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Professional Identity Formation in Medical Education (Part I): Core Principles, Application, Challenges and Solutions

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ABSTRACT

Professional identity formation (PIF) reshaped the aim of undergraduate medical education from the simple acquisition of competencies to the developmental process through which a learner comes to think, act, and feel as a physician. Despite the increasing curricular attention, PIF persists inconsistently defined, theorized, operationalized and assessed. This review aimed to consolidate the concept, theory, and core principles of PIF; and to critically appraise its benefits, current challenges, and evidence-informed solutions. A narrative review was carried out. Databases including PubMed, MEDLINE, ERIC, and PsycINFO were searched using the terms; “professional identity formation,” “medical professionalism,” and “undergraduate medical education.” Seminal texts in developmental psychology, sociology, and educational theories were also included. The PIF is grounded in social learning theory and communities-of-practice frameworks. It's identified core principles were explicit curricular outcomes, structured reflection, longitudinal mentorship, role modelling, and developmental assessment. PIF is operationalized through mentorship and coaching programs, reflective instruction, community-based and simulation-based education. Benefits of PIF included; more consistent professional practice, improved student wellbeing, curricular consistency and enhanced patient care. Persistent challenges include the adverse effect of the hidden curriculum, tensions with competency-based medical education, identity discordance and burnout. PIF represents a transformative framework for undergraduate medical education that complements and extends competency-based frameworks. Medical schools must move beyond simple professionalism instruction toward sustained, systemic approaches that foster authentic physician identity throughout the undergraduate medical years continuum. Future research should focus on longitudinal outcome studies, the use of validated longitudinal multimodal measurement tools, and equity-informed approaches to PIF.

INTRODUCTION

Medical education has conventionally been assessed according to the acquisition of distinct knowledge, skills, and attitudes (Cruess *et al.*, 2015). This competency-oriented approach does not fully capture how a beginner novice is transformed into a physician who thinks, acts, and feels like a member of the profession (Cruess *et al.*, 2014; Cruess *et al.*, 2019). Professional identity formation (PIF) has consequently been suggested as a more encompassing educational goal, integrating cognitive, affective, moral, and social dimensions of becoming a physician rather than treating professionalism as a separate competency to be checked off a list (Cruess *et al.*, 2014; Cruess *et al.*, 2019).

The current intense attention on Professional Identity Formation echoes a broader recognition across the continuum of undergraduate medical education that identity, and not just behavior, must be the explicit target of curricular reform (Cruess *et al.*, 2015; Cruess *et al.*, 2019). Regulatory and accrediting bodies incrementally expect medical schools to prove that their graduates possess an ethically grounded professional identity, urging renewed medical education experts' attention to how such identities are formed, reinforced, and assessed (Sarraf-Yazdi *et al.*, 2021; Swanwick *et al.*, 2018).

Despite the increasing recognition of its value, professional identity formation continues to be relatively understudied dimension of undergraduate medical education (Holden *et al.*, 2012; Sarraf-Yazdi *et al.*, 2024). While there is broad consensus on its importance, medical schools vary substantially in their curricular approaches, instructional methods and assessment strategies for professional identity formation (Cruess *et al.*, 2014; Cruess *et al.*, 2019). The hidden curriculum, including the informal lessons transferred through role modeling, institutional culture and social interaction, often distorts the explicit professional values taught in college formal curricula (Sarraf-Yazdi *et al.*, 2024).

This review article aimed to consolidate the concept of Professional Identity Formation, its theoretical basis, conceptual frameworks, core principles, benefits, challenges and the evidence-informed solutions to those challenges. The findings of this review may offer medical educators, leaders, curriculum developers and researchers an evidence-informed understanding of professional identity formation and the best approaches for its integration into undergraduate medical education. Nonetheless, the findings may support learners development into future physicians via guiding the design of curricula, innovation in teaching and learning

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techniques, assessment strategies and faculty development initiatives that foster Professional Identity Formation.

MATERIALS AND METHODS

Study Design

This study was designed as a narrative review, an approach suited to synthesizing and critically interpreting a broad and conceptually heterogeneous body of literature in which theoretical, qualitative and quantitative sources coexist. A narrative rather than a systematic design was selected because Professional Identity Formation is a multidimensional construct informed by developmental psychology, sociology and education theory, and because the review aimed to integrate conceptual and empirical evidence rather than to estimate a pooled effect. The structure of the review was aligned with the quality items of the Scale for the Assessment of Narrative Review Articles (SANRA), namely justification of the article's importance, a clear statement of aims, description of the literature search, appropriate referencing, scientific reasoning, and appropriate presentation of data.

Review Questions

The review was guided by the following questions: (1) How is Professional Identity Formation defined? (2) What are its core principles? (3) How is it operationalized? (4) What benefits have been reported? (5) What challenges hinder its implementation? and (6) What solutions have been proposed to address these challenges?

Search Strategy

Electronic databases, including PubMed/MEDLINE, ERIC and PsycINFO, were searched for relevant literature. Search terms included "professional identity formation," "medical professionalism," and "undergraduate medical education," combined with related terms such as "professional identity," "medical students," "mentoring," "role modelling," "reflection," "hidden curriculum," "competency-based medical education," "assessment," and "burnout" using the Boolean operators AND and OR. An example search string was: ("professional identity formation" OR "professional identity"). The reference lists of key articles were also searched to identify additional relevant sources. Seminal texts in developmental psychology, sociology and education theory, together with key competency frameworks and accreditation documents such as the CanMEDS framework and the LCME standards, were also incorporated.

Eligibility Criteria

Publications were included if they addressed professional identity formation, professional identity or medical professionalism in the context of medical students or physicians in training; were published in English with full text available. Publications were excluded if they focused exclusively on non-medical health professions, were opinion without a theoretical or empirical basis, or were duplicates.

Study Selection

Titles and abstracts were screened for relevance to the review questions, followed by full-text reading of potentially relevant publications. Selection was guided by relevance, conceptual contribution and methodological rigor, with priority given to seminal conceptual works, systematic and scoping reviews, and recent empirical studies.

Data Extraction and Synthesis

First from each included source key findings relevant to the review questions was extracted. Then data were synthesized narratively using a thematic approach, in which findings grouped into themes corresponding to the review questions: conceptualization and theoretical foundations, core principles, operationalization, benefits, challenges, and solutions. Different evidence across sources was compared in order to identify areas of consensus, gaps in the evidence and contextual variation.

Appraisal of Evidence

Consistent with narrative review methodology, no formal risk-of-bias assessment was undertaken. However, the type and strength of the evidence were considered when interpreting the findings.

Ethical Considerations

As this study was based exclusively on previously published literature and involved no human participants or personal data, ethical approval was not required.

LITERATURE REVIEW

Definitions of Professional Identity Formation

Professional identity formation is most widely defined, following the work of Cruess and colleagues, as the process by which individuals come to think, act, and feel like a physician, integrating the knowledge, skills and behaviors of the medical profession with their own pre-existing personal identity (Cruess *et al.*, 2015; Cruess *et al.*, 2019). This definition deliberately emphasizes and describes identity formation as a psychological and social construct rather than a static credential, portraying it as an ongoing, transformative process that continues across the professional lifespan of the student (Cruess *et al.*, 2014; Cruess *et al.*, 2015).

Holden and colleagues extended this conceptualization by characterizing Professional Identity Formation as a multidimensional integration of cognitive, affective and behavioral domains, that encompassing ten key aspects, six domains, and thirty subdomains portraying the complexity of physician identity (Holden *et al.*, 2012; Holden *et al.*, 2015). This framework has been influential in demonstrating that PIF is not a single construct, but its rather a developmental process that unfold at different rates for different learners (Holden *et al.*, 2012; Holden *et al.*, 2015).

A further distinction in the literature separates professionalism from professional identity formation,

where professionalism is understood as the outward expression of expected behaviors, and professional identity understood as the internalized sense of self from which such behaviors arise (Cruess *et al.*, 2019; Kalet *et al.*, 2017). Kalet and colleagues argued that this distinction is educationally crucial because interventions directed exclusively at behavior may not robustly shift a student's underlying identity, whereas identity-focused interventions are more likely to sustain professional conduct across different contexts (Kalet *et al.*, 2017; Kalet *et al.*, 2018).

Professional identity formation is now understood to commence before formal medical training, with anticipatory socialization occurring during pre-medical education, clinical training and continuing well beyond graduation into residency and independent long-term practice as physician (Endalcachew *et al.*, 2023; Holden *et al.*, 2015). This continuum perspective suggests that admissions processes, pre-clinical education, clinical clerkships training, and postgraduate practice are discrete but interconnected phases in a single developmental trajectory (Endalcachew *et al.*, 2023; Liang *et al.*, 2024).

Cross-cultural research study findings have cautioned against assuming that the predominantly North American and European conceptualizations of PIF translate consistently across all educational and cultural contexts (Helmich *et al.*, 2017; Ho, 2013). Helmich and colleagues illustrated that the relative attention placed on individual autonomy versus community and family-oriented values reframes how professional identity is conveyed in different societies, while Al-Eraky and Chandratilake revealed that professionalism itself is conceptualized differently within Arabian medical education contexts, highlighting the need for culturally sensitive models of PIF (Al-Eraky & Chandratilake, 2012; Helmich *et al.*, 2017).

The Difference Between Professional Identity and Professionalism

The relationship between professionalism as a behavioral trait and professional identity as an internal value is one of the most dynamic tensions in current medical education (Cruess *et al.*, 2014). Historically, medical schools tackled professionalism principally through explicit teaching in ethical principles, codes of conduct, and behavioral expectations (Cruess *et al.*, 2014). While such instruction has value, it has substantial limitations; including the fact that behavioral compliance does not ensure true internalization of professional values, and hence students who are taught to portray professionalism without developing genuine professional identity may ultimately prove less resilient in the face of moral intricacies, institutional pressure or professional exhaustion (Cruess *et al.*, 2014).

Cruess and colleagues (2016) proposed an essential amendment to Miller's (1990) classical pyramid of clinical competence to tackle this limitation. Miller's original pyramid outlined a hierarchy of competence levels as; Knows, Knows How, Shows How and Does which

culminate in authentic professional performance (Miller, G. E. 1990). Cruess and colleagues contended that this model, while useful for clinical skills, fails to depict the dimension of professional identity, and suggested adding a fifth level, "Is," at the apex of the pyramid. This level refers to the internalized sense of being a physician, which represents the aim of professional identity formation in undergraduate medical education (Cruess, R. L., et al 2016). This suggestion has been widely accepted in contemporary medical education.

Theoretical foundation

The main theoretical basis for Professional Identity Formation stems from social learning theory and the concept of communities of practice, which conceptualize learning as a process of participation, from which beginners progressively move to full membership of a professional community (Cruess *et al.*, 2015; Cruess *et al.*, 2019). Within this point of view, identity formation is inseparable from socialization, as learners acquire the norms and values of medicine via structured and unstructured communication with more experienced members of the profession community (Cruess *et al.*, 2014; Cruess *et al.*, 2019).

Developmental and constructive-developmental theories, including adaptations of Kegan's stages of adult development, have also attempted to illustrate how students move from simply following externally enforced rules toward an internalized, self-authored professional identity capable of enduring ambiguity and moral complexity (Holden *et al.*, 2012; Holden *et al.*, 2015). This developmental approach helps explain why Professional Identity Formation unfolds unevenly across a group of learners and why some of them revert under stress before consolidating a more mature professional identity (Holden *et al.*, 2012; Holden *et al.*, 2015).

More recent scoping and conceptual work has pursued to integrate the individual, social, and situational viewpoints into unified frameworks, recognizing that Professional Identity Formation is formed concurrently by personal reflection, structured socialization within communities of practice, and the broader institutional and sociocultural context in which clinical training occurs (Sarraf-Yazdi *et al.*, 2024; Sarraf-Yazdi *et al.*, 2021). Sarraf-Yazdi and colleagues' theory-informed conceptual framework explicitly maps how these individual, relational, and institutional domains act together dynamically rather than in a simple linear sequence (Sarraf-Yazdi *et al.*, 2024; Sarraf-Yazdi *et al.*, 2021).

Core Principles of Professional Identity Formation

The first core principle of Professional Identity Formation is that it needs to be treated as a formal, explicit learning outcome rather than a secondary outcome of clinical training, which require deliberate curricular reform, dedicated faculty time and firm institutional commitment toward fostering it (Cruess *et al.*, 2014; Cruess *et al.*, 2019). Cruess and colleagues argued that curricular reform

grounded in this principle should shift professionalism teaching from an isolated set of educational sessions toward an integrated approach running across all years of undergraduate medical training (Cruess *et al.*, 2014; Cruess *et al.*, 2019).

The second core principle is that reflection constitutes the indispensable mechanism through which experience is transformed into identity, replacing discrete clinical encounters into meaningful mechanism that consolidate a student's emerging sense of self as a physician (Holden *et al.*, 2015; Sharpless *et al.*, 2015). Sharpless and colleagues' analysis of medical students' reflective writing revealed that structured opportunities for reflection allow students to make sense of dissonant or emotionally charged experiences that might otherwise be internalized without critical evaluation (Holden *et al.*, 2015; Sharpless *et al.*, 2015).

The third principle pertains to the necessity of a supportive community of practice characterized by a welcoming institutional culture, in which students experience autonomy, meaningful participation, and a genuine sense of belonging as they move from outer observers toward full clinical responsibility (Cruess *et al.*, 2019; Sarraf-Yazdi *et al.*, 2024). Communities that fail to offer such welcome and psychological safety would risk producing fragmented or defensive identities rather than integrated ones (Cruess *et al.*, 2019; Sarraf-Yazdi *et al.*, 2024).

The fourth principle recognizes the role of modelling, mentoring, coaching, and supervision as a 'mentoring umbrella' that transmits professional values and behavior through relationship rather than through didactic teaching alone (Koh *et al.*, 2023; Toh *et al.*, 2022). Systematic scoping reviews have shown that the effectiveness of role modelling depends on students' capacity to identify, critically assess, and selectively internalize the values exemplified by role models, rather than uncritical imitation (Koh *et al.*, 2023; Toh *et al.*, 2022).

Finally, assessment is recognized as a core principle, as what is measured marks what is valued. Consequently, Professional Identity Formation requires longitudinal, formative, and multi-method assessment methods capable of capturing developmental trajectories rather than single cross-sectional decisions of competence (Kalet *et al.*, 2017; Kalet *et al.*, 2018). This principle has driven the development of qualitative, quantitative, and mixed assessment methods specifically created to track identity development over time across the continuum of the training years (Buck *et al.*, 2019; Kalet *et al.*, 2017).

Benefits of Professional Identity Formation

Consistent Professional Conduct

A well-consolidated professional identity formation is linked to more consistent professional behavior, because behavior that flows from an internalized sense of self is more resilient across varied and unsupervised clinical settings than behavior driven purely by external monitoring (Cruess *et al.*, 2014; Cruess *et al.*, 2019). This approach helps explain why curricular reforms explicitly

targeting identity, rather than behavior alone, are considered more likely to generate stable improvements in professionalism (Cruess *et al.*, 2014; Kalet *et al.*, 2017).

Improve Student Wellbeing

Professional Identity Formation has also been associated with student wellbeing. A theoretical work proposed that a coherent professional identity helps trainees feel a sense of meaning at work, that can support them alleviate the intense demands of medical training (Cruess *et al.*, 2019; Wald *et al.*, 2015). Wald and colleagues argued that the triad of reflection, relationship, and resilience are central to Professional Identity Formation and simultaneously supports professional identity formation and protects against the erosion of wellbeing that manifest the burnout (Holden *et al.*, 2015; Wald *et al.*, 2015).

Reduce Student Burnout

Structured mentoring, which are central to PIF-supportive curricula, have shown to correlate with reduced student burnout and enhanced perceived professional identity development, suggesting that investment in Professional Identity Formation infrastructure carries measurable benefits for mental health and professionalism outcomes (Anurat *et al.*, 2024; Krishna *et al.*, 2024). In 2024, Anurat and colleagues revealed that higher-quality mentor-mentee relationship structure was substantially associated with stronger scores across multiple domains of professional self-identity among Thai medical students (Anurat *et al.*, 2024; Krishna *et al.*, 2024).

Reduce Curricular Fragmentation

Incorporating Professional Identity Formation within the medical college curriculum offers a coherent organizing model that can integrate instruction with ethics, communication, and professionalism into a single developmental process, thus reducing curricular fragmentation and enhance the perceived relevance and value of professionalism training to students (Cruess *et al.*, 2014; Holden *et al.*, 2012). This integrative function is one of the reasons Professional Identity Formation has been situated as a unifying concept across competency-based medical education curricula (Holden *et al.*, 2012; Sternszus *et al.*, 2023).

Strengthen Patient Care and Health Systems

Professional Identity Formation has benefits for patient care and health systems. Physicians with a well-integrated professional identity are theorized to display greater altruism, accountability, and ethical sensitivity in practice (Cruess *et al.*, 2019; Wald *et al.*, 2015). Although direct causal evidence linking Professional Identity Formation training to patient outcomes remains limited, the theoretical case for these benefits is well established in the literature (Cruess *et al.*, 2019; Melton & Varpio, 2022).

Challenges to Professional Identity Formation

Despite its solid conceptual frameworks, the

implementation of Professional Identity Formation in medical schools programs remains limited due to several interconnected challenges.

The Hidden Curriculum

The hidden curriculum, defined by Hafferty as the unspoken academic, social and cultural messages transmitted to learners independently of the formal curriculum, remains one of the most reported threats to PIF, as it can transfer values and behaviors that directly contradict what is explicitly taught (Brown *et al.*, 2020; Hafferty, 1998). Destructive role modelling, hierarchical clinical cultures, and normalized cynicism have all been recognized as hidden-curriculum influence capable of eroding students' efforts and destroying their emerging professional identity (Brown *et al.*, 2020; Hafferty, 1998). Empirical work in varied settings have shown that the hidden curriculum operates via mechanisms such as time pressure that hinders reflective practice lead to emotional dissonance that is arising from seeing unprofessional conduct by senior faculty members and clinicians, which can generate identity confusion rather than integration (Brown *et al.*, 2020; Hafferty, 1998). Nonetheless, the hidden curriculum is resistant to conventional curricular reform and requires deliberate institutional strategies to tackle its effects (Brown *et al.*, 2020; Hafferty, 1998).

Tension with Competency-Based Medical Education

The world-wide move toward competency-based medical education (CBME), along with its emphasis on standardized and observable outcome measures, sits in productive but real tension with the individualized, developmental, and less readily observable nature of Professional Identity Formation (Kalet *et al.*, 2017; Sternszus *et al.*, 2023). Sternszus and colleagues detected three specific contradictions; first, CBME's focus on behavioral outcomes, while PIF's focus on developmental process, secondly, CBME's emphasis on standardization versus PIF's emphasis on individualization, and lastly CBME's competence-based assessment style versus the inherent holistic nature of identity assessment (Kalet *et al.*, 2017; Sternszus *et al.*, 2023).

If left unaddressed, this tension risks curricula that verify what students can do while overlooking who they are becoming in future, potentially weakening the profession's broader inclusivity and professionalism goals (Krishnasamy *et al.*, 2022; Sternszus *et al.*, 2023). Reconciling these frameworks requires leaders, curricular developers and medical education experts to resist decreasing Professional Identity Formation to a checklist of observable behaviors (Kalet *et al.*, 2017; Sternszus *et al.*, 2023).

Identity Dissonance and Burnout

Conflicts occurred during training can generate dissonance between a student's personal values and the roles and expectations of the medical profession in real practice. When unaddressed, it can weaken belonging, self-efficacy, and ultimately lead to distress, burnout, or

attrition from the profession (Melton & Varpio, 2022; Wald *et al.*, 2015). Melton and Varpio's critical review (2022) cautions that an individualist orientation toward professional identity formation, which frames identity struggle merely as a personal burden to be fixed through institutional-level intervention (Hafferty, 1998; Melton & Varpio, 2022).

Some research studies have identified bidirectional relationships between professional identity and burnout. A less integrated professional identity has been linked to poorer mental health, while burnout itself can, in turn, disrupt the ongoing process of identity formation (Anurat *et al.*, 2024; Wald *et al.*, 2015). This reciprocal relationship implies that interventions addressing PIF has to be designed in connected cycle rather than as isolated curricular tracks (Anurat *et al.*, 2024; Wald *et al.*, 2015).

Discrimination During Medical Training

Discrimination encountered during medical training across the continuum of the academic years poses a measurable effect on professional identity formation for learners from the minority backgrounds. Venkataraman and colleagues, examined responses from over 37,000 medical students, found that African American and Black students were significantly less likely to report that their medical college supported their development and also underrepresented groups were less likely to report assistance for their professional development (Venkataraman *et al.*, 2024; Volpe *et al.*, 2021).

Gender has its effect on shaping the Professional Identity Formation trajectory. A survey data revealed that both women and men report gender-based discrimination during training, with apparent effects on their professional identity development and career decision-making (Kristofferson *et al.*, 2018; Webber *et al.*, 2025). Likewise, gendered clinical experiences have independently been shown to influence students' specialty preferences through the same identity-formation pathway (Kristofferson *et al.*, 2018; Webber *et al.*, 2025). These study findings indicated that Professional Identity Formation cannot be treated as a gender-neutral or identity-neutral process, because the same culture may be experienced differently depending on a student's social background and culture (Kristofferson *et al.*, 2018; Webber *et al.*, 2025).

Gender minority trainees encounter distinct challenges to Professional Identity Formation, including higher rates of discrimination, and mental health burden (Danckers *et al.*, 2024; Madrigal *et al.*, 2021). Volpe and colleagues' study with minoritized medical students further revealed that students must actively negotiate an 'outsider' status within their professional socialization, drawing on their identities as a resource for connecting with similarly positioned patients during training (Madrigal *et al.*, 2021; Volpe *et al.*, 2021).

Solutions and Key Interventions

Addressing the Hidden Curriculum

To address the hidden curriculum medical schools need to move beyond awareness-raising initiatives toward

more practical structured interventions. The intervention have to include transparent naming of hidden-curriculum effects within formal instruction and faculty development programs that equip clinical teachers to model professional practice for students to report unprofessional act they encounter during training years (Brown *et al.*, 2020; Hafferty, 1998). Intervention including regular, protected debriefing sessions within clinical rotations has been proposed as one practical strategy for addressing hidden-curriculum effects before being internalized as a negative behavior (Brown *et al.*, 2020; Hafferty, 1998).

Reconciling Professional Identity Formation with Competency-based Frameworks

Reconciling Professional Identity Formation with competency-based frameworks necessitates curricula to include process-based competency milestones to clearly acknowledge the context-dependent nature of identity development and integrate guided self-assessment into coaching and mentorship programs (Kalet *et al.*, 2017; Sternszus *et al.*, 2023). Sternszus and colleagues' proposed curricular amendments that offer a practical roadmap for colleges seeking to keep the developmental integrity of Professional Identity Formation within an outcomes-driven environment (Krishnasamy *et al.*, 2022; Sternszus *et al.*, 2023).

Structured Longitudinal Mentoring Programs

Protecting student wellbeing via Professional Identity Formation necessitates mentoring, coaching, and advising programs be adequately resourced, longitudinal, and well trained faculty members to identify signs of identity dissonance and burnout, rather than treating wellbeing support as separate college functions (Anurat *et al.*, 2024; Wald *et al.*, 2015). Structured, trained peer and near-peer mentoring programs have showed value in fostering Professional Identity Formation and in mitigating the burnout, marking them as a cost-effective college investment (Anurat *et al.*, 2024; Krishna *et al.*, 2024).

Foster Equity and Accountability

Advancing equity within Professional Identity Formation demands medical schools to move beyond anti-discrimination programs toward active institutional level accountability for the environments in which students from minoritized backgrounds are taught and trained (Venkataraman *et al.*, 2024; Webber *et al.*, 2025). Curricular content tackling intersectionality of race and gender identity, combined with availability of diverse faculty as mentors and role models, has been proposed as means of enabling belonging to the community of practice and the profession (Bi *et al.*, 2020; Danckers *et al.*, 2024).

Enhanced Faculty Training Programs

Sustained faculty development is a solution to most Professional Identity Formation challenges. Faculty members who have not reflected on their own professional identity are poorly placed to model, mentor,

or assess Professional Identity Formation in students. Investment in faculty members communities of practice around teaching, coaching, mentoring and assessing Professional Identity Formation is a prerequisite for vigorous curricular reform (Cruess *et al.*, 2019; Toh *et al.*, 2022). Colleges adopting blueprint-driven curricular mapping, aligned clearly with Miller's pyramid and Bloom's taxonomy, can ensure that PIF-related learning outcomes are taught, practiced, and assessed across all years of undergraduate medical training rather than being limited to isolated sessions (Kalet *et al.*, 2017; Sternszus *et al.*, 2023).

RESULTS AND DISCUSSION

This narrative review combined seminal literature on Professional Identity Formation in undergraduate medical education. The synthesis produced seven interrelated findings addressing the concept and theoretical framework of PIF, its core principles, how it has been operationalized, its reported benefits, the challenges to its implementation, and the evidence-informed solutions proposed to tackle them effectively.

Definition of Professional Identity Formation

The reviewed literature congregated on defining PIF as the developmental process through which a learner comes to think, act, and feel like a physician by integrating the values of the profession with a pre-existing personal identity. Professional identity was invariably distinguished from professionalism, as the former representing an internalized sense of self and the latter as outward behavioral manifestation, a distinction that has been formalized by adding the level "Is" to the apex of Miller's pyramid. Nevertheless, medical schools continue to vary in their theoretical orientation, curricular approaches and assessment strategies.

Social Learning and Communities of Practice as the Dominant Theoretical Foundation

Social learning theory and the communities-of-practice framework emerged as the primary explanatory lens, conceptualizing PIF as progressive movement from outsider to full engagement in the professional community. Constructive-developmental theories, notably adaptations of Kegan's stages of adult development, complemented this standpoint by explaining individual variation in the pace of identity development, while recent conceptual models integrated individual, relational and institutional domains into a single dynamic framework.

Five Core Principles Underpin Professional Identity Formation

This review identified the five core principles underpinning Professional Identity Formation: (i) PIF as an explicit, formal educational goal; (ii) structured reflection as the mechanism that converts experience into identity; (iii) a welcoming, psychologically safe community of practice; (iv) role modelling, mentoring, coaching and supervision

acting collectively as a ‘mentoring umbrella’; and (v) longitudinal, formative and multimodal assessment.

Operationalization Across Curriculum, Instruction, Assessment and Faculty Development

At the curricular level, Professional Identity Formation is embedded through explicit identity-focused curriculum models, competency frameworks such as CanMEDS, accreditation standards, and longitudinal integrated clerkships. The instructional strategies most consistently support Professional Identity Formation were structured mentoring and coaching, collaborative small-group learning, service learning, reflective portfolios, and simulation with identity-focused debriefing. For assessment, no single instrument was found to be robust enough to assess Professional Identity Formation; as different quantitative tools designed to capture the same construct correlated only weakly. A longitudinal, multimodal and mentoring-embedded approach was recommended to assess Professional Identity Formation. Faculty development was also identified as a prerequisite for all of these educational strategies.

Reported Benefits of Professional Identity Formation

Five benefits were reported including more consistent professional conduct, improved student wellbeing, reduced burnout, reduced curricular fragmentation, and downstream gains for patient care and health systems. However, the evidence supporting these benefits was predominantly theoretical, cross-sectional or just association, and therefore, direct causal evidence linking PIF interventions to patient outcomes remained limited.

Challenges Constrain Implementation of Professional Identity Formation

The principal challenges of Professional Identity Formation identified by this review were the hidden curriculum, the tension with competency-based medical education, identity dissonance with a bidirectional relationship to burn out, and discrimination affecting students from minoritized groups.

The proposed Solutions to Address these Challenges

Effective solutions are found to be systemic rather than individual. The proposed solutions to address these identified challenges are structural interventions against the hidden curriculum, process-based competency milestones that reconcile PIF with competency-based frameworks, adequately resourced longitudinal mentoring, institutional accountability for equity, and sustained faculty development. A common thread across these solutions was a shift of responsibility from the individual student toward the institution itself and its learning environment.

Discussion

This review was carried out to consolidate the theoretical foundations, conceptual framework and core principles

of Professional Identity Formation, and as well to critically appraise its benefits, challenges and the available evidence-informed solutions. Overall, the findings indicated that Professional Identity Formation has matured from a minor concern into an organizing goal of undergraduate medical education, yet its implementation and assessment remain uneven.

This review found broad convergence on the definition of Professional Identity Formation as learning to think, act and feel like a physician, and also, it found a clear distinction between professional identity and professionalism. This finding is consistent with Jarvis-Selinger *et al.* (2012), who argued that competency alone is not enough and that medical education must attend to who learners are becoming and not only to what they can do, and with Monrouxe (2010), who described identity as multiple, relational and continuously negotiated rather than a fixed endpoint. Goldie (2012) similarly drew on social identity perspectives to conclude that educators must deliberately support the integration of personal and professional identities. This review synthesis extended these earlier works by showing that, more than a decade later, conceptual consensus has not been matched by consistency in curricular operationalization and assessment (Sarraf-Yazdi *et al.*, 2021; Sarraf-Yazdi *et al.*, 2024).

In contrast to the most individual-centered Western conceptualizations, studies from the Arab region described professionalism and identity through a different value lens. Al-Eraky *et al.* (2014), in a Delphi study with experts from Arabian countries, proposed the Four-Gates model, in which professional attributes are organized around dealing with self, with tasks, with others and with God, a faith-based dimension that was largely absent from Western frameworks. This is consistent with the cross-cultural cautions raised by Helmich *et al.* (2017) and Ho (2013). The explanation for this difference is that professional identity is navigated against the values and norms of the surrounding society. Therefore, medical schools in Saudi Arabia, Sudan and comparable contexts should adapt, rather than adopt the whole imported Professional Identity Formation frameworks, so that the identities students form are both professionally sound and culturally authentic and sensitive.

The dominance of social learning and communities-of-practice theory identified in this review is consistent with the original work of Lave and Wenger (1991), who described learning as legitimate participation through which newcomers become full members of a community, and with Cruess *et al.* (2015), who translated this framework into a schematic model of the socialization of medical students and residents. However, unlike purely social accounts, developmental perspectives emphasize the internal meaning-making of the individual student (Holden *et al.*, 2015; Kalet *et al.*, 2017). This review suggested that these perspectives are complementary rather than competing; as social theories explain the direction of identity development toward the value of the professional community, whereas developmental theories

explain its pace and the variability observed between students within the same group. This complementary line explains the growing acceptance of integrated models such as that proposed by Sarraf-Yazdi *et al.* 2024.

The finding that structured reflection is a central mechanism of Professional Identity Formation is tallying with the findings of the systematic review of Mann *et al.* (2009), which found that reflective capacity can be developed and is fostered by a supportive environment and mentoring programs, although the authors noted limited evidence linking reflection to ultimate outcomes. Similarly, Wong and Trollope-Kumar (2014), examined medical students' portfolio reflections and identified role models and patient experiences among the major influences on professional identity formation, which supports the observations of Sharpless *et al.* (2015). With regard to the role modelling, Passi *et al.* (2013) showed in their BEME review that the role models may have both positive and negative influences and that their impact is strengthened when the role modelling is made explicit and followed by reflection, in agreement with the observation of Koh *et al.* (2023) that students must critically evaluate rather than simply imitate the role models. A plausible explanation for these findings is that clinical experiences are emotionally charged; hence, without guided reflection and a trusted mentor, students may internalize whatever they observe, including negative behavior.

This review found that no single assessment tool adequately captures Professional Identity Formation and that different quantitative measures correlate only weakly (Buck *et al.*, 2019). This is resonated with Goldie (2013) findings, who concluded that professionalism should be assessed using multiple methods, by multiple assessors, across different contexts and over time. Kalet *et al.* (2017; 2018) and Silveira *et al.* (2023) demonstrated that a developmentally grounded instrument, the Professional Identity Essay, can detect change during pre-clerkship training and can be validated across cultures, whereas self-report questionnaires such as the Professional Self Identity Questionnaire are more vulnerable to social desirability bias (Crossley & Vivekananda-Schmidt, 2009; Noreen *et al.*, 2023). These discrepancies can be explained by the nature of professional identity as an internal, dynamic and multidimensional construct, so that each instrument captures only one facet of it rather than the whole picture. Triangulation of written, self-reported and observational data within a programmatic, mentoring-embedded approach is therefore required.

The association between a well-consolidated professional identity and consistent professional conduct identified in this review is backed by Papadakis *et al.* (2005), who found that physicians disciplined by state medical boards were nearly three times more likely to have had unprofessional behavior documented during medical school. Although that study did not measure professional identity directly, it indicated that professional dispositions formed during training persist into practice, supporting the argument of Cruess *et al.* (2014) that early identity formation has long-

term consequences.

Regarding students wellbeing, the need for identity-supportive curricula is spotlighted by Dyrbye *et al.* (2006), who reported a high prevalence of depression, anxiety and other indicators of psychological distress among medical students, and by evidence that empathy erodes during training, particularly in the third year of medical school (Hojat *et al.*, 2009; Neumann *et al.*, 2011). In contrast, continuity-based designs appear protective; longitudinal integrated clerkships prevented the erosion of students' patient-centered beliefs (Hirsh *et al.*, 2012; Krupat *et al.*, 2009), and the BEME review by Thistlethwaite *et al.* (2013) reported generally positive outcomes of longitudinal placements for students' learning and patient-centered attitudes.

Nevertheless, this review agreed with Melton and Varpio (2022) that most of the evidence for these benefits is theoretical, cross-sectional or just an association rather than causation. This gap can be clarified by the long period between undergraduate education and measurable outcomes, the multiple confounders running across years and the rarity of validated outcome measures, all of which make causal attribution to specific PIF interventions challenging and complicated.

Moreover, this review found that the hidden curriculum was one of the most frequently reported threats to PIF, and this is consistent with Hafferty and Franks (1994), who argued that formal ethics teaching is undermined by the structure of medical training. Moreover, Brown *et al.* (2020). Neumann *et al.* (2011) similarly attributed the decline in empathy among trainees to distress and to effects of the hidden curriculum. A notable explanation emerging from this review was that the same mechanism that drives Professional Identity Formation also drives its distortion; because when students seek belonging within the community of practice (Lave & Wenger, 1991), they tend to adopt the norms they observe in authentic clinical settings, which carry greater weight than classroom effect. This explains why the hidden curriculum resists conventional curricular reform and why institution-level interventions are required rather individual-based initiatives (Hafferty, 1998).

The tension between Professional Identity Formation and competency-based medical education found in this review mirrors the concern raised by Jarvis-Selinger *et al.* (2012) that a purely competency-focused model may neglect identity. Frank *et al.* (2010) defined CBME as an outcomes-based approach organized around observable competencies, which illustrates why the less observable nature of identity fits uneasily within it (Sternszus *et al.*, 2023). In contrast, Krishnasamy *et al.* (2022), exploring educators' perspectives within a competency-based curriculum, described approaches in which professional identity can be deliberately fostered within such a curriculum, and the addition of the level "Is" to Miller's pyramid offers a conceptual bridge between the two approaches (Cruess *et al.*, 2016). Therefore, this tension can be translated as a productive relationship rather

than an incompatibility; as competencies describe what a physician does, whereas professional identity describes who the physician is, and process-based milestones combined with coaching and mentoring allow both to be sought at the same time.

The review also found that discrimination has its effect on Professional Identity Formation, and that agreed with Venkataraman *et al.* (2024) and Volpe *et al.* (2021) and further explained by Teherani *et al.* (2018), who showed that small differences in assessed clinical performance amplify into large differences in grades for learners underrepresented in medical program. Such cumulative disadvantage may reduce students' sense of belonging, which according to communities-of-practice theory, are prerequisites for full participation and professional identity consolidation (Cruess *et al.*, 2015; Lave & Wenger, 1991). By contrast, Volpe *et al.* (2021) revealed that minoritized students can draw on their identities as a resource for connecting with patients of similar backgrounds, indicating that diversity is strength point to professional identity rather than being a vulnerability factor.

The evidence-informed solutions identified in this review built on earlier recommendations. Stern and Papadakis (2006) proposed teaching professionalism by setting expectations, providing experiences and evaluating outcomes. This review extended this approach from behavioral professionalism toward identity and added more attention to the learning environment, equity and wellbeing. Al-Eraky *et al.* (2015) designed and evaluated a faculty development program for teaching professionalism in the Arabian context and advocated a shift from stand-alone training interventions toward a longitudinal mentorship paradigm within communities of learning, which is tallying with Toh *et al.* (2022) and Cruess *et al.* (2019). The consistency of these findings across Western, Asian and Arabian settings suggests that faculty development and longitudinal mentoring are considered one of the most transferable components of Professional Identity Formation oriented curriculum reform.

Implications for Practice

For medical schools, particularly in Sudan and similar contexts, the findings of this review imply the need to adopt Professional Identity Formation as an explicit curricular goal; and to map its related outcomes longitudinally across all years of undergraduate medical education. Also, the findings highlight the need to establish longitudinal mentoring programs; incorporate guided reflection and portfolios. Additionally, PIF frameworks should be adapted to local cultural and religious values and supported by investment in faculty development that equips faculty members with the knowledge and skills to counteract the negative impact of the hidden curriculum.

Strengths and Limitations

The strength of this review is that it integrated seminal

theory with recent evidence and links each identified challenge to an evidence-informed solution. However, several limitations should be acknowledged. As a narrative review, it did not follow a systematic search and selection protocol or apply a formal quality appraisal of included studies; therefore, selection bias cannot be excluded. The review was limited to the databases searched and may not have adequately covered relevant grey literature or non-English publications. In addition, the reviewed literature originated predominantly from North America, Europe and Asia, with relatively few studies from the Arab region and Africa. Nonetheless, much of identified evidence are qualitative cross-sectional which limited causal inferences of PIF interventions. Future longitudinal and multi-institutional studies, particularly in Arab and African regions medical schools are required to validate assessment tools and to examine the link between PIF interventions and patient outcomes.

CONCLUSION

This narrative review consolidated the theoretical and conceptual literature on Professional Identity Formation in undergraduate medical education. The evidence indicated that Professional Identity Formation, defined as the developmental process through which learners come to think, act and feel like physicians, is conceptually distinct from professionalism and is best illustrated by the integration of social learning, communities-of-practice and constructive-developmental theories. Five core principles were found to underpin Professional Identity Formation; including explicit curricular goal, structured reflection, a supportive community of practice, role modelling and mentoring, and longitudinal formative assessment. These principles are operationalized through longitudinal curriculum development, structured mentoring and coaching, reflection, multimodal assessment, and faculty development. The reported benefits of Professional Identity Formation were consistent professional conduct, improved student wellbeing, reduced burnout, greater curricular coherence and potential gains in patient care. Despite the fact these benefits are conceptually robust, they are predominantly supported only by theoretical evidence. The implementation of PIF is constrained by the hidden curriculum, tension with competency-based medical education, identity discordance and the burnout. Because these challenges are largely systemic, they require institution-level intervention rather than individual-level responses. Therefore, medical schools should establish Professional Identity Formation as an explicit and assessable curricular goal, map it longitudinally across all years of undergraduate medical education, use resource structured mentoring programs, adopt primarily formative and multimodal assessment, address the hidden curriculum through sustained faculty development, and adapt Professional Identity Formation frameworks to local cultural and religious contexts. Future research should focus on longitudinal and multi-institutional studies, the development of Professional

Identity Formation assessment instruments, and rigorous evaluation of the effects of Professional Identity Formation interventions on physicians performance and patient outcomes following graduation.

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