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Pandora's Box in AI-Powered Assessment in Medical Education

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ABSTRACT: The emergence of artificial intelligence (AI) in higher education represents a transformative opportunity, but also an ethical and pedagogical challenge. In the field of university medical education, the use of AI in assessment processes opens a "Pandora's box": it unleashes potential benefits for formative assessment and competency development but also risks that threaten the authenticity and humanisation of the educational process. This essay critically analyses the "Pandora's box" metaphor in AI-mediated assessment, from a constructivist perspective and in accordance with the Mexican regulatory framework for higher education, highlighting the need to integrate technology in an ethical, formative, and student-centred manner.

KEYWORDS: Pandora's box, Artificial intelligence, medical education.

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Introduction

In Greek mythology, Pandora opened a box containing all the evils of the world, leaving only hope inside. In contemporary education, the metaphor of "Pandora's box" symbolises the risks and possibilities that emerge when artificial intelligence (AI) is incorporated into academic assessment. In medical training, where not only knowledge but also procedural skills and ethical values are assessed, the emergence of automated tools poses a dilemma: how can AI be used to strengthen formative assessment without losing the human element of learning?

Medical education, aligned with the General Law of Higher Education (LGES, 2021) and the General Health Law (2022), aims to train professionals capable of responding to societal health needs. Within this framework, evaluation cannot be reduced to measuring outcomes; it must instead become a reflective, continuous, and humanising process. Therefore, the introduction of AI must be analysed from a critical, constructive, and ethical perspective.

Formative Assessment and the Constructivist Paradigm

Formative assessment is conceived as a supportive process that provides feedback to students throughout their learning, rather than simply grading their final performance. According to Black and Wiliam (2009), its purpose is to "bridge the gap between the current state of knowledge and the desired level," allowing students to self-regulate their learning. From a constructivist perspective, assessment is a social and dialogical process that fosters the active construction of knowledge.

In medical education, this vision translates into the need for instruments that assess comprehensive competencies: cognitive, procedural, and attitudinal. Rubrics, portfolios, and self-assessment have become established strategies that promote reflection, self-efficacy, and professional responsibility (Morales & Landa, 2021). When integrated into this process, AI can expand its possibilities, provided it remains at the service of pedagogical judgment rather than replacing it.

Artificial Intelligence in Assessment: Opening Pandora's Box

AI applied to assessment offers a range of opportunities that, when used effectively, can positively transform teaching practices. Its contributions include immediate feedback, personalised learning, performance data analysis, and the prediction of learning trajectories (UNESCO, 2023). In medical education, this can translate into intelligent tutoring systems, adaptive clinical simulations, and diagnostic reasoning analysis tools.

However, opening this "Pandora's box" also brings risks: depersonalization of teaching, algorithmic biases, loss of validity in assessments, and a threat to academic integrity (Williamson & Piattoeva, 2022). If AI replaces the teacher's pedagogical and ethical perspective, assessment becomes dehumanised, reducing learning to mere data patterns. The hope, as in the myth, lies in educators becoming critical guardians of the process, using technology as a mediating tool rather than an absolute judge.

Competency Assessment in Medical Education with AI

Contemporary medical education is geared towards developing comprehensive professional competencies, where technical knowledge is integrated with critical thinking, ethics, and human sensitivity (SEP, 2022). AI can contribute to strengthening this approach by designing simulated scenarios and automating the analysis of clinical performance, provided there is an ethical and educational framework to oversee its application.

For example, an AI system could offer feedback on communication with the patient in a simulation, but only the instructor can contextualise that information within the values of medical humanism. AI lacks the moral and cultural understanding necessary to judge attitudes, empathy, or complex clinical decision-making. Therefore, the role of the professor—especially in medicine—remains irreplaceable as a facilitator of learning and guarantor of comprehensive assessment.

Ethical and Legal Considerations in the Mexican Context

The use of AI in assessment must align with the principles of transparency, equity, and accountability established in the General Law of Higher Education (2021) and the National Artificial Intelligence Strategy (Government of Mexico, 2023). These regulations stipulate that educational technologies must promote quality, inclusion, and the protection of students' personal data.

Likewise, the Mexican Qualifications Framework for Higher Education (SEP, 2022) emphasises that all innovation must contribute to comprehensive human development and professional ethics. Therefore, in university medical education, AI should only be considered valid if it reinforces meaningful learning, respects student autonomy, and preserves the integrity of the educational relationship.

Conclusions

Opening Pandora's box of AI-powered assessments in medical education means acknowledging both its risks and its transformative potential. The hope that remains within that box is the possibility of building a fairer, more reflective, and more personalised formative assessment, always guided by the instructor's ethical and pedagogical judgment.

The challenge, therefore, is not to avoid AI but to humanise its use by integrating it critically and responsibly into university assessment processes. Only in this way can we ensure that technology serves the noblest purpose of medical education: to train competent, ethical professionals committed to health and human dignity.

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