

## Scope and application of learning theories in the delivery of medical education

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### Abstract

Learning is a complex process and refers to the acquisition of new knowledge, comprehension, skills, attitude, behaviors, values, and preferences. Learning theories have been proposed to explain how students receive, process, and retain knowledge. These theories differ from each other based on the underlying principles. Being medical educators, we should have an understanding of each of the learning theories, so that instead of taking sides with one specific theory, we should be broad enough in our vision to accept and employ them based on the nature of the educational experience. To conclude, it is vital that medical teachers should be aware of how students learn, and this aspect can be understood by knowing about different learning theories. Further, we must understand that there is an overlap between educational theories and they complement each other, and thus we should not consider them in isolation.

**Keywords:** Learning theories, Behaviorism, Constructivism, Humanism, Cognitivism

### Introduction

In general, learning refers to the process of acquiring new knowledge, comprehension, skills, attitude, behaviors, values, and preferences (Mennin, 2021). Humans begin to learn right from the childhood phase (viz. wherein an infant learns that whenever s/he is hungry and cries to attract attention, the mother will come) and continues until death through interaction between people and their environment (Behaviorism and Social cognitive) (Mennin, 2021; Consorti *et al.*, 2021). Further, at times, learning requires a single exposure (viz. getting an electric shock once wet hands go into a socket) or might require repeated exposures (such as the ability to insert an intravenous line) (Mennin, 2021; Consorti *et al.*, 2021; He *et al.*, 2021). Moreover, learning might result due to conscious effort or even without conscious awareness.

To summarize, learning is a complex process, that can occur in several ways, which might vary from person to person. However, as medical educators, we should be aware of the different ways in which learning occurs, so that we can expedite the learning process, and thus awareness of learning theories is extremely crucial (Mennin, 2021; Consorti *et al.*, 2021; He *et al.*, 2021; Carson & Wilcox, 2019).

### Learning Theories

Learning theories have been proposed to explain how students receive, process, and retain knowledge (Consorti *et al.*, 2021). Owing to the complex nature of learning, several learning theories have been proposed, that differ from each other based on the underlying principles (Shahrivini *et al.*, 2021). Being medical educators, we should have an understanding of each of the learning theories, so that instead of taking sides with one specific theory, we should be broad enough in our vision to accept and employ them based on the nature of the educational experience (He *et al.*, 2021; Carson & Wilcox, 2019).

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Further, we must acknowledge that a wide range of cognitive, environmental, behavioural, and emotional attributes, along with prior experience, play a defining role part in the process of acquisition of knowledge and skills (Consorti *et al.*, 2021; He *et al.*, 2021; Carson & Wilcox, 2019; Shahrivini *et al.*, 2021). The learning theories have been explained below:

### *Behaviourism*

As per this theory, learning refers to changes in behavior (a kind of response) that results because of a stimulus and can be observed. Behaviorists advocate the provision of input (stimulus) and then observe the output (produced response) (He *et al.*, 2021). However, no specific significance is given to the interactions that happen between the stimuli and response. Reinforcements have been identified as a crucial factor to augment the learning process in behaviorism. Positive reinforcement can be understood by the example that if the students complete their assignments on time, teachers can either give them additional credits or praise them. On the other hand, in the case of negative reinforcement, the good stimulus is removed (reward), but in order to ensure learning, additional time is given to complete the assignment (Mennin, 2021; Consorti *et al.*, 2021, Basukala & Chaudhary, 2021).

The theory also advocates for the inclusion of punishment, which can be illustrated in the field of medical education by giving additional assignments, if the students fail to complete them on time.

### *Advantages*

Behaviorism has been linked with multiple advantages such as it enables students to focus on a single goal by providing specific and objective learning outcomes. In addition, the theory ensures that learning will happen depending on the objectives that are set. Further, teachers can manage allocated time effectively as the overall behavior of students is generalized. The theory also advocates the assessment of students on specific criteria (learning outcomes).

### *Potential challenges and critique*

This theory represents learning only in terms of change in behaviour and does not give importance to cognitive aspects. Further, no significance is given to aspects of intelligence, passion, interests, and feelings of the learners. In addition, as the theory assumes that all students will attain precisely the same level of understanding of every topic taught by the medical teacher. However, if that does not happen, it means that the learning process has failed. As we all are aware that each student is different from others, expecting all students to have similar understanding is not fair. Further, the knowledge is delivered externally, and students are extrinsically motivated, so it does not have a significant impact on the learning process. Another concern with the Behaviorism theory is that all learning resource materials are provided to students in silos and there is not much opportunity for students to showcase their creativity (*viz.* does not encourage self-directed learning) (He *et al.*, 2021, Basukala & Chaudhary, 2021).

### *Application of Learning Theory*

The Behaviorism theory can be applied in the classroom or practical settings to improve the knowledge and skills of medical students (Consorti *et al.*, 2021; He *et al.*, 2021; Shahrivini *et al.*, 2021). For instance, a Community Medicine teacher plans to take a session on the health care delivery system, including 3 objectives (*viz.* classification of the health system; population norms; and work profile/job responsibilities of the health workers). As per this theory, the teacher covers the first objectives, while students listen quietly. Upon completion of the objective, the teacher gives an assignment based on the information delivered, which the students then complete. The teacher gives feedback to students about their performance and then begins covering the second objective, and the same procedure is repeated. In other words, with each cycle of administration of feedback, the students are gradually conditioned to learn the topic. Similarly, things can even be implemented in practical or clinical settings for the acquisition of skills.

### *Social Cognitive and Self efficacy*

As the name suggests, this theory is an amalgamation of two approaches to explain the learning process (Mennin, 2021). This includes the social (behaviorist) approach, wherein we learn by interacting with other individuals and with our environment; and the cognitive approach (which explains the importance of cognition in facilitating our learning (Carson & Wilcox, 2019). This theory advocates that our actions, learning, and the way we work essentially result because of a constant, dynamic, and mutual interaction between 3 attributes, namely personal, environmental, and behavioral factors. It is important to acknowledge that the impact of these factors does not remain constant, but changes based on activities, the persons who are involved, and the variable settings (Carson & Wilcox, 2019; Tayade & Latti, 2021).

Humans, including medical students, tend to have five capabilities that are crucial to promote learning in different scenarios. These include symbolizing (viz. use of symbols to change our experience and thereby enabling future actions); forethought (wherein we forecast the potential results of our actions and the way it will help to accomplish the set goals); vicarious (which depicts that learning does not result only when we are performing actions, but even by observing actions of other people and the resulting outcome); self-regulatory (viz. we regulate our own behaviour depending on our internal standards and the evaluation that we carry out to our actions); and self-reflection. Self-efficacy refers to the self-beliefs of a person pertaining to their individual abilities to carry out a task and attain the set targets (Carson & Wilcox, 2019; Tayade & Latti, 2021).

#### *Advantages*

The theory is supported by extensive literature and because it supports a combination of behaviourism and cognitivism theories, both merits can be considered together. In addition, the theory deals with significant social behaviours of persons. Furthermore, the

theory explores the role of reward in learning, or stability of behaviour, which are essential.

#### *Potential challenges and critique*

The available literature has raised concerns about whether reinforcement is crucial for both learning and subsequent actions. Moreover, problems have also been emerged regarding the unpredictable stability of self-efficacy-related expectations. Moreover, limited attention has been given to motivation, emotions, and conflicts in this learning theory (Shahrini *et al.*, 2021).

#### *Application of Learning Theory*

This theory can be employed for the acquisition of knowledge, skills, professionalism - related traits, etc. For instance, in busy ward settings, environmental attributes will become the most important determinant to drive medical interns to perform the work, while inwards that are not busy, it is the personal factors (attitude to learning), that students will take an initiative to learn new skills (Carson & Wilcox, 2019; Ali *et al.*, 2018).

#### *Constructivism*

According to this theory, learning is a process of constructing knowledge by adding new information to prior experiences. The good thing is that knowledge is shared between faculty and learners and that they learn in small groups, while the faculty assumes the role of a facilitator. Similar to the Humanism theory, as students are actively involved in learning, this theory also advocates student-centered learning.

#### *Advantages*

We must note that owing to the active engagement of the learners, the overall process remains joyful. Further, students try to learn about the topic in detail by asking questions. As students also learn by interacting with each other, a definite improvement in communication skills has been observed.

### *Potential challenges and critique*

The teaching approach lacks a proper structure and may prove to be extremely difficult for learners who need a structured approach towards their learning. In addition, as students grade themselves on their own, the overall gradation might significantly vary from the expected standards (Peters *et al.*, 2017; Dornan, 2012; Gillespie *et al.*, 2021).

### *Application of Learning Theory*

Constructivism theory has been used for the acquisition of knowledge, critical thinking, problem-solving, clinical reasoning, etc. This can be accomplished by peer teaching (*viz.* students in either groups or pairs teach each other), problem-based learning (wherein students acquire knowledge by developing solutions to the identified problem in the given real-world scenario), inquiry-based learning (in this case, students pose their own questions pertaining to a specific topic, and then look for the potential answers by literature search or by observing others), and cooperative learning (*viz.* students work in small groups to enhance their own and each other's learning) (Shahrivini *et al.*, 2021; O'Brien *et al.*, 2012).

### *Cognitivism*

This theory emphasizes the ways in which information is received, organized, stored, and retrieved by the mind, which is like an information processor (Consorti *et al.*, 2021). As per this theory, there are three types of loads, Intrinsic load (the topics/subject that is taught), Extraneous load (unnecessary distractions), and Germane load (mental process to ensure learning). As a medical educator, our aim is to convert working memory (wherein information is retained for 15-30 seconds) to long-term memory (the information can be retained for an infinite period). This can be accomplished by managing the Intrinsic load (subject content), decreasing the Extraneous load (minimizing distractions), and thereby optimizing the Germane load (streamlining the mental process for learning to occur) (Skipper *et al.*, 2016; Trost *et al.*, 2019).

### *Advantages*

In the practical sense, cognitivism encourages immersive learning and thus facilitates the understanding of new concepts. It also ensures the development of promoting problem-solving skills and the application of the same in other scenarios. Further, this approach in learning enhances comprehension and builds confidence among students (Skipper *et al.*, 2016; Trost *et al.*, 2019).

### *Potential challenges and Critique*

This theory does not give significance to observable behaviour (as a form of learning), rather that learning is an internal mental process (Consorti *et al.*, 2021; Skipper *et al.*, 2016). The primary concern is that it gives emphasis to cognitive processes that we cannot directly observe and thus we are not precisely sure that memory has changed. In short, learning is more subjective in nature and lacks scientific evidence. Moreover, no emphasis has been given to other potential factors that are shown to affect behaviour (Shahrivini *et al.*, 2021; Skipper *et al.*, 2016).

### *Application of Learning Theory*

This learning theory can be used to teach clinical reasoning, medical expertise, knowledge, decision-making, etc. This can be applied in multiple ways in the classroom/other settings in medical education, such as once a student has been trained on a manikin for basic/advanced life support, the teachers ask students to reflect on their experience. The teacher can pose a question to students on any specific topic, and the students are asked to respond to the question with justification and an explanation of their thought process. Further, teachers can also motivate students to have discussions among themselves about the topic in consideration (Mennin, 2021; Consorti *et al.*, 2021; Shahrivini *et al.*, 2021).

### *Humanism*

As the name suggests, this theory deals with human nature, which wants to improve its survival and well-being with the passage of

time (Rasasingam *et al.*, 2017). In the case of medical education, humanism is about how best medical students are given a platform to augment their learning (Rasasingam *et al.*, 2017). The theory aims to attain self-actualization (the process by which a student reaches their optimal potential). To accomplish this, the provision of a safe learning environment is a must so that the development of students freely can be ensured. Further, the role of teachers is as facilitators, while the students occupy the centre stage as this theory advocates student-centered learning. Finally, the quality of learning is also influenced by the kind of relationship between teachers and students (Rasasingam *et al.*, 2017; Smith *et al.*, 2013).

### *Advantages*

Students' inner thoughts are taken into consideration and teachers are encouraged to think about students to enhance their interest and enthusiasm toward learning. Additionally, the relationship between teacher and students is given preference, which is a significant determinant of learning.

### *Potential challenges and critique*

This theory focuses on the potential of students, with no attention to the impact of the environment. Further, too much attention to students, and can actually compromise the teaching process in itself. Moreover, the role of the teacher is undermined in the entire process (Rasasingam *et al.*, 2017; Smith, *et al.*, 2013).

### *Application of Learning Theory*

The teachers in classroom settings can encourage student-centered learning, which in turn ensures active engagement of students and makes the student a self-directed learner. In addition, the adoption of the humanist tradition in the classroom promotes consideration of the feelings, psychological needs, and emotions of each student individually, and thus students are given time to control their own behavior (Consorti, *et al.*, 2021; Rasasingam *et al.*, 2017).

## **Conclusion**

In conclusion, it is vital that medical teachers should be aware about how students learn, and this aspect can be understood by knowing about different learning theories. Further, we must understand that there is an overlap between educational theories and they complement each other, and thus we should not consider them in isolation.

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