is very useful.

### CONCLUSION

It is very challenging to decide which theory explains the given problem in hand correctly, correctly as the theme of the above mentioned theories overlap. Behavioral approach helps to make out *what learner knows* and helps in explaining basic forms of learning i.e. memorization and stereotyped responses. For higher level of thinking and problem solving approach cognitive theory is more suitable. Tasks involving heuristic problems which demands discrimination and application of knowledge are better explained by constructive approach.

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