Postgraduate medical education: see one, do one, teach one...and what else?

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ABSTRACT

Postgraduate medical education (PGME) faces many challenges and must evolve. Three principles can guide this evolution. First, PGME apprenticeship, a form of situated learning, is guided by the four dimensions of the Cognitive Apprenticeship Model: content, method, sequence, and sociology. Second, situated learning involves experiential learning and inquiry processes; it is most effective for learners practicing self-directed learning. The promotion of self-directed learning requires consideration of its three dimensions: process, person, and context. Finally, the need for competency-based PGME can be accomplished through holistic models, such as situated learning. The implementation of this evolution should be informed by the characteristics of the new paradigm, inner and outer settings of the organisations, and individuals involved. Implementation encompasses communication to engage stakeholders, training process redesign in accordance with the new paradigm, faculty development to empower and engage involved individuals, and research to enhance the understanding of PGME.

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Introduction

Postgraduate medical education (PGME), a mission of the Hong Kong Academy of Medicine (HKAM), is important for the development of competent caring medical practitioners and for efforts to ensure high-quality patient care.[1] As the HKAM celebrates its 30th anniversary, there is a need to examine how it must evolve to accommodate changes in the healthcare landscape, diverse patient needs, the increasing complexity of medical practice, and advances in educational practices.[2] Despite the limited evidence available regarding PGME, some principles can guide the necessary evolution. Here, I focus on three themes: (1) PGME is situated learning, (2) PGME should be self-directed, and (3) PGME should be competency-based. Considering the space limitations, I provide a broad framework; readers can acquire additional information from relevant articles included in the References.

Postgraduate medical education is situated learning

Understanding situated learning

Postgraduate training in medicine mainly occurs in the workplace through participation in clinical tasks. This training approach can be regarded as a process of apprenticeship after a doctor in training enters a particular specialty or 'community of practice' (CoP; discussed in detail below).[3] The principles of this learning process include increasing learner engagement in the daily work of the community, professional identity formation, and development of the ability to communicate using the community's language and act according to the community's norms.[4] Thus, learning is embedded in everyday activities and is no longer considered 'necessarily or directly dependent on pedagogical goals or official agenda'.[4] This mode of learning is consistent with the anthropological concept of 'situated learning'.

The notion of 'situated learning' emerged from the work of Lave,[5] who identified distinct differences between learning in a school setting and learning through everyday activities. In a school setting, education focuses on individual learners; it is dominated by cognitivism (ie, information transmission and processing) and behaviourism (ie, shaping of behaviour via reinforcement and punishment). In this context, knowledge is perceived as an 'inert, self-sufficient, abstract, self-contained, symbolic substance, which is transferred from the teacher to the learner and becomes stored in the learner's memory for later use'.[6] In contrast, proponents of situated learning theory recognise that learning is the active construction of knowledge through social collaborations and a focus on social relationships and interactions, rather than a focus on individual learners. Thus, they view knowledge as a tool. An individual can possess a tool without being able to use it; use of the tool helps to increase the individual's understanding of the tool and the relevant context (ie, situation). The specific learning

醫學進修教育發展的演變與挑戰

蘇慶餘

醫學進修教育必須不斷發展以應對各種挑戰。我們可藉三個原則指導這一演變。首先，醫學進修教育是學徒制或一種形式的情境學習，可以由認知學徒制模型的四個維度指導：內容、方法、順序和社會學。其次，情境學習涉及體驗式學習和探究過程，對於行使自主學習的學習者來說最為有效。培育自主學習需要解決其三個維度：流程、人員和環境。最後，醫學進修教育應該以能力為本，並通過情境學習等整體模型來實現。這種演變的實施應根據對新範式的特徵、組織的內部環境、外部環境和所涉及的人員的了解，實施包括溝通以吸引利益相關者參與、根據新範式重新定義標準、教師發展以授權參與以及進行研究以增強對醫學進修教育的理解等措施。

that occurs is a function of three factors in the context where that learning occurs: the people in the context, the 'tools' used, and the specific activity itself.[6]

Three decades after Lave published her seminal work, many researchers in health professions education use situated learning theory to guide curriculum design because they recognise its potential advantages.[7] Situated learning places learners in realistic settings where socially acquired knowledge is often valued, strategically utilises the learner's prior knowledge of a particular subject, and (most importantly) increases the likelihood of knowledge application within similar contexts.[7] For example, Lave asked adults to determine which of two products in a grocery store was a 'best buy'. When participants actually went to a grocery store, talked with people in their group, and physically handled various items to compare sizes and shapes, they correctly answered 98% of the math problems involved in the experiment. In contrast, when participants were provided the same math problems in a paper-and-pencil test format, they correctly answered 59% of the math problems.[5]

Cognitive Apprenticeship Model

As a form of apprenticeship, PGME requires teaching methods that differ from school-based learning approaches. 'See one, do one, teach one' is the method used in traditional apprenticeships.[3] However, the learning of complex subjects, such as PGME, involves components that are not readily observable, as well as complex relationships and interactions among teachers and learners. Thus, Brown et al[8] developed a complementary approach to the traditional teaching model, known as the Cognitive Apprenticeship Model (CAM). The CAM focuses on four dimensions that are present in any learning environment: content, methods, sequencing, and sociology (Table 1).[9]

TABLE 1. Principles for designing cognitive apprenticeship environments[9]

Principle	
Content	**Types of knowledge required for expertise**
Domain knowledge	Subject matter–specific concepts, facts, and procedures
Heuristic strategies	Generally applicable techniques for completing tasks
Control strategies	General approaches for directing an individual's solution process
Learning strategies	Knowledge about how to learn new concepts, facts, and procedures
Methods	**Ways to promote the development of expertise**
Modelling	Teacher performs a task that students can observe
Coaching	Teacher observes and facilitates while students perform a task
Scaffolding	Teacher provides supports to help students perform a task
Articulation	Teacher encourages students to verbalise their knowledge and thoughts
Reflection	Teacher enables comparisons of performance among students
Exploration	Teacher invites students to establish and solve their own problems
Sequencing	**Keys to ordering learning activities**
Increasing complexity	Meaningful tasks with gradually increasing difficulty
Increasing diversity	Practice in various situations to emphasise broad application
Global to local skills	Focus on conceptualising the whole task before executing the parts
Sociology	**Social characteristics of learning environments**
Situated learning	Students learn in the context of working on realistic tasks
Community of practice	Communication about different ways to accomplish meaningful tasks
Intrinsic motivation	Students set personal goals to seek skills and solutions
Cooperation	Students work together to accomplish their goals

Content

Domain knowledge constitutes the explicit concepts, facts, and procedures associated with an area of expertise; this type of knowledge is usually found in textbooks and lectures. Proponents of situated learning theory and CAM argue that a strong grasp of domain knowledge is necessary but insufficient for experts who seek to solve real-world problems. Such experts must also acquire three types of strategic knowledge: heuristic strategies, control strategies, and learning strategies.[9]

Method

However, strategic knowledge is often tacit; experts may utilise each type of strategic knowledge without conscious awareness of such use. Therefore, apprenticeship teaching methods are designed to provide learners with opportunities to observe, engage in, and discover the strategic knowledge used by experts, within the relevant context. The six teaching methods in CAM can be categorised into three groups. The first three methods—modelling, coaching, and scaffolding—represent the core of traditional apprenticeships. These methods are intended to help students acquire an integrated set of skills through observation ('see one') and guided practice ('do one'). The next two methods—articulation and reflection—are designed to help students focus their observations and gain conscious control of their own problem-solving strategies. The final method—exploration—aims to encourage learner autonomy in terms of implementing expert problem-solving processes and formulating problems.[9] I want to emphasise the links between these teaching methods and Kolb's Cycle of Experiential Learning. Situated learning constitutes experiential learning via participation in clinical tasks. Kolb[10] described experiential learning as a transformative process. When learners perform or 'do' a clinical task, they transform abstract knowledge into concrete experience. However, learning is only complete when learners reflect on their concrete experience, then transform that experience back into generalised and abstract knowledge to guide future practice.[10] When they are ready, learners can independently apply this enhanced knowledge in practice. Kolb's Cycle supports the purpose of each group of teaching methods in CAM; it also highlights the value of facilitated reflection and feedback in workplace-based learning, including workplace-based assessment.[11]

Sequencing

The sequence in which clinical tasks are performed affects learning efficacy. Cognitive Apprenticeship Model offers three principles to guide sequencing. First, tasks should progress from simple to complex, requiring increasing amounts of skill and conceptual knowledge. Next, diversity should gradually increase to allow learners to identify conditions in which they should use various skills and strategies. Finally, activities and tasks should progress from a global perspective to a local perspective; thus, learners should build a conceptual map of an activity before considering its details (ie, specific tasks). The establishment of a clear conceptual model of the overall activity helps learners understand the part they are performing, which improves their ability to engage in progress monitoring and develop self-correction skills.[9]

Sociology

Lastly, the social characteristics of learning environments (ie, 'sociology') can affect motivation, confidence, and orientation towards problems that individuals encounter as they learn. The first element of sociology, which is a core consideration, is ensuring that learners perform tasks and solve problems in an environment that reflects the real-world nature of such tasks. The second element of sociology is intrinsic motivation. Learning environments should be created in manner that enables learners to perform tasks because the tasks are intrinsically related to their goals of interest, rather than because the tasks are driven by extrinsic motivation (eg, earning a good grade or pleasing the teacher). The third element of sociology is the aforementioned CoP, which comprises a group of people who share a passion for something they do and learn how to do it better during repeated interactions; learning may be an intentional or incidental outcome of those interactions. Communities of practice have three key characteristics: a shared domain of interest; engagement in joint activities, information sharing, and relationship building among members; and the development of a shared repertoire of resources for practice.[7] Key components of situated learning are relationships among CoP members and engagement in active communication about skills related to their expertise. Full members of the CoP (ie, specialists) provide guidance to doctors in training; they also learn from each other through these interactions. The final element of sociology is cooperation: learners should work together in a manner that fosters cooperative problem solving. There are many ways in which peer learners can help each other to learn; for example, senior learners can guide junior learners in practice, giving and receiving peer feedback, or solving problems together. Learning via collaboration is a powerful motivator and a powerful mechanism for the expansion of learning resources.[9] There is evidence that learners can receive diverse benefits from peer-assisted learning.[12] Thus, it is important to empower doctors in training via teaching and feedback, rather than waiting until their specialty training is completed.

Implementation considerations

I will use the Consolidated Framework for Implementation Research (CFIR) model to guide this portion of the discussion (Fig).[13,14] The CFIR, a conceptual model for implementing change or intervention, consists of five domains. The implementation process, one of the domains, should be informed by considerations of the other four domains: characteristics of the 'intervention', inner setting, outer settings, and individuals involved in the intervention.[13]

Intervention

In this discussion, the intervention is the new model of learning: CAM. Damschroder et al[13] identified multiple intervention characteristics that may influence the difficulty encountered during implementation. Model complexity and resource implications, particularly in terms of workforce, could be key challenges. Stakeholder engagement via communication is essential to highlight the potential benefits of this new mode of learning. Testing on a small scale and exploring adaptation to the Hong Kong context would also facilitate implementation.[13]

Inner setting

The implementation of this new mode of learning must be led by an organisation (eg, a college). Leadership, culture, organisational implementation climate, and relevant experiences may affect the implementation of this paradigm shift[14]; evaluation and management of these factors are potential challenges. Sharing and collaboration among colleges may be useful strategies.

Outer settings

Postgraduate medical education occurs in the clinical setting where challenges can arise from interactions among trainers, doctors in training, the HKAM and colleges, employers, regulators, and patients and the caregivers. Two key challenges in this outer setting are patient safety and the tension between service and training.[3] Patient safety concerns have led to a substantial increase in the use of simulation in medical education, based on the rationale that simulated practice accelerates the learning curve while providing a safe environment for skills rehearsal and opportunities to learn from error.[3] Simulation should be integrated into postgraduate specialty curricula as a core delivery vehicle to complement workplace-based learning for both individual skill development and interprofessional team-based training.[15] The other key issue is that doctors in training and their trainers are both clinic employees; thus, a managed tension exists between service and training, which requires ongoing dialogue among stakeholders to ensure appropriate balance.[3]

Individuals involved

The individuals involved, especially the trainers and doctors in training, are part of the inner setting but regarded as a separate domain under the CFIR. Although PGME is 'situated', it does not necessarily indicate that effective methods are used to facilitate

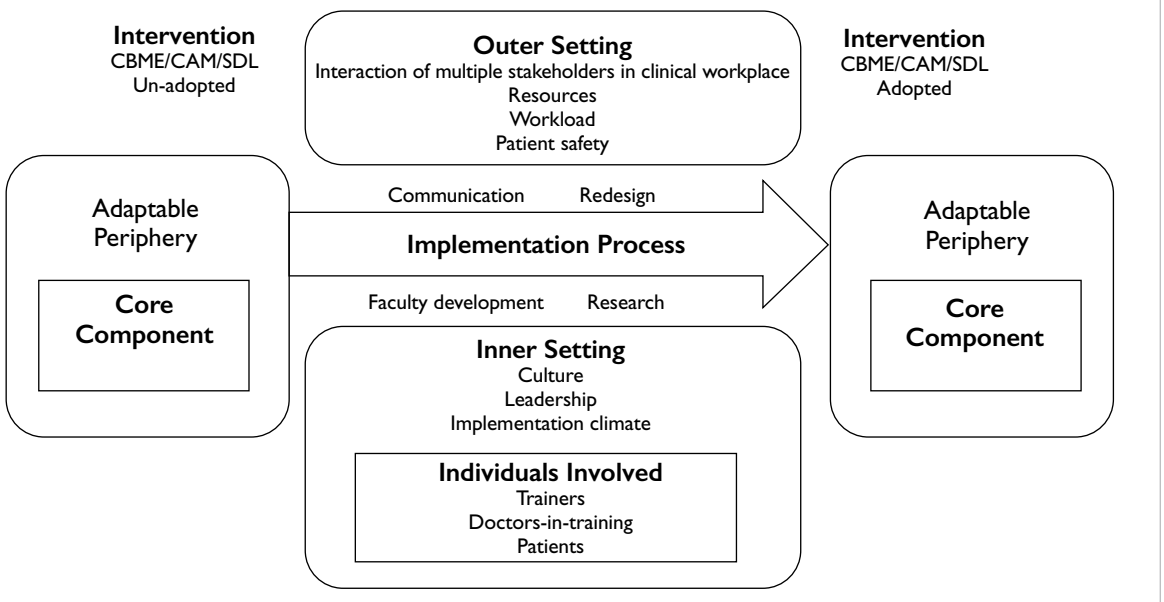

FIG. Consolidated Framework for Implementation Research[13,14]
Abbreviations: CAM = Cognitive Apprenticeship Model; CBME = competency-based medical education; SDL = self-directed learning

situated learning. Most clinical teachers are not trained; they simply use teaching methods that they experienced in schools.[16] Therefore, faculty development (discussed in detail below) is essential. Moreover, there has been some discussion regarding colleges in which not many of their specialists are motivated to teach. However, situated learning depends on interactions among CoP members; learning opportunities can only be maximised through the engagement and empowerment of all members. Accordingly, faculty development should not be restricted to a selected group, and the objective of such development should not be limited to the acquisition of teaching skills; it should be oriented towards motivating participants to establish a professional identity in which they serve as a clinical teacher.[17] Doctors in training cannot be passive learners in this process. In addition to active participation in clinical tasks, they must actively seek out opportunities (eg, reading medical literature, attending workshops and conferences, and receiving mentorship and guidance from experienced practitioners) to enhance their knowledge and skills, then use those enhancements to improve their clinical expertise. Furthermore, in contrast to the school setting, situated learning is not organised according to a curriculum, especially because clinical encounters are not always predictable. Accordingly, doctors in training must assume responsibility for their own learning.[18] However, there is evidence that self-directed learning (SDL) is uncommon among learners in Hong Kong.[19] This is the second theme that I will address.

Postgraduate medical education should be self-directed

Understanding self-directed learning

The notion that doctors in training must assume responsibility for their own situated learning is essential to the concept of SDL. The origin of SDL is closely linked to adult learning theory.[18] Knowles[20] defined SDL as a process in which individuals take initiative (with or without assistance from others) to determine their learning needs, formulate goals, identify human and material resources for learning, choose and implement appropriate learning strategies, and evaluate learning outcomes.

Self-directed learning also requires a paradigm shift. Traditional teaching (ie, pedagogy) is teacher-directed and focuses on content delivery. A major problem with such an educational process is that learners can become accustomed to habitually reinforced patterns of perception, thinking, judgement, feeling, and behaviour; these patterns may lead to inflexible behaviour and a lack of motivation for SDL.[21] The direction of adult learning (ie, andragogy) involves engaging learners in an inquiry process. Based on the six assumptions of adult learning (Table 2), Knowles et al[22] described a process which teachers can use to facilitate such inquiry (Table 3). It has been argued that SDL is a universally necessary competency in a changing world, particularly for individuals in complex fields such as medicine.[21] Indeed, the Accreditation Council for Graduate Medical Education has recommended that doctors in training become self-directed learners, use innovative tools (eg, computerised diaries and portfolios) to evaluate their own learning, and facilitate learning in other individuals.[23]

More recently, Hase and Kenyon[24] expanded the concept of SDL and proposed the notion of heutagogy (ie, self-determined learning) as a learning paradigm for the information age. Although the concept is complex, it can be summarised as follows: modern technology enables explorations of existing knowledge, connections with experts, collaborations with peers, reflections on personal experiences, and the creation and sharing of knowledge. This technology makes learning flexible, allowing learners to learn at their preferred time and in their preferred manner.[22] Accordingly, e-learning utilising this technology should be viewed as an approach to re-define the learning experience, rather than as a simple substitute for more traditional learning methods.[25] This learning paradigm is relevant to PGME and lifelong learning.

TABLE 2. Assumptions of adult learning[22]

1.	Need to know: adults want to know why they should learn something before they invest effort in learning it.
2.	Learner's self-concept: adults have a self-concept of being responsible for their own decisions and their own lives. They need to be seen by others and considered capable of self-direction.
3.	Role of experience: adults enter educational activities with a greater quantity and different quality of experience. These experiences must be considered in the educational process.
4.	Readiness to learn: adults become ready to learn things they need to know and must be able to do for effective management of their real-life situations.
5.	Orientation to learning: adult learning is problem-centred.
6.	Motivation: adults respond to some external motivators, but their most potent motivators are internal.

Dimensions of self-directed learning and implications for implementation

The definition established by Knowles et al[22] implies a process to facilitate SDL. However, there is increasing recognition that, in addition to the process component, the construct of SDL has multiple dimensions.[18,22,26] Additionally, Ricotta et al[26] suggested that the application of SDL in clinical settings would require approaches that differ from classroom methods because of its more rapid pace and the need to consider patient safety. Here, I will address the three dimensions described in two models of SDL in medical education: process, person, and context.[18,26]

Process

As mentioned above, trainers must utilise appropriate strategies to facilitate the inquiry process. In addition to the process described by Knowles et al[22] (Table 3), Sawatsky et al[18] and Ricotta et al[26] described learning processes in SDL; although the three groups of authors used different terminology in their descriptions, all processes are conceptually similar. The fundamental requirements of strategies to facilitate SDL should focus on learner engagement, emphasise curiosity, support inquiry-based approaches, and promote exploration.[26]

Person

Self-directed learning is a question of the extent to which learners maintain active control of the learning process.[27] Thus, the use of appropriate facilitation processes is necessary but not sufficient to fulfil the goals of SDL. Learners must thoroughly grasp essential learning skills and develop personal attributes necessary to control the inquiry process. Feedback literacy is a particularly important learning skill because reflection and feedback are indispensable components of experiential learning. Carless[28] defined feedback as an interactive process in which students interpret and use various inputs to enhance their work. The utilisation of feedback, combined with engagement in actions that close the feedback loop, is an active process. In his model of feedback literacy, Carless[28] established three pre-conditions: appreciation of feedback, formation of judgements, and management of affect. Trainers can help foster feedback literacy through strategies such as peer feedback.

The personal attributes of curiosity, perseverance, flexibility, and integrity are prerequisites for individuals who wish to engage in SDL. Motivation is a key factor which energises and connects these attributes.[26] The predispositions of doctors in training towards SDL will gradually change as they develop confidence in SDL and gain a more sophisticated knowledge framework.[18] Trainers should assess learner readiness and cultivate SDL through the adoption of teaching strategies appropriate for each stage (Table 4).[29]

Context

The personal attributes described above must be developed in an effective and safe learning environment. Importantly, these attributes may be threatened by approaches that emphasise professional examinations and competition among doctors in training. The cultivation of SDL requires a paradigm shift from a traditionally competitive learning environment to an environment that encourages humility and accepts failure.[26] Trainers should establish psychological safety, encourage curiosity, and normalise cognitive dissonance. At the organisational level, a curiosity-focused culture can facilitate learning activities. The acceptance of uncertainty and promotion of inquiry-based approaches help learners to become motivated and prepared to pursue SDL. The creation of an environment that supports SDL development requires new strategies, prioritisation of learner engagement, and encouragement of questioning.[26]

TABLE 3. An andragogical process model for learning[22]

Element	Details
Preparing learners	Provide information Prepare for participation Help develop realistic expectations Begin thinking about content
Climate	Relaxed and trusting Mutually respectful Informal and warm Collaborative and supportive Open and authentic Humanness
Planning	Mechanism for mutual planning by learners and facilitator
Diagnosis of needs	By mutual assessment
Establishing objectives	By mutual negotiation
Designing learning plans	Sequenced by readiness Problem units
Learning activities	Experiential techniques (inquiry)
Evaluation	Mutual re-diagnosis of needs Mutual measurement of programme

Postgraduate medical education should be competency-based

Understanding competency-based medical education

Building on the above discussion regarding the learning environment and methods necessary for PGME, I will explore the desired outcomes. Although the concept of outcome-based or

TABLE 4. Staged self-directed learning model[29]

Stage	Student	Teacher	Strategy
1	Dependent	Authority, coach	Coaching with immediate feedback Drill Informational lecture Overcoming deficiencies and resistance
2	Interested	Motivator, guide	Inspiring lecture plus guided discussion Goal-setting and learning strategies
3	Involved	Facilitator	Discussion facilitated by teacher who participates as equal Seminar Group project
4	Self-directed	Consultant, delegator	Internship, dissertation, individual work, or self-directed study-group

competency-based education emerged nearly a century ago, its popularisation in medical education began in the 1990s when leaders in the Canadian medical profession observed widespread dissatisfaction in many areas.[30,31] They attributed this dissatisfaction to forces such as the availability of medical information on the internet, patient consumerism, government regulations, financial imperatives, litigation, technology, and an overall explosion of medical knowledge; thus, they concluded that medical education could no longer be planned with a focus solely on the latest aspects of medical diagnosis and treatment.[31] Modern professional training should create doctors who can accommodate rapid advances in medicine, recognise patient perspectives, appreciate the skills of other health professionals, and work effectively in teams.[32] Therefore, training programmes should address clinical skills and knowledge, along with other aspects of clinical competence required among doctors (eg, communication skills, attitude, team working, audit, research, teaching, and SDL).[32] The Royal College of Physicians and Surgeons of Canada included seven competencies under the CanMEDS framework.[33,34] Similar developments soon followed in other countries.[23,35,36] In 2010, the Hong Kong Academy of Medicine published a position statement indicating that the 'Hong Kong Specialist' should demonstrate competency in seven broad domains: professional expertise, health promoter, interpersonal communication, team working, academic, manager-leader, and professionalism.[37]

Implementation process

A common approach to teaching multiple competencies involves dividing them into individual units, then teaching them separately using methods that are appropriate for each competency. Among educationists, this is known as the 'atomistic approach', which is difficult to implement because the curriculum is already very full. Moreover, this approach is ineffective in situations that involve complex learning because the competencies are closely related to each other and the whole is more than the sum of its parts—it contains the elements and the relationships among those elements.[38] A holistic approach using real-world tasks avoids potential problems regarding compartmentalisation and fragmentation.[38] In the setting of PGME, situated learning and CAM are appropriate methods. Accordingly, the three themes discussed here are closely linked together and can be regarded as a single paradigm for modern PGME.

The implementation process of this new paradigm, one of the five domains of the CFIR (Fig),[13,14] consists of four strategies based on implementation research and theories: communication, redesign, faculty development, and research.[31]

Communication

The new paradigm is very different from current practice; it is also complex and involves significant resource investments. Successful implementation heavily relies on effective communication to engage stakeholders in both the inner and outer settings. Frank and Danoff[31] suggested the use of a social marketing–based communication plan. The framework of social marketing includes concepts of exchange theory, audience segmentation, competition, consumer orientation, and continuous monitoring.[39]

Redesign

The Academy and the colleges are responsible for setting educational standards for PGME objectives, training programme accreditation, assessment, professional examinations, and continuing medical education standards; thus, they should redesign the relevant educational standards to incorporate a foundation that involves all competencies.[31] This integrative approach would include efforts to align curricular objectives with experiential training in the

clinical workplace.[40] The incorporation of workplace-based assessment into the curriculum is an example of such integration.[41]

Faculty development

Steinert[42] defined faculty development as all activities that health professionals pursue to improve their knowledge, skills, and behaviours as teachers and educators, leaders and managers, and researchers and scholars, in both individual and group settings. The engagement and empowerment of all CoP members in teaching and learning are prerequisites for implementing community-based medical education via situated learning. Steinert et al[17] recommended that the process of faculty development mirror the process of PGME itself: it should utilise SDL and view learning as a process of inquiry through experiential learning, rather than as a process of direct transmission. It should also utilise situated learning theory and view teaching skills as tools to be used in specific contexts, rather than objects that can be acquired. Thus, although workshops may be a useful starting point, there is a need to focus on longitudinal development via faculty development communities.[17] As mentioned above, the objective of faculty development should not be limited to teaching skill acquisition; it should include the establishment of a professional identity as a clinical educator, as well as motivation for teaching.[17] Similarly, faculty development should promote a culture of change and further development of PGME through innovation, research, and organisational transformation.[17,42]

Research

Finally, the field of PGME is comparatively new and does not have a strong academic presence. Most of its practical approaches are derived from undergraduate medical education or general education. However, there are some concerns, learning methods, and practices with uniquely 'postgraduate' origins.[3] Considerable research efforts are necessary to provide evidence that can drive further improvements in PGME, and resources are needed to support such efforts.[3,31]

Conclusion

Health professionals are expected to possess a diverse set of competencies that fulfil current societal needs. Apprenticeships using real-world clinical tasks can provide effective competency-based medical education. However, the traditional 'see one, do one, teach one' approach is inadequate for the complex learning tasks involved in PGME. Instead, learning in this environment involves the facilitation of experiential learning and inquiry, rather than simple content delivery. To achieve this shift in perspective, teaching methods from CAM and SDL must be adopted. The cultivation of SDL requires appropriate context, as well as a CoP with members who possess teaching skills and attitudes that differ from traditional teaching. Faculty development is important for the successful implementation of this new paradigm; it should be grounded in the same principles of experiential learning, situated learning, and SDL. This approach will equip members of the CoP with essential skills, while supporting effective communication and engagement. Moreover, it will cultivate the talent necessary to redesign standards and practices, while encouraging interest and active participation in research efforts to advance PGME.

Author contributions

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