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Original Research Article

Applying Learning Theories to Clinical Teaching in Contemporary Settings: A Conceptual Analysis

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Abstract: ***Background:*** Learning theories play a crucial role in shaping clinical instructional strategies, materials, and activities. By applying these theories, clinical teachers can create engaging, interactive, and student-centred learning experiences. However, some theories are complex and require time and adequate training to fully understand and implement. This study presents a theoretical concept analysis aimed at identifying clear and readily applicable concepts from well-known learning theories to enhance clinical teaching and learning in contemporary settings. ***Methods:*** A search for published articles on well-known learning theories was conducted. Articles were retrieved from Google Scholar and PubMed using search terms such as 'learning theories,' 'learning theories and clinical teaching,' 'applying learning theories to clinical teaching,' and 'learning theories in clinical instruction.' The principal investigator screened articles at the title, abstract, and full-text levels. Selected articles were thoroughly reviewed to identify relevant learning theories, from which key concepts underpinning clinical teaching and learning in contemporary settings were extracted and described. ***Results:*** We retrieved 625 articles, removed 38 duplicates, and screened the remaining articles at the title, abstract, and full-text levels. Ultimately, 23 articles were included in the study. The documented learning theories included behaviorism, social learning, constructivism, social constructivism, discovery learning, meaningful learning, experiential learning, humanistic theory, self-determination theory, and expectancy-value theory. ***Conclusion*****:** Guiding clinical teaching sessions with well-established learning theories can significantly enhance learning outcomes in contemporary settings. Therefore, we recommend the intentional application of learning theories in clinical education to improve student engagement, knowledge retention, and skill acquisition. Additionally, policymakers should integrate evidence-based learning theories into clinical teaching guidelines and training programs to standardize and enhance the quality of education in healthcare settings.

Keywords: Learning, Theories, Clinical, Teaching, Contemporary, Concepts.

BACKGROUND

Historically, teaching and learning in universities put more importance on what to teach and little emphasis on the practice of how to teach [1]. For many decades, teaching staff in universities have been honored more for their knowledge content in a specific area than for possession of robust instructional methods. Unfortunately, colleges and schools of health professions in universities have not been exception. Globally, many universities that offer health professional academic programs continue to emphasize the need for the teaching staff to demonstrate their scholarship abilities by researching and publishing in their areas of expertise. In addition, research scholarly work as evidenced by number of publications in a specialty remains a key factor that influences promotion decisions for the teaching staff [2].

However, since the time of Socrates, many educationists and academic scholars have been studying how learning occurs, which instructional practices facilitate learning and the contexts in which learning occurs best. One striking finding from their studies is that; academic staff only having expert content knowledge is not enough and therefore recommend

that all academic staff in universities should also have pedagogical skills on how to apply various instructional methods [1].

This is more so in contemporary times because in addition to core clinical competencies, health professionals should possess collaborative, innovative, problem solving, critical thinking, teamwork, independent learning and lifelong learning competences [3-5]. This implies that academic staff must break the inertia for change and adopt innovative teaching approaches to address competences that health professionals should have in contemporary time. Similarly, in many countries, all academic staff, irrespective of professional background usually undergo compulsory formal training on education principles where the concepts of teaching and learning are taught [6].

While the call to equip academic staff with pedagogical skills remains ongoing, it is crucial to recognize that teaching with real patients in clinical settings forms the core of health professional training [7]. However, persisting challenges in clinical practice, evolving healthcare needs, and shifting professional competencies necessitate the exploration of more effective approaches to clinical teaching [5, 8].

Learning theories describe the processes and conditions through which learning occurs, offering educators models and concepts to design instruction that enhances learning [9]. These theories not only explain what motivates students to learn but also outline the conditions that facilitate or hinder learning. Consequently, learning theories can guide educators in creating effective learning experiences and minimizing potential barriers. Many scholars advocate for the use of learning theories to improve educational outcomes in medical education [10]. Shaughnessy and Erlich [11], emphasize that use of learning theories not only solves clinical teaching and learning problems but also improves assessment and course ratings.

Despite this, there has been limited exploration of learning theories and the concepts that underpin clinical education [12]. Moreover, like other theoretical frameworks, some learning theories are complex and require significant time and training to fully understand and implement. As a result, many learning theories rarely make their way into educational practice [13].

Additionally, many clinical teachers in the contemporary time continue to teach as they were taught, relying on traditional methods rather than incorporating evidence-based teaching practices informed by learning theories [14-17]. This has perpetuated silent but significant challenges in clinical teaching and learning in modern times. Therefore, we conducted a theoretical analysis to identify concepts from well known learning theories that are straightforward and readily applicable for enhancing clinical teaching and learning in contemporary time. It is hopped that this will unravel the difficulties encountered in understanding and applying learning theories in clinical teaching [18].

METHODS

A search for published articles on well-known learning theories was conducted between October and December 2024. Articles were retrieved from Google Scholar and PubMed using search terms such as 'learning theories,' 'learning theories and clinical teaching,' 'applying learning theories to clinical teaching,' and 'learning theories in clinical instruction.' The reference lists of the retrieved articles were also reviewed to identify additional relevant studies. We included both published and grey literature written in English on learning theories in health professions education, including medical, nursing, and allied health education, regardless of the year of publication.

Extracted articles were exported to EndNote software, which was used to remove duplicates. The principal investigator screened articles at the title, abstract, and full-text levels. Selected articles were thoroughly reviewed to identify learning theories, from which theoretical concepts underpinning clinical teaching and learning in contemporary settings were described.

RESULTS

We retrieved 625 articles, removed 38 duplicates, and screened the remaining articles at the title, abstract, and full-text levels. Ultimately, 23 articles were included in the study. The learning theories documented included behaviorism, social learning, constructivism, social constructivism, discovery learning, meaningful learning, experiential learning, humanistic theory, self-determination theory and expectancy value theory. Most of the articles referred to medical students and originated from Canada, the United States of America, the United Kingdom, and the Netherlands. A smaller number of articles came from India, Qatar, and Iran and were primarily published between 2000 and 2024.

Nearly all the articles emphasized that learning theories are vital in guiding curriculum development, clinical and classroom teaching, and the assessment of teaching and learning. Many articles highlighted the wide range of learning theories, some of which emphasized traditional approaches, while others embraced more contemporary teaching methods across the three domains of learning: cognitive, psychomotor, and affective. Some articles further classified the theories

into categories such as instructional, cognitive, social, humanistic, transformative, experiential, and motivational theories for clearer descriptions. From these theories, essential concepts highly relevant to clinical teaching were identified and described. The next section of this article provides a concise overview of each theory and its key concepts as they relate to clinical teaching and learning.

Overview of the Role of Learning Theories in Clinical Teaching and Learning

Like other aspects of medical education, clinical teaching and learning for healthcare professionals serve as a dynamic intersection of educational philosophies, learning theories, pedagogical practices, and conceptual frameworks [19]. Effective clinical teaching requires consideration of multiple variables, each playing a significant role. For instance, a clinical teacher must first understand how individuals learn to effectively facilitate the teaching process.

Therefore, the role of learning theories in this case cannot be ignored. Harasim [19], stated that a theory explains why something occurs or how it occurs. Therefore, learning theories are a set of principles which explain how individuals receive, process, retain and recall new information [20]. Learning theories describe conditions and processes through which individuals learn and provides teachers with models to develop instructional sessions that lead to better learning. Similarly, understanding factors that influence effective learning helps teachers to plan the most effective ways in which they can help students to learn better. Laura [9], adds that learning theories explain processes that individuals engage in as they digest new information. Theories also explain factors that motivate individuals to learn and what promotes or hinders effective learning. In other words, theories help teachers to appreciate and mitigate challenges that hinder effective learning. Lastly, theories provide frameworks for designing guidelines for assessment of teaching and learning.

Therefore, clinical teaching requires an instructor to first understand how students acquire, process, retain and reproduce clinical knowledge and skills to plan and deliver effective clinical teaching sessions. In this section, we explain common learning theories and how they can be used to guide effective clinical teaching and learning. Before we embark on this task, it is imperative to remember that clinical teaching and learning aims at enabling students to acquire three domains: cognitive (knowledge), psychomotor (skills) and affective (attitudes). Consequently, learning theories attempt to account for learning in each of these three domains.

According to Taylor and Hamdy [21], learning theories can be congregated into three broad categories: instrumental learning theories, humanistic theories, motivation learning theories, transformative learning theories, social learning theories and reflective learning theories. At operational and contextual level, motivation theories and reflective theories can also be regarded as models.

Instrumental learning theories are those that put experience of students at the center of learning and include behavioral and cognitive learning theories. Humanistic learning theories explain the role of student centeredness, self-actualization and internal motivation in effective learning. Similarly, motivation learning theories continue to emphasize the role of intrinsic motivation and self-reflection in students' academic success. For instance, expectancy valency motivation theory states that motivation to learn is a product of expectancy of success and value of success [22].

On the other hand, transformative theories affirm that students can change their thinking based on the quality of the new information acquired. Regarding social learning theories, these are theories which contend that learning and thinking are social activities and therefore explain the influence of the community and context to effective learning.

Therefore, from literature research, we found that behaviorism, social learning, social constructivism, constructivism, discovery learning, meaningful learning, experiential learning and humanistic learning theories were some of the major learning theories which explain how students undertaking health professional courses receive, process and retain clinical knowledge, skills and behavior.

Behavioral Learning Theories and Clinical Teaching and Learning

Behavioral theories were largely because of the work by John B. Watson, B.F Skinner, Edward Thorndike, and Ivan P. Pavlov. According to these behaviorists, learning can be achieved through external observable actions and therefore disregard the role of the mind in the learning. Behaviorists believe that internal behavior cannot be studied because no one can see what is in the mind of the student [23]. Behaviorists maintain that learning occurs as students interact with their external environment. They believe that students modify their external behavior because of consequences in the environment [24]. According to behaviorists, a teacher can modify the behavior of students by simply modifying their external environment. Similarly, it means that a teacher can manipulate learners' environment to promote or discourage some behaviors.

Therefore, behavioral theories assume that external stimulus in the environment can modify students' behavior and further considers the mind as a black box whose role in the learning process cannot be studied. For instance, Pavlov

demonstrated that a dog could be conditioned to associate the sound of a bell with food and eventually it would salivate whenever the bell would be rung irrespective of whether it received food or not. Skinner studied the effect of reinforcement. From his study, it was found that rewarding behavior promoted it while punishing it equally weakened it.

Some of the principles and concepts of behavioral learning theories such as clarity of purpose, time, repetition, feedback, rewards, withdraw, stimulus, and response provide an important understanding on how teaching and learning can be improved to promote mastery of knowledge, skills and attitude needed by the health care trainees in the modern time. Clarity of purpose, also referred to as learning objectives are statements of intended learning outcomes of instruction [25]. According to Foong [23], formulating learning objectives should be the first step in instruction planning because learning objectives help students to understand the action or performance expected of them. Torre, Daley [24], adds that sharing learning objectives or outcomes with the learners helps them to know what should be learned, how it will be learned and how evaluation will be performed.

Secondly, clinical skills are often complex and sensitive, requiring students to have sufficient time for exposure and learning. Typically, students begin by studying theoretical content before observing how these skills are performed. Gradually, they gain confidence and start practicing under the supervision of qualified staff. Initially, they assist, then perform tasks under observation, and eventually repeat the practice multiple times until they master the skills. This implies that students need adequate time, motivation, opportunities for repeated practice, and supervision by qualified staff. From behaviourism theory, we learn that the clinical learning process requires sufficient time, as further illustrated by the learning curve: *See fig 1.*

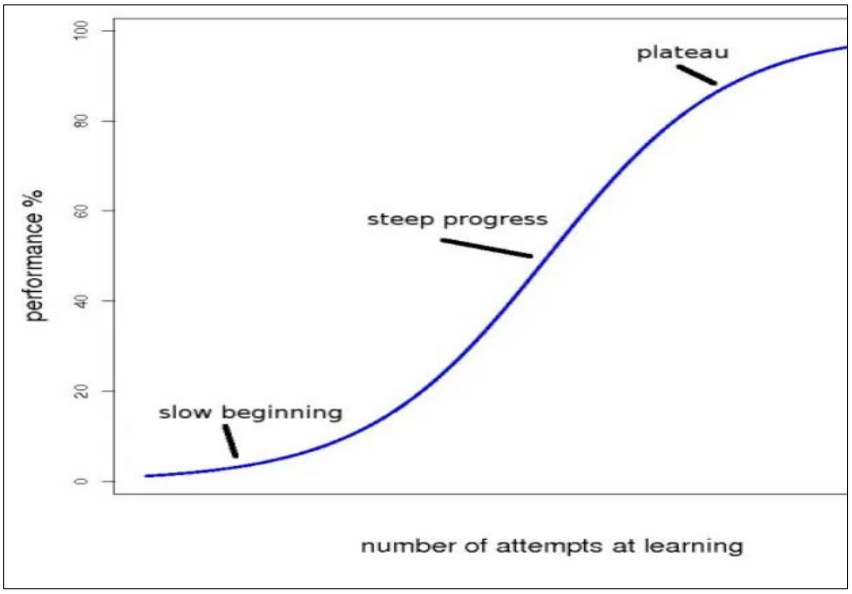

Figure 1: The learning curve

The third concept we pick from behavioral learning theories is the importance of giving feedback to students as they go through the learning process. Giving feedback is one of the principles of teaching and learning. From some studies, feedback has been found to improve students' academic achievement by effect size of .70 [26]. Therefore, from behavioral learning theories, we can conclude that providing feedback to students while teaching clinical skills indeed can improve mastery of such skills. The importance of feedback on clinical learning is further described in this article.

The fourth clinical teaching and learning principle we pick from behavioral learning theories is that of rewards and reinforcement. Indeed, from one of the study findings, it was found that rewarding students for their behaviors or actions strongly influenced their motivation to learn and perform or exhibit desired behavior [27]. For instance, a teacher should praise a student if he or she demonstrates appropriate behavior and provide immediate feedback that condemns inappropriate behavior so that it is not repeated.

From behavioral learning theories, we also learn that to facilitate student centered teaching and learning in the 21st century, a teacher should be more visible and active in the initial teaching and learning process because at this stage, a student needs more guidance and support. However, the teacher should progressively withdraw his or her participation to allow a student to take center stage and manage his or her learning with minimal support. *See figure 1.*

Regarding stimulus-response relationship as presented in behavioral learning theories, behaviorists believe that learning occurs when students demonstrate appropriate response to the presented stimulus [28]. They add that a strong relationship exists between response and reinforcement. For instance, Ertmer [28], cites a proposal from Gropper (1987) that teachers should prepare learning activities which can stimulate students and rise their interest to learn, as this happens, they will learn and perform the activity. In addition, when an activity is well performed, teachers should praise students for the activity well done, in doing so, they will be more motivated to repeat the same or similar activity. *See Table I.*

Social Learning Theory and Clinical Teaching and Learning

Social learning theory was proposed by a psychologist called Albert Bandura. According to Bandura, learning occurs through observation, modeling, and imitation [29]. Bandura explained in his theory that students learn from observing behavior and its consequences among other people. According to Horsburgh and Ippolito [30], Bandura further explained that this type of learning has four stages namely; attention, retention, reproduction and motivation. The first stage is that of attention which explains that students need to first carefully attend to the behavior which they want to reproduce. Secondly, students need to internalize and retain what they have observed. This stage involves a mental process in which students internally rehearses the behavior to be reproduced. Appreciation of mental involvement in learning is one of the tenets that distinguishes social learning theory from behavioral learning theories. Also, because of mental involvement, social learning theory can precisely be termed as social cognitive learning theory. The third stage is that students need an opportunity to reproduce what they had attained from attention and retention stages by converting them into realistic actions. Lastly, social learning theory attests that students need to be motivated to pay attention to the new behavior to be imitated, to retain and reproduce the observed behavior.

Taylor and Hamdy [31], agree with Bandura and adds that, context and community are the two elements that are crucial to learning. They add three assumptions namely: i) learning and thinking are social activities, ii) learning and thinking are structured by the tools that are available in specific circumstances, iii) thinking is influenced by the setting in which learning takes place.

Kendra [29], also agrees with Bandura and reveals that there are three core concepts that reside at the heart of social learning theory that can be applied in clinical teaching in modern times to equip students with desired competencies. The first concept is that learning among students can occur as a result of observation. The second concept is that the mind takes an active role in the learning process and for this reason, intrinsic and extrinsic motivation cannot be ignored. The last concept is that social learning theory claims that learning does not always mean change in behavior. Regarding the concept of observation, an interesting and very common example is the apprenticeship teaching model. Apprenticeship model provides an opportunity for students to learn from qualified and practicing clinical staff. Whereas apprenticeship model is being criticized in modern times that it does not provide homogenous competences, it remains popular in medical education because of its rich teaching and learning aspects [32, 33]. Through their interactions with patients, clinical staff either knowingly and unknowingly exert a lot of influence to learners as role models and accordingly, Kagawa [34], describes this type of learning as a hidden curriculum. The model, as earlier described, derives its strength from social learning theory. The model has been found to inculcate soft skills into students hence preparing them adequately for the tasks ahead.

Therefore, social learning theory explains that students can improve their knowledge, clinical skills and professional values by imitating actions of their professional clinical staff. This implies that the clinical staff, at times referred as student mentors should have appropriate knowledge, skills and professional values to be passed on to the students. Clinical staff should be willing, prepared and supported to be effective role models and mentors. Clinical staff should also have at least basic pedagogical skills to enable them to perform their teaching roles.

Similarly, social learning theory describes how a relatively new concept called ‘community of practice’ can be applied in clinical teaching and learning. Community of practice concept was originally described by Lave and Wanger in 1991 as ‘situated learning’ based on the observation that learning was not simply acquiring knowledge but involved a complex relationship between novice and expert [35]. According to Ranmuthugala, Plumb [35], novices (learners) start as ‘peripheral participant’ in practice and slowly rambles the journey towards the center of practice as they interact and learn from experts (clinical staff). Therefore, the community of practice concepts agree with the learning curve and other concepts which assert that learning clinical skills is a gradual process of which learners should be given sufficient time and opportunity to experience what they need to do. *See Table I.*

Social Constructivist Learning Theory and Clinical Teaching and Learning

This theory was advanced by a psychologist called Levi Vygotsky. According to Kim [36], social constructivism is based on three assumptions namely; reality, knowledge and learning. Social constructivists believe that reality is constructed through human actions and cannot be discovered because it does not exist prior its social creation. Social constructivists assume that knowledge is a product of human creation and is socially constructed. They believe that human

beings create meaning through their interactions with each other and with the environment in which they live. Lastly, social constructivists assume that learning is a social process which does not only occur within an individual but also when individuals are engaged in social activities.

Lohman [37], and Yadav [38], agrees with Kim [36], but adds that, processing of new knowledge takes three phases, namely, the knowledge construction phase, knowledge storage phase and knowledge retrieval phase. Knowledge construction phase involves building an understanding of new concepts by knitting various pieces of knowledge. Knowledge storage phase involves mental processes of sending new knowledge into memory and knowledge retrieval encompasses the act of finding and using the already stored knowledge.

Tenets of social constructivist learning theory informs us that learning in the clinical area can be improved if instructors foster collaborative learning whereby students are facilitated to construct knowledge through dialogue and scaffolding with others. This theory forms the basis for the Team Based Learning (TBL) approach. It also provides a strong foundation for giving group work or assignments to students. These teaching methods are commonly used in clinical teaching. *See table I.*

Constructivist Theory and Clinical Teaching and Learning

Constructivist learning theory traces its origins to Jean Piaget's work on children's cognitive development. This theory suggests that students construct new knowledge and skills by integrating them with prior knowledge, recognizing their applicability in problem-solving, taking responsibility for their own learning, and being highly internally motivated to learn (39]. From the literature, we find that this theory is based on the concepts of assimilation and accommodation. Assimilation refers to the process in which students integrate new knowledge with existing knowledge, while accommodation involves reframing or restructuring new experiences to fit within the mental framework (schema) already in place [40]. Constructivists believe that knowledge is subjective and is usually constructed by the students as they interact with the content. Constructivism learning theory is built on progressivism educational philosophy. Progressivists are usually pragmatic and believe that learning can be more effective if it is individualized and tailored towards the needs of the learner. This theory places students at the center of learning and refers to the teacher as a facilitator, guide, advisor and mentor as opposed to being an authority of learning.

Therefore, the theory of constructivism suggests that clinical teachers should encourage students to recall previous knowledge and skills and relate them to the new knowledge and skills being taught. This means that, for a clinical session to be successful, teachers should help students integrate biomedical sciences knowledge such as anatomy, physiology, and biochemistry with the clinical knowledge and skills being taught, completing the learning continuum. The clinical teacher should demonstrate the relevance of what students are learning, showing when and where it will be applied to solve clinical problems. Additionally, the clinical teacher should allow students the time and opportunity to drive their own learning, ensuring they have ample time and resources to interact with the content and construct meaning from it. Finally, the teacher should create an engaging learning environment that fosters internal motivation. Therefore, based on the theory of constructivism, there are key concepts that guide how clinical teaching can be conducted to enable students to acquire the competencies needed to meet the clinical care demands of modern times. *See table I and figure 2.*

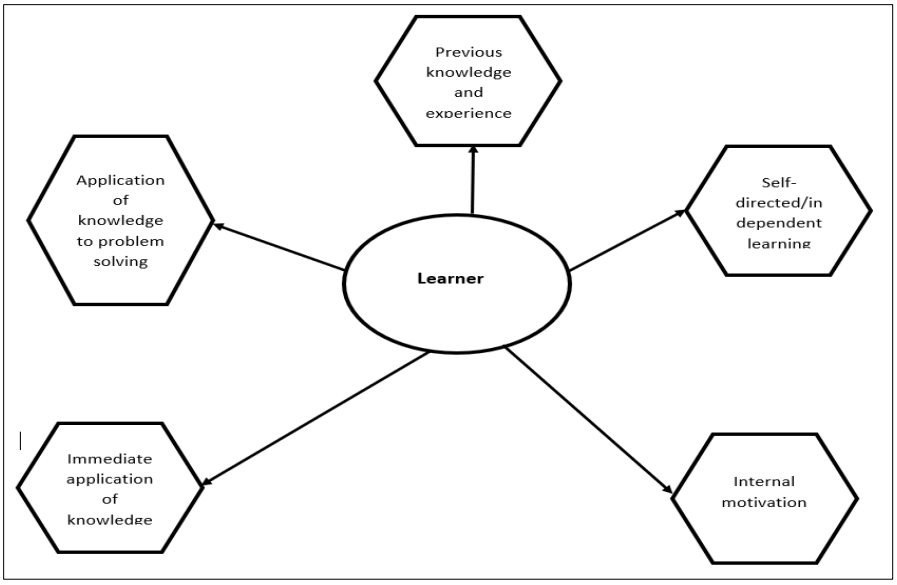

Figure 2: Constructivist theoretical framework and its application to clinical teaching and learning

Meaningful Learning Theory and Clinical Teaching and Learning

Meaningful learning theory was advanced by an American psychologist known as David Ausubel [41]. This theory shares some concepts with constructivist learning theory. For instance, according to Ausubel, learning is an active process in which students integrate new knowledge with the previous knowledge, concepts or approaches in a hierarchical way. Many researchers agree with David's theory. For instance, Javed [42], writes that meaningful learning is an active learning approach in which new acquired knowledge is related to the previous knowledge. Similarly, McLeod [43], also writes basing on the work done by Ausubel and states that existing knowledge is as important as new knowledge because it is on the previous knowledge that new learning is constructed. Mcleod adds that according to Ausubel, schemata are highly hierarchical representations of knowledge where general concepts appear at the top and increasingly specific sub concepts form tree branches. Therefore, Ausubel introduces an important concept of advance organizers or concrete anchors. An advance organizer is the information or image which teachers put at the beginning of the lesson to help students relate the information which they already know to the information going to be taught [44]. Advance organizers are usually very helpful in situations where a teacher wants to teach a complex skill or unfamiliar concept to students. Certainly, clinical skills usually appear scary to students and very difficult to learn. However, from meaningful learning theory, we now know that giving an advance organizer to students before introducing a new clinical concept can reduce anxiety and greatly help them to integrate previous knowledge or skill with the new one hence promoting mastery of competences much needed today. An example would be providing students with an ampoule of medicine to touch, feel, and read before the teacher begins teaching how to administer the drug. *See table 1*.

Discovery Learning Theory and Clinical Teaching and Learning

Discovery learning theory was introduced by cognitive psychologist Jerome Bruner. It has been recognized as essential in guiding how students learn science. The theory emphasizes that the goal of studying science is not merely to memorize facts but to help students acquire the knowledge and skills needed to understand the world, solve problems, and make informed decisions about scientific and social issues. These findings concur with those of Pappas [45]. According to Pappas, discovery learning is built on students' previous experiences and knowledge and encourages students to use their intuition, imagination, creativity and search for new knowledge, facts and truths. Pappas adds that there are five principles of discovery learning theory.

The first principle is that of problem solving. In this case, the theory states that students can learn how to solve problems if a teacher gives them learning activities which encourage risk taking, probing and problem solving. This implies that for clinical teaching to be effective, the teacher should assign challenging clinical tasks, such as managing clinical scenarios, to students. As they work through these tasks, they learn how to care for patients in similar situations. The second principle is learner management, which emphasizes that teachers should allow students to learn independently and at their own pace. This principle encourages clinical teachers to be flexible and to design adaptable clinical schedules that promote student-centered learning, ultimately maximizing clinical teaching outcomes. The third principle emphasizes the need for integration and connectivity. It urges teachers to design learning activities that enable students to connect and integrate prior knowledge with new knowledge. The theory encourages students to combine both previous and new knowledge to create something new. Therefore, for clinical teaching and learning to be more effective, the clinical teacher should apply teaching methods and models that promote this integration for improved outcomes.

The fourth principle emphasizes information analysis and interpretation. The theory asserts that learning should be process-oriented rather than content-driven. It highlights the importance of teaching students how to analyze and process information rather than memorizing facts. In clinical teaching, this principle suggests that the focus should be on helping learners critically engage with and apply their knowledge to enhance understanding. Therefore, clinical teachers should foster deep learning rather than surface-level memorization, ensuring that students develop meaningful and practical insights.

The final principle is failure and feedback. Discovery learning theory emphasizes that learning occurs not only when students find the correct answer but also when they make mistakes. This principle suggests that clinical teachers should consistently provide feedback, as learning is incomplete without it. Additionally, teachers should not always expect correct answers but should encourage students to view mistakes as valuable learning opportunities. Therefore, discovery learning theory shares some concepts with other theories such as constructivist theory. *See table I.*

Experiential Learning Theory and Clinical Teaching and Learning

Experiential learning theory is perhaps one of the learning theories commonly applied in higher education [46]. The theory was established by Kolb. The theory draws on the work of prominent 20th century scholars such as John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers, and others [47, 48]. Unlike cognitive learning theories, which focus primarily on cognition over affect, and behavioral learning theories, which overlook the role of the brain in learning, experiential learning defines learning as a process in which knowledge is created through the transformation of experience [16]. Literature research about experiential learning reveals varying definitions. However,

most of the literature centers around learning through experience or by doing. For instance, Odendaal [49], defines experiential learning as active participation of learners in events or activities which lead to accumulation of knowledge or skills. Kolb [47]. Experiential learning is also described as a learning approach in which the learner is directly engaged with the realities being studied. It contrasts with the lecture method, where learners primarily read, hear, discuss, or write about these realities without directly experiencing them as part of the learning process.

According to experiential learning theory, students can be categorized into four types: Divergers, assimilators, convergers, and accommodators. Divergers prefer to approach learning through concreate experience and to process learning through reflective observation. Divergers are good at viewing situations from many perspectives and perform better if they are tasked to generate new ideas. Divergers learn better from practical tasks such as assessment of patients, administration of medicines, and performing a surgical operation. Divergers also learn by reflecting on what they have performed through debriefing, group discussion and journaling. Assimilators prefer to approach knowledge through abstract conceptualization and to process it through reflective observation. Assimilators are best at understanding a wide range of information. They are precise at logical thinking and inductive reasoning but not practical skills. Assimilators process new knowledge by reflecting on it and integrating it with the existing knowledge. They are comfortable when they are confronted with models, concepts and structured information which they need to analyze and organize. Accommodators on the other hand, have the ability to learn from hands on experience and love challenging tasks and experiences. However, they rely heavily on others for information needed to solve problems. Accommodators tend to take risks. Finally, convergers approach knowledge through abstract conceptualization but prefer processing it through active experimentation. Convergers prefer to deal with technical tasks and problems rather than social and interpersonal issues. Unlike assimilators, the strength of convergers lie in their ability to use abstracts, theories, models and structured information to make decisions and solve problems.

Therefore, experiential learning theory is highly useful in clinical teaching and learning because it emphasizes experience, reflection, and active experimentation. The theory highlights the importance of integrating theoretical knowledge from the classroom with practical skills in the clinical setting, which is a core role of health workers. It fosters critical thinking, problem-solving, and a commitment to continuous quality improvement. Additionally, the theory accommodates flexibility in learning, making it inclusive for students with diverse learning styles. *See table I.*

Humanistic Learning Theory and Clinical Teaching and Learning

Psychologist Carl Rogers and Abraham Maslow are generally thought to be the founders of modern humanistic learning theory (50]. Johnson Andrew describes human learning theory as one focused on personal growth and the full development of each individual's potential. He further explains that this theory advocates education that fosters the development of knowledgeable individuals who can nurture themselves, others, and the environment, rather than simply transmitting standardized theoretical content to students.

This theory posits that students learn deeply and widely if learning is organized in a way that it is natural and enjoyable. Johnson emphasizes when students are coerced into learning through external motivation, they dislike learning and consequently learn less. Torre, Daley [51], agree with Johnson and write that humanistic learning theory relates to human needs and ultimate need being self-actualization. Rostami and Khadjooi [52], do not differ. According to these two authors, humanistic learning theory posits that learning can be more effective if collaborative learning among students is encouraged and if the desire for students is to learn how to learn and consequently become the best they can be in life.

The concepts presented by this theory guide clinical teaching by emphasizing the importance of providing a safe and respectful learning environment, fostering positive relationships, and supporting students in setting personal learning goals through self-directed learning. It emphasizes the importance of self-reflection, self-awareness, post-clinical debriefing sessions, and individualized learning, ensuring that students who struggle receive additional support. Furthermore, it advocates for holistic development, focusing not only on clinical skills but also on essential competencies such as effective communication. *See table I.*

Self-Determination Theory

This is one of the major motivational theories which was proposed by Edward Deci and Richard Ryan [53]. Ten Cate, Kusurkar [53], indicate that self-determination theory is very helpful in guiding curriculum development, clinical teaching, classroom teaching and assessment of teaching and learning. This theory states the three essential psychological needs namely, competence, autonomy and relatedness must be met for the learner to achieve psychological wellness [54]. For instance, a teacher can promote relatedness by allowing learners to practice professional roles appropriate to their level of training. This fosters a sense of belonging, which enhances motivation and ultimately improves their competencies. From this theory, we can conclude that learners register better learning outcomes if they feel they are responsible for their learning, motivated, capable and connected [55].

The theory posits that to promote effective learning, clinical teachers should apply the scaffolding technique to assist learners in transitioning from learning by observation to independent practice. Teachers should accommodate various learning styles to promote inclusivity. The theory also emphasizes the importance of providing constructive feedback to support reflective observation. Additionally, the learning environment should be improved, and interdisciplinary teamwork should be promoted to enable learners to learn from diverse sources. *See table I.*

Expectancy-Value Theory

Motivation has been documented as one of the vital attributes in clinical teaching and learning success. Many times, clinical teaching and learning is characterized by the low motivation of learners which manifest in form of absenteeism from the clinical sites, passive and surface learning and failure to attend to the given clinical tasks by the clinical teacher.

On contrary, learners who are motivated to learn will actively participate in the learning without any form of reward and will direct their effort towards the desired goal [56]. Expectancy value theory postulates that achievement-related choices are motivated by the combination of peoples' subjective expectations for success and subjective value attached to the success [57]. This means that for the students to actively participate in the clinical teaching sessions, they should believe that the clinical teaching session will be successful, and the successful session will add value to their academic scores and better patient care. Therefore: Motivation to learn = expectancy of success × the value of success [21].

By setting realistic, achievable goals, breaking tasks into manageable components, and providing positive feedback, clinical teachers can enhance learners' confidence and engagement. Emphasizing the real-world application of learning materials highlights their relevance, increasing learners' motivation. Additionally, hands-on experience in real-world settings allows learners to apply their knowledge directly, reinforcing the connection between learning and professional development. This approach fosters more motivated, confident, and effective clinical learners, ultimately leading to improved outcomes. *See table I.*

Table I: Summary of the described theories, concepts and their application in clinical teaching

Theory	Concepts	Application in clinical teaching and learning
Behavioral learning theories	-Clarity of purpose-Time & repetition -Feedback -Reward -Withdraw -Stimulus & response - Demonstration	- Teacher should set and communicate clear learning objectives and outcomes to students Students should be given constructive feedback regarding their clinical practice Clinical teaching should be given sufficient time, and students need an opportunity to repeat skills several times until such skills are mastered Students should be rewarded for their work Teacher should design learning activities which can stimulate students' interest to learn Students should be given opportunity to learn on their own with minimal support from the teacher Teacher perform demonstrations and level of achievement is scored using predetermined rubric
Social learning theory	-Role modeling -Student motivation -Apprenticeship -Community of practice -Progressive learning -Learning environment	Clinical staff should have basic training in pedagogy and role modeling of students Expert knowledge, hard and soft skills such as compassionate and empathy among clinical staff should be at their best Teacher should design clinical teaching sessions that recognize progressive learning Training health facilities should exhibit qualities of excellence in providing patient care
Social constructivist learning theory	-Team based teaching and learning - Group assignments -Collaborating learning - Scaffolding	- Teacher should apply team based and collaborative learning in clinical teaching - Teacher should create environment that encourages students to construct knowledge as a team - Students should be supported by the teacher and clinical staff to learn new clinical knowledge and skills by breaking such content into manageable material
Constructivism learning theory	-Previous students' experience -Student centered learning	-Teacher should stimulate student's experience and build on it to facilitate learning of new tasks

	-Shifting role of teacher -Individualized learning -Competence based teaching and learning -Concept mapping	-The role of the teacher and clinical staff is to facilitate learning as opposed to giving knowledge to students -New approaches and practices of clinical teaching such as problem-based methods should be applied in the 21st century - Teacher should endeavor to understand each student's abilities and weaknesses
Discovery learning theory	-Past experience and knowledge -Learners 'autonomy - Feedback -Problem solving -Critical thinking -Innovative skills - Learners 'attitudes	- Teacher should elicit and promote integration of previous knowledge with the new knowledge - Apply problem-based teaching and learning approaches - Provide prompt and constructive feedback - Promote student centered learning - Teach soft skills
Meaningful learning theory	-Activation of previous knowledge -Relating new knowledge with the previous knowledge	- Teacher can give an advance organizer or concrete anchor to help students integrate previous knowledge with the new knowledge
Experiential learning theory	-Holistic approach to teaching and learning - Transformation of experience -Reflective thinking -Challenging tasks -Brain storming and problem solving -Decision making	- Teach all the three domains - Transformative learning - Design challenging learning tasks that stimulate critical/reflective thinking -Apply strategies and methods that promote problem solving skills - Use brainstorming sessions - Prepare demonstrations and return demonstrations - Provide opportunity for every student to experience the reality
Humanistic learning theory	-Self-directed learning -Relevant content -Attend to student's emotions, imagination and creativity - Learning environment - Learn how to learn - Feedback and reflection -Individualized learning -Holistic learning	- Promote self-directed learning - Teach only what is relevant and useful to students - Communicate to students the application of content/experience - Attend to full spectrum of student's experiences - Create non-threatening learning environment -Connect with student's lives - Promote greater understanding of self - Provide feedback such as post clinical debriefing - Provide extra support to learners with special needs - Identify learners at risk of poor academic achievement and provide targeted support - Provide environment for learners to acquire multiple competences such as communication in addition to clinical skills
Self determination theory	Identify learning gaps and bridge them Accommodative learning Feedback Safe learning environment Interdisciplinary learning	Apply scaffolding technique Accommodate various learning styles Provide constructive feedback Promote safe learning environment Promote inter-professional learning and care
Expectancy value theory	Realistic tasks Positive feedback Connect to real world application of learning	-Set challenging but realistic objectives, goals or tasks -Breakdown complex tasks into small manageable forms - Provide positive feedback at each level of success - Inform learners about the relevance and application of what is being learnt - Provide opportunities for learners to practice the skills learnt

CONCLUSION AND RECOMMENDATIONS

Guiding clinical teaching sessions with well-established learning theories can significantly enhance learning outcomes in contemporary settings. Therefore, we recommend the intentional application of learning theories in clinical

education to improve student engagement, knowledge retention, and skill acquisition. Additionally, policymakers should integrate evidence-based learning theories into clinical teaching guidelines and training programs to standardize and enhance the quality of education in healthcare settings.

Study Limitations

This study, driven by a concept analysis approach, did not follow a standardized, rigorous method for literature search, data collection, and analysis, which may limit the reproducibility of its findings.

DECLARATIONS

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