

Medical teaching in the 21st century: A critical approach to the professional competencies of teachers in Health Sciences.

Twenty-First Century Medical Education: A Critical Approach to the Professional Competencies of Health Sciences Educators.

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Abstract: Medical education in the 21st century demands the integration of disciplinary knowledge with pedagogical, ethical, communicative, and digital competencies in increasingly complex healthcare settings. The aim of this opinion piece is to critically examine the foundations of professional competencies for educators in the Health Sciences and to propose a contextualizable framework for their development. Through a directed narrative synthesis, the AMFEM, Harden and Crosby, CanMEDS, Tuning, and WFME models are compared according to their target audience, scope, and limitations, incorporating recent studies on faculty development, reliable professional activities, and artificial intelligence. Tensions are identified between standardization and local relevance, observable performance and humanistic training, as well as between individual responsibility and institutional conditions. Eight interrelated domains are proposed, conceived as an argumentative construct rather than a validated consensus. Professional development for educators requires continuing education, mentoring, formative assessment, and institutional support. Postgraduate degrees constitute a relevant pathway for advanced training for certain roles, but are not a universal requirement.

Keywords: medical teaching; teaching competencies; higher education; health sciences; competency-based training.

Resumen: La docencia médica del siglo XXI exige integrar el conocimiento disciplinar con competencias pedagógicas, éticas, comunicativas y digitales en contextos asistenciales cada vez más complejos. El objetivo de este artículo de opinión es examinar críticamente los fundamentos de las competencias profesionales del docente en Ciencias de la Salud y argumentar una propuesta contextualizable para su desarrollo. A partir de una síntesis narrativa dirigida, se contrastan los modelos AMFEM, Harden y Crosby, CanMEDS, Tuning y WFME según su destinatario, alcance y limitaciones, incorporando estudios recientes sobre desarrollo profesoral, actividades profesionales confiables e inteligencia artificial. Se identifican tensiones entre estandarización y pertinencia local, desempeño observable y formación humanística, así como entre responsabilidad individual y condiciones institucionales. Se proponen ocho dominios interrelacionados, concebidos como una construcción argumentativa y no como un consenso validado. La profesionalización docente requiere formación continua, mentoría, evaluación formativa y apoyo institucional. Las titulaciones de

posgrado constituyen una vía de profundización pertinente para determinadas funciones, sin representar una exigencia universal.

Palabras clave: docencia médica; competencias docentes; educación superior; ciencias de la salud; formación por competencias.

1. Introduction

Higher medical education has undergone profound transformations driven by the rapid expansion of biomedical knowledge, the complexity of healthcare systems, epidemiological diversity, and the need for person-centered care. In these circumstances, university teaching in the health sciences transcends the mere presentation of content: it involves designing relevant learning experiences, facilitating the application of clinical reasoning, and contributing to the training of socially responsible professionals. The call to reform health professions education underscores the connection between the needs of the population and the performance of those involved in teaching (1). Competency-based training has fostered the explicit formulation of learning outcomes, the monitoring of student progress, and the alignment of teaching and assessment. However, mechanically transferring indicators to the work of faculty can reduce reflective practice to a set of verifiable behaviors and relegate dimensions that are difficult to quantify, such as clinical prudence, ethical sensitivity, deliberation in the face of uncertainty, and the educational relationship. Therefore, the competency-based approach should be understood as a resource for improving educational decisions, not as a self-sufficient end in itself (2). Patient safety is a cross-cutting requirement of health education. Student supervision, procedure evaluation, timely feedback, and risk identification are relevant responsibilities of the clinical instructor, but their implementation also depends on the availability of practice settings, patients, resources, and institutional agreements. The educational approach to safety proposed by the World Health Organization emphasizes precisely that clinical learning requires favorable organizational conditions and cultures that allow for the analysis of errors without trivializing their consequences (3).

The debate on teaching competencies relies on heterogeneous references: the Mexican Association of Faculties and Schools of Medicine (AMFEM) formulates a profile of the medical professor (4); the World Federation for Medical Education (WFME) establishes standards for training institutions (5); Harden and Crosby describe the professional roles of the medical professor (6); Srinivasan and colleagues propose specific competencies for educators (7); CanMEDS outlines competencies for physicians (8); and Tuning guides curriculum design based on learning outcomes (9). Recognizing their different areas of application prevents us from considering their statements as equivalent or interchangeable lists. The thesis of this opinion piece argues that teaching competencies only acquire value when they articulate knowledge, skills, attitudes, and professional judgment to respond to specific situations of teaching, supervision, and evaluation. Instead of demanding a universal, decontextualized profile, it is more important to discuss which capacities are priorities, what evidence supports them, and under what conditions they can be developed sustainably. Therefore, the purpose is to critically analyze the aforementioned frameworks, contrast them with recent research, and argue for a core competency proposal adaptable to the realities of contemporary medical education.

2. Conceptual foundations of competency-based training in higher education

The competency-based approach has its roots in performance-oriented training experiences and has evolved toward concepts that integrate knowledge, procedures, attitudes, values, and situated action skills. In higher education, it should not be limited to instrumental outcomes: a competent professional must interpret problems, justify decisions, recognize the limits of their knowledge, and act responsibly in novel situations. For medical education, this perspective involves progressively

linking stated learning outcomes with clinical practice and the ethical commitments that accompany it (2).

Tuning contributes to defining generic and specific competencies, as well as promoting transparency and comparability of graduate profiles; however, its main unit of analysis is the curriculum and not the individual performance of the teacher. For its part, CanMEDS describes expected physician roles—including communicator, collaborator, leader, academic, and professional—the acquisition of which requires modeling and teacher support, but does not, on its own, allow for inferring a complete competency profile of the educator. This conceptual distinction is fundamental to avoid undue transpositions between the competencies of the student, the healthcare professional, and the teacher (8, 9).

In keeping with its opinion-based nature, this analysis is based on a carefully curated selection of relevant conceptual and institutional documents and scientific publications, without aiming for the exhaustiveness or reproducibility characteristic of a systematic review. Key conceptual frameworks for this debate were prioritized and compared with literature published primarily between 2024 and 2026 on faculty development, clinical teaching assessment, and digital transformation. The interpretation was organized around five questions: who is each framework intended for, what dimensions does it emphasize, what are its limitations, what is the nature of its foundation, and what degree of adaptation is required in Latin American contexts? This comparative reading procedure does not constitute a consensus analysis, meta-analysis, or validation of an instrument. Its purpose is to make transparent how the argument is constructed: guiding criteria are derived from the contributions and gaps of the models, which are subsequently compared with recent research and reviews. A relevant example is the Latin American framework for teacher development by Jerez and colleagues, which identifies progressive dimensions and levels of performance and allows for questioning rigid profiles focused exclusively on the accumulation of credentials (10).

From this perspective, teaching competencies are integrated skills that manifest themselves in situated decisions: selecting a simulation strategy for a clinical objective, managing a difficult feedback conversation, adapting an activity for students with different needs, or balancing autonomy and supervision during a procedure. Their assessment requires diverse evidence and professional judgment; no single checklist, satisfaction survey, or number of academic publications can represent the complexity of teaching practice. A critical reading must also identify the material conditions of educational work. The pressure of patient care, differences in access to technology, the availability of clinical settings, and the unequal allocation of academic time all influence opportunities for developing skills. Attributing a lack of resources to an individual teacher's shortcomings is a misplacement of responsibility. Competency-based training is only socially relevant if it engages with these limitations and recognizes the shared nature of quality assurance (5, 10).

3. Teaching competencies in higher education in Health Sciences

Universities require professors who integrate disciplinary expertise, pedagogical foundations, communication skills, research capabilities, and a humanistic commitment. Clinical experience, while essential for many roles, does not in itself guarantee the ability to plan learning, assess performance, or maintain an effective pedagogical relationship. Furthermore, pedagogical training disconnected from real-world healthcare challenges can produce seemingly correct teaching interventions that are ultimately irrelevant to the healthcare context.

The core competencies of university professors encompass scientific updating and epistemological judgment, learning planning and evaluation, two-way communication, reflection on their own practice, and commitment to student well-being. Vera Carrasco's proposal, formulated within the Latin American context, is useful for grouping these competencies into cognitive and

disciplinary, communicative, research, psychopedagogical, academic-administrative, and humanistic dimensions (11). Table 1 summarizes its functional implications and avoids confusing a guiding classification with a validated scale.

Table 1. Basic competencies in university teachers in the health field.

	Skills	Functional characteristics
1	Cognitive and disciplinary	Update the evidence in the specialty and transform it into relevant clinical problems, objectives, and experiences.
2	Communicative	Explain and listen clearly; engage in dialogue with students and patients and provide respectful feedback.
3	Research	Critically interpret scientific evidence, examine one's own teaching, and promote responsible inquiry.
4	Psychopedagogical and psychosocial	Adapting teaching methods to diversity; promoting motivation, self-regulation, and psychologically safe learning environments.
5	Academic-administrative	Plan and coordinate activities, scenarios, resources and evaluations according to institutional and social needs.
6	Humanities	Model ethics, empathy, fairness, professionalism, and respect for the dignity of students and patients.

This classification allows us to recognize a common core, but it should not become a list of independent attributes. For example, effective feedback articulates clinical reasoning, communication, socio-emotional skills, and assessment criteria; planning a safe practice simultaneously requires disciplinary, pedagogical, and organizational skills. The educational value lies in this integration and in the possibility of observing its application to real problems, rather than in declaring that the teacher "possesses" a competence in an abstract way (7, 11).

In clinical teaching, supervision should be tailored to the student's experience, the risk of the procedure, and the complexity of the clinical setting. Entrustable professional activities (EPAs) for clinical instructors offer a promising way to describe responsibilities such as bedside teaching and to make confident decisions regarding the instructor's performance. Rafiq and Sethi propose observable activities for instructors in this setting; however, their use should be considered contextual and not extrapolated as a universally validated instrument for all specialties (12).

Communication and humanistic skills are especially important in interprofessional teams. Modeling respectful communication with nursing, medicine, rehabilitation, and other disciplines demonstrates that safe care is a collaborative endeavor. The World Health Organization's framework for interprofessional education supports the relevance of training experiences linked to collaborative practice, although specific strategies must be adapted to the organization of the service and the characteristics of the students (13).

Educational research also requires a non-reductionist interpretation. It is reasonable that every teacher can locate, analyze, and use relevant pedagogical evidence and reflect on the results of their teaching. However, the systematic production of original research, the leadership of lines of inquiry, and the publication of results correspond to trajectories with differentiated dedication and support. The scope review by Van Schalkwyk and colleagues highlights the plurality of modalities and purposes of teacher development, while the classic work by Steinert and colleagues points to the importance of experiential activities, feedback, and organizational support (14, 15).

Institutional environments are part of the explanation for teaching performance. A faculty development program must have clear objectives, equitable access, support, monitoring, and quality evaluation. McCoy and colleagues presented a framework in 2016, developed through consultations with specialists and applied to the evaluation of faculty development programs; this contribution shifts the question from "what does the professor lack?" to "what conditions does the institution provide so that they can improve?" (16). This shared responsibility is essential in universities with a high teaching load and limited resources.

The assessment of basic competencies requires triangulation of sources: observation of sessions, analysis of lesson plans, reflective portfolios, review of practical activities, and student opinions used with caution. Student satisfaction provides useful information about the training experience, but does not by itself demonstrate pedagogical effectiveness or impact on patient safety. Faculty development decisions should be based on sufficient formative evidence, interpreted according to responsibilities and contexts (14-16).

4. Specific skills and professional development of the medical teacher

According to the Mexican Association of Faculties of Medicine (9), teachers in higher education who work in the area of Health Sciences should have the specific competencies shown in Table 2.

Table 2. Specific competencies in medical teachers.

Specific skills	Main features
Design or redesign of study plans and programs	Align content, learning outcomes and health needs; justify curriculum adjustments with data and collegial dialogue.
Design and organization of teaching methods, practices and resources	Select active methodologies, simulation, and clinical or digital resources according to objectives, safety, and accessibility.
Coordination of educational processes	Manage practices, teams and resources; coordinate clinical supervision, quality and equitable learning opportunities.
Promoting professionalism	Modeling ethical judgment, respect, clinical responsibility, interprofessional conduct, and constructive error analysis.
Design and application of assessment instruments	Build valid and contextualized evidence of performance; combine observation, explicit criteria and useful feedback.
Participation in the generation of scientific knowledge	Apply evidence to teaching; promote critical thinking and, depending on the trajectory, develop educational research and innovation.

Comparing models requires distinguishing their purpose before pointing out similarities. AMFEM characterizes the responsibilities of the individual teacher; Harden and Crosby organize twelve teaching roles into six functional areas, from facilitation and modeling to planning and assessment; and Srinivasan and colleagues define educator capabilities, including student-centeredness, communication, and professionalism. Convergence among them strengthens the relevance of certain practices, but does not in itself demonstrate that all domains carry equal weight or that a list is transferable intact between institutions (4, 6, 7).

CanMEDS, in contrast, describes the physician that the university aspires to train. Their roles as communicator, collaborator, professional, and academic offer reference points for organizing

learning experiences and observing the modeling of these behaviors, but they do not replace a theory of teaching work. Tuning guides the coherence between profiles, results, and evaluation, while WFME proposes institutional quality standards and encourages their contextualization. Therefore, these three frameworks complement the professor's profile from different levels: expected performance of the healthcare professional, curriculum architecture, and institutional conditions (5, 8, 9).

This distinction reveals a primary contradiction of the competency-based paradigm: what is most easily documented does not always correspond to the most valuable aspects of training. A checklist can describe the steps of a technique, but it does not encompass ethical prudence, empathy, or the ability to recognize when it is appropriate to suspend an activity for safety reasons. Similarly, the recording of indicators can encourage bureaucracy and discourage professional judgment when used for punitive rather than formative purposes. Consequently, teaching competence must be assessed using multiple lines of evidence and criteria that allow for uncertainty and reflection (2, 3).

A second tension arises between the demand for individual innovation and the conditions of the system. Demanding clinical simulation, structured assessment, research, and advanced use of platforms from professionals who lack protected time or technological support can turn the discourse of excellence into an additional source of inequality. The Latin American framework by Jerez and colleagues highlights progressive dimensions linked to facilitation, assessment, research, educational management, and empathetic pedagogical relationships, which supports phased improvement trajectories rather than the simultaneous obligation to reach a maximum profile (10).

Based on these principles, we propose considering a core competency when it: (a) is linked to actual teaching responsibilities; (b) has a reasonable correspondence between frameworks designed for relevant purposes; (c) has identifiable conceptual or empirical support; (d) can be examined through evidence from practice, without being reduced to a single score; and (e) is relevant to patient safety, equity, and contextual feasibility. These criteria guide our academic judgment; they do not derive from a weighted score or a formal consensus technique. The lack of external validation constitutes an explicit limitation of the proposal.

Applied with this scope, the criteria allow for the identification of eight interrelated domains: relevant curriculum design; safe clinical facilitation and supervision; evidence-based assessment and feedback; professionalism, ethics, and humanism; interprofessional communication and collaboration; reflective practice and educational research; leadership and quality management; and responsible digital transformation. The classification expands AMFEM's six operational functions by explicitly addressing clinical learning safety, collaboration, and technological transformation; it should not be interpreted as a definitive taxonomy or an accreditation instrument (4-10, 12-16).

Clinical supervision acquires substance when concrete decisions are observed: defining what tasks a student can perform, anticipating risks, intervening promptly, and justifying the degree of autonomy allowed. Clinical teaching assessments (CTAs) for clinical instructors help describe observable integrative performance, but their reliability and usefulness in different specialties, educational levels, and health services need to be investigated before being used for certification purposes. The relationship between teaching supervision and patient safety is plausible and relevant, although it is not appropriate to attribute direct causality based on descriptive studies of competencies (3, 12).

Regarding assessment, the educator's judgment is expressed in the selection of instruments appropriate to the purpose. Knowledge tests, structured observation of procedures, case discussions, and structured objective clinical assessment provide complementary information; none should

become an absolute substitute for the others. A good feedback system provides understandable criteria, opportunities for improvement, and attention to the emotional context in which the practice takes place. Its quality depends on a coherent curriculum design and shared agreements among the evaluators (5-7).

Digital transformation adds new demands that go beyond the technical management of information and communication technologies. Hybrid teaching requires instructional design, accessibility, data protection, and learning monitoring; educational analytics compels us to examine the validity of indicators and the risk of excessive surveillance. UNESCO's AI competency framework for teachers incorporates dimensions of human agency, ethics, AI fundamentals, pedagogy, and integration into professional development, while the World Health Organization warns of governance, bias, and safety issues associated with generative models in health (17,18).

In medical education, generative artificial intelligence can facilitate the creation of materials, simulated cases, questions, and support for self-directed learning, but it can also produce inaccurate content, persuasive but unsubstantiated responses, and risks to privacy and academic integrity. A systematic review by Pham et al. compiled 33 studies on the use of generative AI by health professions students and observed a greater prevalence of individual than collaborative activities. A scoping review by Astbury et al. explored its application to teaching and assessment, highlighting opportunities alongside challenges related to accuracy and reliability. These publications do not justify assuming automatic educational superiority of the technology (19, 20).

Therefore, digital competence should be defined as the ability to select, implement, verify, and critically evaluate digital resources, including AI systems. It is essential to recognize when it is appropriate to use them, to make their use transparent, to protect identifiable information, and to maintain human oversight in clinical or academic decisions. The relevance of a tool is not measured by its novelty, but by its verifiable contribution to a learning objective and by the proportionality between benefits, costs, and risks (17-20).

Professional development is the mechanism that allows these capacities to be sustained. The evidence synthesized by Van Schalkwyk and by Steinert and colleagues supports a broader view than isolated workshops: mentoring, reflection, experiential activities, communities of practice, educational projects, and organizational support. The framework of McCoy and colleagues also provides indicators for evaluating institutional programs, which is especially relevant when universities wish to link their investments in training with observable changes in teaching processes (14-16).

Postgraduate degrees in medical education represent a valuable opportunity, particularly for faculty members who assume stable responsibilities in curriculum design, leadership, program evaluation, and educational research. However, generalizing that all teaching professionals should obtain a master's degree ignores the heterogeneity of dedications and roles. The AMEE guide on faculty development through advanced degrees places academic degrees within a continuum of training and conditions them on institutional needs, resources, and goals; therefore, the credential should not be confused with sufficient demonstration of teaching competence (21).

Finally, the proposed core domains should be understood as an open conceptual framework. The selection of sources was deliberate and not exhaustive; the models compared are not homogeneous, and the evidence comes from diverse contexts. No Delphi consensus, psychometric validation, or longitudinal study was conducted to demonstrate that the eight domains, on their own, improve educational or healthcare outcomes. Their practical utility requires further feedback from

teachers, students, curriculum managers, and patients, as well as pilot studies to explore feasibility, acceptability, and relevance within each institution's specific context.

5. Conclusions

- Medical education in the 21st century requires moving beyond the notion that a good teacher is solely defined by their mastery of a specialty or their ability to transmit information. Professional teaching competencies encompass disciplinary reasoning, pedagogy, safe supervision, assessment, professionalism, and social responsibility; their value is demonstrated in concrete educational situations. The AMFEM, Harden and Crosby, Srinivasan, CanMEDS, Tuning, and WFME models offer complementary perspectives, but they must be interpreted according to the specific individual and institutional level they address.
- The analysis allows us to propose eight related core domains, without considering them a closed list or a validated consensus. Their justification rests on the explicit comparison of relevant frameworks, their connection to real educational functions, and the consideration of recent literature. It is acknowledged, however, that conceptual convergence does not equate to causal evidence and that their adoption requires critical review, contextual adaptation, and subsequent evaluation of their performance.
- The professional development of teachers in the Health Sciences demands a continuous process that combines disciplinary updates, pedagogical training, mentoring, reflection on practice, and educational research aligned with the professional profile. Master's degrees and other postgraduate studies can facilitate leadership and advanced training pathways, but their indiscriminate requirement is not supported by the elements analyzed. Institutions and teachers share the responsibility of creating training opportunities, protecting academic time, and sustaining quality improvement.
- Ultimately, the challenge lies in training teachers capable of making sound educational decisions, communicating with compassion, critically evaluating evidence, and using digital resources—including artificial intelligence—safely and ethically. In this way, a competency-based approach can contribute to relevant medical education without limiting its scope to what is easily measurable.

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