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A New Level In Medical Education: Epa – An Innovative Pedagogical Approach To Teaching The Subject "Information Technologies In Medicine"

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Abstract. Contemporary medical education demands not only the acquisition of theoretical knowledge but also the development of advanced practical skills among students. In this context, the teaching of subjects such as "Information Technologies in Medicine" plays a critical role, as it equips future healthcare professionals with the ability to navigate and utilize medical informatics and digital health systems effectively. There is an increasing necessity to prepare students not just as passive learners but as independent, responsible, and digitally competent medical specialists.

This article explores the theoretical foundations and pedagogical significance of the Entrustable Professional Activities (EPA) approach within the framework of medical education. The EPA model, which emphasizes task-based competence and responsibility, provides a structured method to evaluate whether students can be entrusted with specific professional activities, especially in real-world healthcare IT environments.

Particular attention is given to how the EPA methodology can be integrated into the course "Information Technologies in Medicine", fostering a learner-centered and practice-oriented environment. Through this approach, students are gradually prepared to operate independently in digital healthcare settings — such as working with electronic health records, decision support systems, and health data analysis tools. Moreover, assessment within the EPA framework is based on transparency, trust, and observable performance, ensuring that learners are evaluated not only on what they know, but on what they can confidently and reliably do.

Keywords: *EPA (Entrustable Professional Activities), medical education, information technologies, competence, professional activity, innovative pedagogy, medical informatics.*

Introduction

Modern medical education is increasingly shifting from purely theoretical instruction to a more holistic and practice-oriented approach, aimed at developing not only knowledge but also clinical competencies, digital literacy, and the ability to perform real-world professional tasks. The rapid technological advancements in the 21st century, the widespread integration of electronic health systems, and the growing reliance on medical information platforms and statistical analysis tools have significantly redefined the expectations placed on future healthcare professionals, including physicians, nurses, and allied medical staff.

Today's students must be prepared not only to study from textbooks or attend lectures but also to navigate modern digital platforms independently, make informed decisions in clinical environments, and effectively utilize technological resources. In response to this urgent need, many leading medical institutions across the globe have adopted **competency-based educational frameworks**, which prioritize the acquisition of practical, entrustable skills and responsibilities in real clinical settings.

One of the most innovative and effective models developed within this context is the concept of **EPA – Entrustable Professional Activities**. First introduced in 2005 by Dutch scholar **Olle ten Cate**, the EPA framework focuses on determining a student's readiness to perform specific professional tasks independently or under minimal supervision. This method provides a structured way to assess not just what students know, but how confidently and competently they can act within the healthcare system.

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The EPA approach bridges the gap between theoretical knowledge and clinical practice, bringing students closer to the actual responsibilities of a healthcare provider. It integrates individualized instruction, real-world accountability, and trust-based assessment, thereby enhancing the overall quality and relevance of medical education.

Main Body.

In recent years, the landscape of medical education has undergone a paradigm shift from knowledge-centered instruction to a competency-based, practice-oriented model. One of the most promising innovations in this field is the **EPA (Entrustable Professional Activities)** framework, which offers a structured way to evaluate students' ability to perform professional tasks independently. This approach bridges the gap between theoretical education and real-life clinical practice, ensuring that students are not only informed but also trusted to act.

In the context of the subject **"Information Technologies in Medicine"**, the implementation of EPA allows educators to map key digital competencies into practical, assessable activities. For instance, rather than merely teaching the theory behind electronic health systems (EHRs), students may be entrusted with specific responsibilities such as entering and managing patient records, maintaining data security, or conducting basic statistical analysis using Excel, SPSS, or Python. These tasks are designed to simulate real clinical scenarios and require the application of knowledge, technical skills, and professional judgment.

Each EPA is aligned with multiple competencies, including:

- **Cognitive (Knowledge):** Understanding of digital health infrastructure, EHR functionality, medical coding systems, and cybersecurity basics.
- **Psychomotor (Skills):** Ability to operate health IT tools, input and process data, visualize medical information, and troubleshoot common software issues.
- **Affective (Attitudes/Responsibility):** Ensuring information confidentiality, practicing ethical data handling, communicating effectively in digital environments, and working collaboratively.

To ensure objectivity and developmental progression, EPA-based tasks are assessed using **entrustment levels**, ranging from observation (Level 1) to full independence (Level 4–5). This staged approach helps both educators and learners understand the trajectory of professional growth and the readiness of students for real-world practice.

Furthermore, the **individualized nature** of EPA supports learner autonomy. Students take ownership of their educational journey through **personal learning trajectories**, enabling tailored feedback and reflection. Tools such as **e-portfolios** allow for tracking progress, documenting evidence of competence, and supporting continuous improvement.

By integrating EPA into the **Information Technologies in Medicine** curriculum, institutions foster a new generation of healthcare professionals who are not only digitally literate but also capable of performing safely and independently within a technology-driven healthcare system. This reflects the growing demand for **digitally competent clinicians**, especially in the context of e-health expansion, telemedicine, and data-driven decision-making.

EPA – Entrustable Professional Activities in Medical Education and Their Application in Medical Informatics

EPA refers to such types of professional activities that can be entrusted to a student to perform independently based on a certain level of supervision and trust. EPAs are often defined for a specific subject, specialty, or clinical practice and usually represent a combination of multiple competencies, including:

- **Knowledge** (theory, IT systems)
- **Practical skills** (design, analysis, visualization)
- **Attitude and responsibility** (communication, information security)

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The main goal of the **EPA method** is to assess how ready a student is to carry out a specific professional task independently, and whether the supervisor can confidently entrust this responsibility to the student.

When applied to the field of **medical informatics**, EPA includes the following core components:

- **Knowledge:** medical IT systems, electronic health records (EHR), basics of digital diagnostics
- **Skills:** working with software, data entry, data analysis, ensuring cybersecurity
- **Responsibility:** accurate information management, maintaining confidentiality of patient and provider data, effective teamwork

EPA Entrustment Levels

The following levels define the degree of supervision required when a student performs a professional task:

1. **Level 1** – The student participates only as an observer
2. **Level 2** – The student performs the task under full, direct supervision
3. **Level 3** – The student performs the task under limited supervision
4. **Level 4** – The student performs the task independently
5. **Level 5** – The student is able to supervise and teach others

Application of EPA in the Course "Information Technologies in Medicine"

The main objective of the **"Information Technologies in Medicine"** course is to prepare students to work with modern digital tools, to understand and effectively use IT systems in healthcare.

An example of an EPA applicable to this course may be structured in the following table format:

(Please provide the table if you need it translated too — I can also help create it if needed).

Is provided:

EPA name	Task Description	Proposed Entrustment Level
Working with an Electronic Health Record (EHR) system	Entering, editing, and saving patient data in an electronic health system	3–4
Ensuring information security	Configuring passwords, assigning user permissions, and managing data confidentiality	2–3
Identifying problems in an IT system	Identifying and resolving computer or software malfunctions	3
Using simulation software	Conducting virtual diagnostics and treatments using medical training simulators	3–4
Conducting statistical analysis	Analyzing medical data and preparing reports using Excel, SPSS, or Python	2–3

Methodological Advantages of the EPA (Entrustable Professional Activities) Approach in Higher Education

- **Enhances student engagement**: Learners take responsibility for their own actions rather than relying solely on the instructor.
- **Develops real-world professional skills**: Competencies are formed in authentic clinical or practical environments.

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- **Provides transparent and staged assessment**: Evaluation is conducted based on defined EPA entrustment levels.
- **Supports personalized learning pathways**: Enables students to follow individual educational trajectories.

Assessment through the EPA model is based on actual professional tasks, and this approach offers the following key advantages:

- **Promotes personal development**: Tasks are assigned individually, tailored to the student's progress.
- **Bridges theory and practice**: Teaching is grounded in real professional activities.
- **Ensures assessment transparency**: Student progress is continuously observed and documented (e.g., through an e-portfolio).
- **Fosters trust-based communication**: Strengthens the relationship between teacher and student by encouraging mutual trust.

Conclusion

EPA (Entrustable Professional Activities) represents a progressive, competency-based educational framework that emphasizes real-world readiness and the gradual delegation of professional responsibility to medical students. Its application in medical education facilitates a more structured, transparent, and personalized learning experience, moving beyond traditional knowledge-based assessment toward performance-oriented evaluation.

Implementing the EPA model in teaching the subject **"Information Technologies in Medicine"** significantly enhances students' preparedness to operate within digital healthcare environments. Through this approach, students are not only trained in the use of contemporary medical IT systems but also develop a strong sense of accountability, data privacy awareness, and the ability to solve problems independently. These attributes are essential for modern healthcare professionals, particularly as digital health continues to evolve rapidly.

Moreover, EPA promotes a student-centered approach that nurtures critical thinking, professional ethics, and interprofessional collaboration skills. By aligning educational outcomes with actual clinical tasks and responsibilities, it helps ensure that future graduates are capable of integrating seamlessly into complex, technology-driven healthcare settings.

In the long term, the widespread adoption of the EPA model has the potential to profoundly improve the quality of medical informatics education. It will contribute to the development of a new generation of healthcare professionals who are not only clinically competent but also technologically adept, innovative, and ready to meet the challenges of 21st-century medicine.

References

1. Ten Cate O. (2005). Entrustability of professional activities and competency-based training. *Medical Education*, 39(12), 1176–1177.
2. Association of American Medical Colleges. (2014). Core Entrustable Professional Activities for Entering Residency. AAMC.
3. Chen HC, van den Broek WE, ten Cate O. (2015). The case for use of entrustable professional activities in undergraduate medical education. *Academic Medicine*, 90(4), 431–436.
4. Englander R, Flynn T, Call S, et al. (2016). Toward defining the foundation of the MD degree: core entrustable professional activities for entering residency. *Academic Medicine*, 91(10), 1352–1358.
5. Kogan JR, Holmboe ES, Hauer KE. (2009). Tools for direct observation and assessment of clinical skills of medical trainees: a systematic review. *JAMA*, 302(12), 1316–1326.
6. Nasca TJ, Philibert I, Brigham T, Flynn TC. (2012). The Next GME Accreditation System — Rationale and Benefits. *New England Journal of Medicine*, 366, 1051–1056.

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Volume 3, Issue 6,July 2025
ISSN (E): 2810-6466
Website: https://academiaone.org/index.php/8

7. **Sayfullayeva D.I., Isroilova Sh.A**. "Zamonaviy ta'lim texnologiyalari" modul birligi va Pedagogik texnologiyalar// TIBBIY TA'LIMDA ETIKA VAINTEGRATSIYA MASALALARI.Xalqaro ilmiy-amaliy konferensiya materiallari.(16 fevral, 2021 yil)ISBN 978-9943-6085-1-8/B.69-70.
8. **Базарбаев М.И., Эрметов Э.Я., Сайфуллаева Д.И., Яхшибоева Д.Э.** Использование медиатехнологии в образовании// ЖУРНАЛ ГУМАНИТАРНЫХ И ЕСТЕСТВЕННЫХ НАУК ISSN: 2181-4007 (print) № 6 (12), 2023. Vol. 1.С. 94-100.
9. **Sayfullayeva D.I., Israilova Sh.A**. Importance of innovative approach in developing creativity in students// International Journal of Advance Scientific Research Issue: Vol. 3 No. 11 (2023): Volume 03 Issue 11 | Pages: 312-317 | Crossref DOI: https://doi.org/10.37547/ijasr-03-11-51 Published Date: 2023-11-26.P. 312-317
10. **Sayfullayeva D.I.** Tibbiy oliy ta'lim muassasalari talabalarini kasb-hunar faoliyatiga tayyorlashda axborot texnologiyalaridan foydalanish metodik tizimini takomillashtirishning o'ziga xosligi// TA'LIM VA INNOVATSION TADQIQOTLAR//(2023 yil № 8).http://interscience.uz.ISSN 2181-1709(P).ISSN 2181-1717(E).SJIF:3.805 (2021).B. 230-233.
11. **Сайфуллаева Д.И.** ТЕЛЕМЕДИЦИНА КАК РЕШЕНИЕ ПРОБЛЕМЫ НЕРАВЕНСТВА В ЗДРАВООХРАНЕНИИ. ISSN2181-7812. Вестник ТМА.2025. www.tma-journals.uz. C.289-290.
12. **Bazarbaev M.I., Sayfullaeva D.I.** WHEN ALGORITHMS MEET ANATOMY: UZBEKISTAN'S MEDICAL EDUCATION IN THE AGE OF TECHNOLOGY. Central Asian Journal of Medicine. journals.tma.uz.2025#4.P.35-39.
13. **Sayfullaeva Dilbar Izzatillaevna**. USING MATHEMATIC-STATISTICAL METHODS IN MEDICAL RESEARCH FOR RAPID DIAGNOSIS. Web of Discovieries :Jounnal of Analysis and Inventions.webofjournasi.com/index.php/3. Volume 3, Issue 5, May – 2025, ISSN(E): 2938-3773.P.71-74.
14. **Базарбаев Муротали Ирисалиевич, Сайфуллаева Дилбар Иззатиллаевна.** Компьютер в белом халате: как технологии трансформируют медицинское образование в Узбекистане. Innovations in Science and Technologies. Issue. Vol. 2 No. 4 (2025): INNOIST.2025-05-1.www.innoist.uz.C.117-123.
15. **Sayfullaeva D.I.** Improving the methodical system of using information technologies in preparing students of medical higher education institutions for professional activities// Novateur publications journalnx- a multidisciplinary peer reviewed journal.ISSN No: 2581 -4230VOLUME 9, ISSUE 1, Jan.-2023. https://doi.org/10.17605/OSF.IO/5ZA94.https://repo.journalnx.com/index.php/nx/article/view/4526 P. 102-105
16. **Sayfullayeva D.I., Israilova Sh.A**. Innovatsion yondashuv asosida talabalar kreativligini rivojlantirish xususiyatlari// Ta'lim va innavatsion tadqiqitlar(2023yil № 12) http://interscience.uz ISSN 2181-1709(P) . ISSN 2181-1717(E). SJIF:3.805 (2021)B.209-212.
17. **Elmurotova D. B., Sayfullayeva D.I., Isroilova Sh.A.** Terms of medical information system//World Bulletin of Public Health (WBPH)// 2024. https://www.scholarexpress.net/index.php/wbph/issue/view/141//.C 91-92.
18. **Сайфуллаева Д.И.** ВИРТУАЛЬНЫЕ УЧЕБНИКИ В МЕДИЦИНСКОМ ОБРАЗОВАНИИ ДЛЯ КРЕАТИВНОГО МЫШЛЕНИЯ БУДУЩИХ ВРАЧЕЙ//Journal of Academic Research and Trends in Educational Sciences (JARTES) VOLUME 3, ISSUE 3 / ISSN 2181-2675. 2181-2675/© 2024 in XALQARO TADQIQOT LLC. DOI: 10.5281/zenodo.13852543 C121-126.