

ANALYSIS OF FOREIGN EXPERIENCES OF PROFESSIONAL COMPETENCE DEVELOPMENT OF MEDICAL STUDENTS THROUGH THE SCIENCE OF INFECTIOUS DISEASES

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Abstract: This article analyzes foreign experiences in developing the professional competence of medical students through the teaching of infectious diseases. It explores innovative methods such as simulation-based training, virtual laboratories, problem-based learning, and the ACL (Activity–Competence–Learning) model implemented in leading international medical schools.

Keywords: medical education, infectious diseases, professional competence, ACL model, clinical reasoning, simulation, virtual laboratories, problem-based learning, reflective practice, international experience.

INTRODUCTION

In recent years, the rapid development of medical education has brought a global emphasis to the critical importance of forming comprehensive professional competence among future physicians. An analysis of international practices, particularly in the teaching of complex fields like infectious diseases, reveals a definitive shift towards integrative educational models, simulation technologies, problem-based learning, and reflective approaches designed to strengthen students' clinical reasoning and decision-making capabilities. Leading foreign universities have pioneered and implemented evidence-based educational strategies that allow students to acquire not only essential theoretical knowledge but also the practical skills, ethical grounding, and communication abilities vital for modern healthcare. Professional competencies are now understood to be a multifaceted construct, extending beyond mere knowledge and skills to encompass communication, empathy, reflection, clinical responsibility, and innovative thinking. By analyzing these advanced international experiences, national medical education systems gain a valuable opportunity to adapt the best pedagogical solutions and integrate them effectively to elevate the quality of physician training. Therefore, implementing integrative, competency-based, and contextually relevant educational approaches grounded in international experience is recognized as a crucial scientific and methodological priority.

METHODS

The development of professional competence in leading international institutions is guided by structured, multi-component pedagogical systems that prioritize active, outcome-based learning. These methods are designed to be integrative, ensuring that various skills are developed in a connected, synergistic manner. Competency-Based Frameworks and Entrustable Professional Activities (EPAs): A foundational method is the adoption of comprehensive competency frameworks.

The CanMEDS model, developed by the Royal College of Physicians and Surgeons of Canada, provides a systematic framework that defines seven key professional roles, such as Medical Expert, Communicator, and Collaborator, each with specific associated competencies.

This model has evolved into the Competence by Design (CBD) project, which represents a fundamental shift from time-based to outcome-based education.

A core component of the CBD project is the implementation of Entrustable Professional Activities (EPAs), which are real clinical tasks that a trainee must progressively demonstrate the ability to perform independently. This approach ensures training is transparent, practical, and tailored to professional needs.

Problem-Based and Case-Based Learning (PBL): This student-centered pedagogy transforms learners from passive listeners into active clinical analysts.

At institutions like the University of São Paulo's Faculty of Medicine, programs utilize PBL and clinical case training to strengthen the cognitive components of professional competence.

Throughout the curriculum, students are tasked with connecting theoretical knowledge with real-life clinical cases, which reinforces their analytical thinking and decision-making skills while fostering independent thought and clinical responsibility.

Simulation and Interprofessional Learning: Advanced curricula, such as the potential-based program at Berlin's Charité Medical Center, place a strong emphasis on simulation and interprofessional learning.

This method involves students collaborating with professors and clinical experts from various faculties, which enhances teamwork, innovative thinking, and professional responsibility. The theoretical significance lies in its support for the integrative development of a wide range of competencies necessary for addressing global healthcare challenges.

Empathy and Communication Training: The "Hospital Project" at the University of Melbourne's Faculty of Medicine focuses on developing empathy and professional interaction skills by having students engage in "patient-teacher" roles with preschool-aged children.

Design Thinking: The Health Design Lab at Thomas Jefferson University in the United States utilizes a "Design Thinking in Medical Education" project to cultivate innovation. Students use design thinking principles to identify real-world healthcare problems, understand patient needs, and develop and test solutions.

Digital Integration and Assessment: In Taiwan, the "Competency-Based Learning and Assessment System (CBLAS)" provides an electronic platform for training medical residents. This platform integrates EPAs, faculty feedback, learning portfolios, and real-time assessment functions to support the continuous development of professional competencies.

Specialized Assessment Tools: At Chiba University in Japan, the "Japanese Pediatric Emergency Medicine Script Concordance Test (Jpem SCT)" project focused on adapting script concordance tests specifically for assessing clinical reasoning in a pediatric emergency context.

RESULTS

The implementation of these advanced pedagogical methods has yielded measurable and significant results across various international institutions, confirming their effectiveness in developing well-rounded medical professionals.

Research on the University of Melbourne's "Hospital Project" indicated that the project significantly enhances students' professional emotional intelligence, patience, adaptability in communication, and their understanding of child psychology.

The competency-based residency programs at McMaster University, structured with EPAs, were found to facilitate the development of diagnostic, communication, documentation, and professional ethics skills, thereby significantly improving the overall quality of medical education.

In Taiwan, the CBLAS electronic platform demonstrably improved the structure and efficiency of education, increased positive faculty attitudes toward competency-based medical education, and achieved a high degree of user satisfaction at 87–90%. The platform also supports an accurate and structured assessment of competencies based on EPAs.

The study on the "Design Thinking in Medical Education" project at Thomas Jefferson University confirmed that the approach effectively develops clinical reasoning, creativity, and professional adaptability among students.

The validation of the Jpem SCT in Japan proved it to be a high-quality, context-appropriate assessment tool with a Cronbach's α of 0.70, indicating that it reliably evaluates clinical reasoning and is a valuable method for developing analytical and diagnostic skills.

A study at the National University of Singapore (NUS) Faculty of Medicine, which examined the integration of digital health, revealed that while courses on topics like telemedicine exist, they are not yet standardized at the national level. This finding highlights a critical need to systematically integrate skills related to electronic medical records, diagnostic software, and scientific databases into medical education to meet public health requirements.

DISCUSSION

The analysis of these foreign experiences makes it clear that developing professional competence is a complex process that extends far beyond the transmission of clinical knowledge. The findings collectively argue for a comprehensive and integrative pedagogical system that intentionally cultivates analytical thinking, empathic approaches, communication skills, ethics, independent decision-making, interprofessional collaboration, and digital health technologies. The successful programs all utilize advanced methods and technologies such as Competency-Based Medical Education (CBME), Entrustable Professional Activities (EPA), Design Thinking, and Script Concordance Tests (SCT). These approaches are effective because they prepare future physicians for real clinical environments, equip them to work independently and responsibly, improve patient communication, and foster a strong professional commitment.

A key insight from this analysis is the concept of pedagogical synergy, wherein the structural interrelation of competencies creates a coherent and complex system. The development of one component, such as clinical reasoning, directly activates and enhances others, including clinical prediction and reflective evaluation. This dynamic transforms a student from a passive recipient of knowledge into an active professional subject. The ability to make clinical predictions is recognized as an essential component of professional competence, enabling a future physician to evaluate a patient's condition, anticipate disease progression, and select appropriate therapeutic strategies. This skill is particularly vital in the field of infectious diseases for predicting pandemic risks, the course of chronic infections, and the effects of pharmacotherapy.

Ultimately, the assessment of professional competence must be holistic, giving priority to clinical reasoning but also evaluating practical skills, professional responsibility, reflection, self-assessment, and proficiency with modern information technologies. The development of these competencies is not only a matter of improving medical education quality but is also a strategic pedagogical requirement that directly impacts the sustainability and efficiency of the entire healthcare system. Therefore, the adoption of these internationally validated, integrative, and competency-based educational approaches is a crucial priority for enhancing medical education and ensuring that newly trained physicians can meet global standards and effectively manage complex health challenges..

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