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Integrating learning theories in medical education: A theory informed framework for clinical teaching

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I. INTRODUCTION

Learning theories explain how learners acquire, organise, retain, and apply new information. In health professions education, they provide the conceptual foundation for evidence-based teaching by helping educators in defining learning objectives, selecting suitable instructional strategies, and designing effective assessments and evaluations. When appropriately aligned with subject content and learners' characteristics, learning theories enhance the quality and depth of student learning (Mukhalalati & Taylor, 2019).

Three foundational theories are commonly applied in medical education: Behaviourism, Cognitivism and Constructivism. Behaviourism emphasises stimulus-response associations where behaviours are strengthened through reinforcement by rewards or punishment, and learning occurs through practice and repetition. Its strength lies in fostering measurable skill acquisition and habit formation, which is ideal for procedural training in health professions in simulation-based teaching – via positive reinforcement (e.g., praise for correct responses), negative reinforcement (e.g., waiving exams for high performance), or punishment (e.g., zero grades for late work). However, it limits deeper engagement, prioritises rote recall over problem-solving and neglects internal cognitive mechanisms (Henton & Iversen, 2012; Strauch & Al Omar, 2014).

Cognitivism proposes that learning occurs through internal cognitive restructuring - a process where

learners organise, store and retrieve knowledge. In practice, this supports the use of chunking information, mnemonic aids, and problem-solving discussions. However pure cognitivism can present a fragmented view of learning with self-efficacy, overlook maturation effects, and resist quantification of social processes (Khalil & Elkhider, 2016).

Constructivism views learning as an active, individualised construction of knowledge built upon prior experiences. Learners compare new information with existing understanding, reflect on inconsistencies, and gradually refine their knowledge through application and critical reflection. It aligns with social and experiential learning theories and promotes skills such as articulation in group projects, problem solving, and assessments encouraging curiosity and collaboration. However, it may produce unpredictable outcomes, heavy reliance on foundational knowledge, and its implementation can be challenging in standardised, high-stakes environments requiring consistent results (Bada & Olusegun, 2015).

This article focuses on these three theories because they are foundational, widely used, provide a complementary structure and easily mapping onto practical demands of clinical teaching. Together they allow educators to move from skill acquisition to conceptual understanding and then to meaningful application in bedside teaching, skill laboratories and simulation-based education. However, in routine practice, educators often need practical

guidance on when and how to apply each perspective during a teaching encounter.

In this Innovation and Insight article, I propose a Theory to Practice Matrix that helps clinical educators intentionally integrate these theories in routine clinical teaching. Rather than replacing existing theories, the matrix offers a sequencing mechanism for selecting the most appropriate theoretical lens at different stages of learning. Such a matrix can be especially valuable in Asia Pacific and other resource variable, time constrained clinical teaching environments where large learner cohorts, hierarchical instructional cultures, and strong summative assessment pressures require flexible yet structured educational strategies. Other perspectives such as social learning, experiential learning, adult learning, situated learning, and connectivism remain relevant but fall outside the scope of present framework.

II. POSITIONING IN LITERATURE

Existing literature on learning theories provides useful guidance for healthcare educators but fail to address how multiple theories interact in complex environments or across a single teaching session. As a result, health professions educators frequently encounter theoretical fragmentation, where behaviourism, cognitivism, and constructivism are invoked superficially or in isolation, leading to inconsistent instructional design and suboptimal learner outcomes. This limitation is particularly evident while designing bedside teaching, skill lab instructions, simulation sessions particularly in balancing skill acquisition, clinical reasoning and meaningful application within limited teaching time. Consequently, educators may rely on personal preference or broad educational principles that offer limited guidance when teaching goals shift during a session.

Rather than treating behaviourism, cognitivism, and constructivism as parallel descriptions, this matrix specifies when each should dominate, combine, or moderate and what risks arise if one theory is overused. Educators may move across theories within a single teaching session according to learner readiness, task complexity, and the intended level of transfer from knowledge to practice.

Unlike comprehensive instructional design models such as Gagne's Nine Events or ADDIE, this Theory to Practice matrix is not intended as a full lesson planning blueprint. Instead, it is a clinician friendly decision aid for choosing and switching between learning theories during teaching encounters.

Two guiding questions frame this work: How can behaviourism, cognitivism, and constructivism be integrated to inform contemporary classroom and clinical teaching strategies? And what practical framework emerges when their strengths and tensions are reconciled in health professional education settings?

III. DISCUSSION

The three learning theories offer distinct yet interconnected perspectives on learning. In medical education, 'Behaviourism' is positioned as supporting habit formation, cognitivism as facilitating information processing and constructivism as promoting authentic application, reflection and transfer to practice.

Although theories are complementary, at the same time, important tensions exist among them: structured control emphasised in behaviourism may conflict with learner's autonomy central to constructivism; cognitivism's focus on individual knowledge processing contrasts collaborative orientation of constructivism; and observable performance may not fully capture the depth of conceptual understanding. Moreover, constructivism may foster reflection and transfer, but it is difficult to standardise it in the high-stake setting of medical education. These tensions highlight the need for a practical framework that helps educators decide when one lens should be prioritised.

Table 1 presents the Theory to Practice Matrix, which positions each learning theory across key instructional phases in clinical teaching. Educators can use it as a planning tool to check whether their sessions over rely on one paradigm and to intentionally blend complementary approaches according to learner readiness, task complexity and assessment goal.

Instructional phase	Behaviourism (Habits)	Cognitivism (Processing)	Constructivism (Meaning)
Best used when	Learner is acquiring a discrete, observable and repeatable skill, especially in early stages of clinical training	The learner needs to understand, organise, retain, and apply clinical information or reasoning.	The learner is ready to integrate prior knowledge with authentic clinical experience and reflect on meaning.
Setting learning outcomes	Specific, observable skills (e.g., perform CPR steps accurately)	Cognitive competencies (e.g., analyse diagnostic schemas) or conceptual understanding of facts (e.g., recognising relationship among key concepts)	Authentic application (e.g. integrating cases into clinical judgment)
Designing learning activities	Drills and repetition (e.g., rote practice, procedural practice in skill lab)	Structured explanations, mnemonics, problem-solving discussions	Group projects, case studies and simulation activities
Feedback/reinforcement,	Positive and negative rewards and punishments (e.g., bonus points)	Timely, specific feedback, avoid becoming cognitively overwhelmed and support schema building	Reflective dialogue (e.g., debriefing, peer critique, guided self-assessment)
Designing assessment	Objective checks of observable performance (checklists)	Structured recall and reasoning checks (e.g., multiple-choice questions, short answer questions blueprint by cognitive level)	Open tasks (e.g., portfolios, work-based assessment, reflections)
Potential limitations if overused	Learning remains task-specific without transferring to new situations	Learning remains too abstract and detached from authentic practice	Learning becomes too open ended and difficult to standardise.
Signals to switch to the next theory	The learner performs the task correctly but cannot explain the underlying rationale, adapt to variation, or solve related problems independently.	The learner can describe concepts but struggles to apply them in real cases, simulate reasoning under pressure, or transfer knowledge to practice.	The learner needs more structure, clearer steps, or more explicit guidance to avoid confusion or unsafe performance.

Table 1. Theory to Practice Matrix for integrating learning theories in clinical teaching sessions

Rather than applying these paradigms chronologically, the matrix encourages non-linear application based on instructional intent. In clinical education teaching does not always progress in a fixed sequence from habit formation to meaning making. Instead, educators may need to move between theories within a single encounter. For example, a learner may first rehearse a physical examination step through repetition, then organise the underlying diagnostic reasoning, and finally reflect on the findings in relation to the patient's broader clinical context. This flexibility is especially relevant in bedside teaching, skills laboratories, and simulation, where procedural accuracy, cognitive organisation, and authentic judgment must often be developed at the same time.

In practical terms, value of this framework lies in making these transitions explicit. If a learner performs a procedure accurately but cannot explain the rationale of the procedure, the educator may need to move beyond behaviourist approach towards cognitivist support. If a learner can explain a concept but cannot apply it in practice, a constructivist approach may help bridge that gap through authentic cases, reflection, and debriefing. If a learner is overwhelmed by ambiguity or unsafe performance, greater behavioural structure may again be required.

IV. IMPLICATIONS OF THIS MATRIX FOR CLINICAL EDUCATORS

The strength of this framework lies in its pragmatic alignment with clinical teaching practice, and its novelty lies in offering phase-based guidance for selecting and integrating theories according to teaching purpose, learner readiness, and assessment need.

In a skill session for example, in teaching suturing skills in a skills laboratory, a behaviourist approach would emphasise repetitive drills and procedural checklists; a cognitivist approach would focus on chunking knot-tying sequences and explaining common errors; while a constructivist approach would integrate suturing into a simulated wound-closure scenario requiring clinical judgment, utilising prior knowledge and reflect on their performance.

Similarly, during bedside teaching on chest pain, a clinician can integrate behaviourist, cognitivist, and constructivist approaches within a single teaching encounter. A behaviourist approach will be reinforcing systematic history taking sequence and physical examination routine; cognitivist focus helps learner organise information through a concept map of differential diagnoses and underlying pathophysiology; constructivist focus provokes small group reasoning

around an authentic patient case, encourages learner to articulate their thinking, negotiate interpretations and apply knowledge to real clinical decisions.

Moreover, literature supports that medical students and resident value different teaching behaviours at different stages of clinical development (Ooi et al., 2021). This further reinforces the need for a flexible matrix that allows educators to adjust their approach according to learner readiness and instructional purpose.

The matrix can guide assessment alignment by encouraging the integration of theoretical perspectives within assessment design. As an example, behaviourist oriented OSCE stations instead of relying only on detailed checklists, can include cognitivist elements such as brief questions probing clinical reasoning. This broader alignment is useful in Asia Pacific settings, where educators often work with large cohorts, variable learner preparedness, and limited teaching time, making flexible yet structured teaching approaches especially valuable. In addition, constructivist approaches such as portfolios, structured reflections, or longitudinal workplace-based assessments may complement summative assessments strategies by capturing contextual learning and reflective practice.

In faculty development workshops, educators can use the matrix to review and refine teaching sessions by identifying overreliance on a single paradigm, and deliberately redesign objectives, activities, feedback, and assessments.

V. CONCLUSION

Classic learning theories – behaviourism, cognitivism, and constructivism – remain powerful tools when treated as complementary lenses rather than competing dogmas, forming a coherent framework for evidence-based teaching in health professions. This Theory to Practice Matrix can act as a practical tool that busy clinicians can adapt when preparing clinical teaching sessions. Nevertheless, the matrix remains conceptual and warrants further refinement through implementation, faculty feedback, and empirical investigation. Future work should examine its use in faculty development workshops, educators' experiences, its feasibility in real settings and impact on learner engagement and clinical reasoning.

Notes on Contributors

The author, Uzma Khan, conceptualised the study, conducted the literature review, reflected on teaching and assessment practices, synthesised the framework, and prepared the manuscript.

Ethical Approval

This conceptual study did not involve human participants or identifiable data; therefore, ethical approval was not required.

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Declaration of Interest

Author has no conflict of interest.

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