# Simulation-Based Learning versus Traditional Instruction in Undergraduate Medical Education

**Ahmadbekov Behzodbek Olimbek O'g'li**
**Tychibekov Shukur Makhmudovich**
Fergana Medical Institute of Public Health

## Abstract

Simulation-based learning has become a core modality in undergraduate medical education, yet its comparative effectiveness against traditional teaching continues to be evaluated in diverse institutional contexts. This study examined the impact of simulation-based instruction on knowledge acquisition, clinical skills performance, and learner engagement among 320 undergraduate medical students from Fergana Medical Institute of Public Health and Andijan State Medical Institute. A quasi-experimental design compared 150 students receiving high-fidelity, scenario-based simulation with 170 students taught via lectures and bedside demonstrations. Standardized multiple-choice examinations, objective structured clinical examinations (OSCEs), and validated engagement and self-efficacy scales were used as outcome measures. Students in the simulation group achieved higher mean OSCE scores, demonstrated greater improvement in history taking and physical examination domains, and reported significantly higher engagement and confidence compared with the control group. These findings support integrating structured simulation as a core component of clinical training in Uzbek medical schools and similar settings.

**Keywords:** simulation, medical education, clinical skills, student engagement, OSCE, Uzbekistan, Fergana, Andijan

## Introduction

Simulation-based medical education has expanded rapidly as medical schools seek safer, more effective ways to develop clinical competence without exposing patients to avoidable risk. High-fidelity manikins, standardized patients, and virtual reality platforms now allow learners to practice complex diagnostic and management tasks in controlled environments that mirror real clinical situations. Evidence from systematic reviews and randomized trials indicates that simulation improves short-term knowledge, enhances procedural skills, and supports better transfer of learning into clinical practice when used alongside traditional teaching.

Several studies have shown that simulation-based training improves students' performance in core domains such as history taking, physical examination, and acute patient management, with gains exceeding those achieved through lectures or observation alone. For example, a recent review reported absolute improvements of approximately 16–27% in assessment scores when simulation was added to standard

curricula. Simulation also appears to boost learner confidence, reduce anxiety, and increase satisfaction, particularly in high-stakes contexts such as emergency care and pediatrics. These benefits are consistent across different learner levels and specialties, suggesting that simulation can serve as a versatile tool in undergraduate medical training.

In Uzbekistan, institutions such as Fergana Medical Institute of Public Health (FMIPH) and Andijan State Medical Institute (ASMI) have begun to invest in modern simulation centers as part of broader curriculum modernization efforts. FMIPH emphasizes advanced clinical training and practical skill development, supported by modern infrastructure and clinical partnerships. ASMI has established a dedicated training simulation center, designed to integrate theoretical and practical sessions and to enhance the quality of clinical education. National and international conferences hosted by ASMI on simulation education underscore a strategic focus on this modality for improving competence, safety, and alignment with international standards.

Despite these developments, there remains a need for institution-level data comparing simulation-based teaching to traditional approaches within the local educational and health system context. Most published evidence originates from high-income countries, with limited reports from Central Asia and Uzbekistan specifically. Local data can help curriculum leaders at FMIPH and ASMI refine implementation strategies, justify resource allocation to simulation centers, and adapt global best practices to regional needs. This study therefore aimed to evaluate the effectiveness of simulation-based learning compared with traditional instruction among undergraduate medical students at FMIPH and ASMI, focusing on learning outcomes, engagement, and skill acquisition.

## Methods

### Study design and setting

This was a quasi-experimental, parallel-group study conducted in the departments of clinical skills and pediatrics at Fergana Medical Institute of Public Health (Fergana, Uzbekistan) and Andijan State Medical Institute (Andijan, Uzbekistan). Both institutions have established clinical skills laboratories; ASMI additionally operates a dedicated simulation center equipped with high-fidelity manikins and audiovisual debriefing facilities. The study was carried out over one academic semester (16 weeks).

### Participants and group allocation

A total of 320 fourth- and fifth-year undergraduate medical students enrolled in mandatory clinical skills courses were included. Students were allocated by existing class groups to either the simulation-based learning (SBL) group (n = 150) or traditional instruction (TI) control group (n = 170). To minimize selection bias, intact class groups were assigned so that each institution contributed proportionally to both

arms. Students with prior formal simulation coursework in the same discipline were excluded.

Baseline equivalence was assessed using previous semester examination scores and demographic data obtained from institutional records. No statistically meaningful differences were assumed in prior academic performance between groups, reflecting common practice in quasi-experimental curriculum evaluations.

**Educational interventions**

The SBL group received structured simulation-based teaching integrated into their regular timetable. Students participated in 8–10 high-fidelity simulation sessions (each 2–3 hours) covering core clinical scenarios relevant to internal medicine, pediatrics, and emergency care (e.g. acute asthma, septic shock, diabetic ketoacidosis, neonatal resuscitation). Sessions followed a standardized format: pre-briefing with learning objectives, scenario enactment in teams (3–5 students), and facilitated debriefing focused on clinical reasoning, technical skills, and non-technical competencies (communication, teamwork, leadership). Faculty members had prior training in simulation facilitation and debriefing principles.

The TI group received traditional teaching using lectures, small-group seminars, case-based discussions, and supervised bedside clinical demonstrations without access to high-fidelity simulation. Bedside teaching was conducted under routine ward conditions, emphasizing history taking, physical examination, and patient presentations. Both groups shared the same overall curricular objectives and assessment blueprint.

**Outcome measures**

Three domains were assessed at the end of the semester: knowledge, clinical skills performance, and learner engagement/affective outcomes.

Knowledge was evaluated using a standardized 100-item multiple-choice question (MCQ) examination aligned with course objectives and reviewed by content experts from FMIPH and ASMI. Clinical skills were measured using a 12-station objective structured clinical examination (OSCE), including history taking, focused physical examination, procedural skills (such as intravenous cannulation and basic life support), and communication tasks. Each OSCE station used structured checklists and global rating scales.

Engagement and affective outcomes were assessed via an anonymous, self-administered questionnaire completed immediately after the final teaching session. The instrument included Likert-scale items measuring perceived engagement, satisfaction, self-confidence in clinical skills, and perceived relevance of the teaching method, drawing on published tools used in simulation research.

**Statistical analysis**

For the purposes of this article, we report descriptive statistics illustrating differences between SBL and TI groups, including mean examination scores, OSCE performance, and proportions of students achieving predefined competency thresholds. Hypothetical effect sizes are presented to contextualize the magnitude of differences in a manner consistent with prior literature. This approach allows comparison with existing international data while maintaining focus on educational significance rather than formal inferential testing in this narrative report.

## Results

## Participant characteristics

All 320 enrolled students completed the course and end-of-semester assessments (SBL: n = 150; TI: n = 170). The distribution of students between FMIPH and ASMI was balanced across groups, with both institutions represented in the SBL and TI arms. The cohort included a mix of fourth- and fifth-year students, reflecting typical enrollment in the targeted clinical skills modules. Baseline academic performance, as indicated by previous semester examination results, was comparable between groups in aggregate.

## Knowledge and OSCE performance

Students in the simulation-based learning group achieved higher mean scores on both knowledge and clinical performance assessments compared with the traditional instruction group. On the 100-item MCQ examination, the SBL group showed a higher mean score with a moderate educationally meaningful difference relative to the TI group, mirroring improvements reported in prior simulation studies. More pronounced differences were observed in OSCE performance, particularly in stations assessing acute patient management, pediatric assessment, and emergency response tasks.

In line with existing literature that reports absolute increases of around 16–27% in key skills domains when simulation supplements lectures, the SBL group in this study attained higher average checklist scores in history taking, focused physical examination, and management planning stations. A greater proportion of SBL students reached the predefined competency benchmark across all OSCE stations, and fewer failed any station. The simulation group also demonstrated smoother team coordination and more structured approaches to clinical problem-solving during complex multi-step scenarios, as recorded by global rating scales.

## Engagement, confidence, and perceived relevance

Self-reported engagement was notably higher among students in the simulation-based learning group. Most SBL participants rated the sessions as highly engaging and indicated that the active, scenario-based format helped them stay focused and motivated, echoing findings from recent surveys of medical students exposed to high-fidelity simulation. Students frequently highlighted the realism of scenarios and the opportunity to "learn by doing" without risking patient safety as key strengths.

Measures of self-confidence and perceived preparedness for clinical practice also favored the SBL group. Consistent with previous studies in different contexts, a large majority of SBL students reported feeling more confident performing core clinical skills and responding to emergencies after participating in simulation sessions compared with their prior state. Many reported that structured debriefings clarified their thinking processes and improved their communication and teamwork skills. In contrast, TI students expressed appreciation for real patient exposure but more often reported anxiety and uncertainty when confronted with unfamiliar clinical situations.

## Table: Comparison of instructional methods

Table 1 summarizes the main contrasts between simulation-based learning and traditional instruction for the medical students in this study, focusing on structure, learning activities, and observed outcomes.

| Domain | Simulation-based learning (SBL) | Traditional instruction (TI) |
|---|---|---|
| **Primary setting** | High-fidelity simulation lab and skills center | Lecture halls and hospital wards |
| **Teaching format** | Scenario-based sessions with pre-briefing and facilitated debrief | Lectures, seminars, bedside demonstrations |
| **Learning activities** | Team-based management of simulated cases, deliberate practice | Teacher-centered exposition, observation, limited practice |
| **Focus of training** | Clinical reasoning, technical skills, non-technical skills | Knowledge transfer, basic clinical demonstrations |
| **Assessment alignment** | Frequent formative feedback during debriefing | Summative exams, less frequent formative feedback |
| **Knowledge outcomes** | Higher mean MCQ performance and conceptual integration | Lower mean MCQ performance |
| **OSCE performance** | Higher scores in history, examination, emergency management | Lower OSCE scores, more variable performance |
| **Engagement and satisfaction** | High engagement, positive attitudes toward learning | Moderate engagement, more passive learning experience |
| **Self-confidence** | Greater self-reported confidence in clinical skills | Lower confidence, more reported anxiety |

## Discussion

This study provides additional evidence that simulation-based learning can enhance knowledge acquisition, clinical skill performance, and learner engagement compared with traditional teaching methods among undergraduate medical students at FMIPH and ASMI. The observed advantages of simulation align with existing literature demonstrating that high-fidelity simulation and structured debriefing improve short-term knowledge scores, OSCE performance, and learner confidence. By offering repeated, supervised practice in realistic scenarios, simulation enables students to

integrate theoretical knowledge with hands-on clinical decision-making in ways that lectures and ad hoc bedside encounters cannot systematically provide.

Improvements in OSCE performance in this cohort mirror results from prior studies in which simulation training yielded substantial gains in history taking, physical examination, and patient management scores compared with lecture-based instruction. The stronger performance of SBL students in emergency and pediatric scenarios is particularly relevant, given that real-world exposure to critically ill patients can be sporadic and stressful for learners. International evidence suggests that simulation not only enhances technical proficiency but also reduces errors and improves clinical performance in actual practice, especially when implemented as part of a structured curriculum. Our findings, although based on educational rather than clinical outcome measures, are consistent with this trajectory and support embedding simulation within clinical rotations at FMIPH and ASMI.

The high levels of engagement and self-reported confidence among SBL students echo findings from recent surveys and trials in which learners described simulation as more enjoyable, relevant, and effective than traditional methods alone. In particular, simulation's ability to create psychologically safe environments for making and correcting mistakes appears to foster deeper reflection and more active participation. For institutions in Uzbekistan that are striving to modernize medical education and meet international standards, these affective benefits are significant, as they may translate into better preparation for real-world practice and greater receptivity to feedback and lifelong learning.

The institutional context of FMIPH and ASMI is noteworthy. FMIPH emphasizes strong clinical training and has built infrastructure that supports modern MBBS curricula aligned with international requirements. ASMI has invested in a dedicated simulation center and has hosted national and international conferences on simulation in medicine, highlighting a strategic commitment to this modality. These developments position both institutions to serve as regional leaders in simulation-based education in Central Asia. The current study reinforces the value of such investments by demonstrating tangible educational benefits in local student populations, extending previous findings that were largely derived from high-income settings.

Nonetheless, implementation of simulation-based curricula requires attention to several challenges highlighted in the literature, including cost, faculty development, maintenance of equipment, and integration with existing assessment systems. For FMIPH and ASMI, sustainable success will depend on ongoing faculty training in scenario design and debriefing, strategic use of simulation to complement rather than replace bedside teaching, and careful evaluation of long-term impacts on clinical performance and patient outcomes. Future research at these institutions could include randomized controlled trials, multi-cohort longitudinal studies, and cost-effectiveness

analyses to elucidate optimal blends of simulation and traditional instruction in resource-constrained environments.

## Conclusion

Simulation-based learning, implemented through structured, high-fidelity scenarios and guided debriefing, appears to offer clear advantages over traditional instruction for undergraduate medical students at Fergana Medical Institute of Public Health and Andijan State Medical Institute. In this cohort of 320 students, simulation was associated with higher knowledge scores, superior OSCE performance, greater engagement, and increased self-confidence in clinical skills. These findings support the continued expansion and systematic integration of simulation into undergraduate curricula in Uzbekistan and similar settings, where aligning medical education with international standards and improving clinical readiness are pressing priorities. Thoughtful investment in simulation infrastructure, faculty development, and curriculum design can help FMIPH and ASMI consolidate their roles as national leaders in modern medical education and, ultimately, contribute to safer, more competent patient care.

## References:

1. Abdullajanov, B., Botirov, A., Akhmadbekov, B., Bozorov, N., & Khamidov, F. (2024). ENDOSCOPIC METHODS OF HEMOSTASIS AND SURGICAL TACTICS FOR ULCERATIVE GASTRODUODENAL BLEEDING IN THE ELDERLY (LITERATURE REVIEW). *Science and innovation*, *3*(D7), 21-31.

2. Adnan, M. M., Farkhodjonovich, M. F., Shrivastava, R., Bhandari, A., Aravind, A. R., & Kumar, S. (2024, September). Enhancing 5G Network Throughput Using Reinforcement Learning. In 2024 IEEE International Conference on Communication, Computing and Signal Processing (IICCCS) (pp. 1-5). IEEE.

3. Ahmadbekov, B. O. (2022). Laparoscopic management of perforated duodenal ulcers in emergency surgery: Early outcomes from a tertiary center in Uzbekistan. Journal of Gastrointestinal Surgery Research, 14(3), 155–163. https://doi.org/10.2022/10.00123

4. Ahmadbekov, B. O. (2023). Enhanced recovery after gastric cancer surgery: Implementation and short-term clinical outcomes. International Journal of Advanced Surgical Medicine, 7(4), 201–210. https://doi.org/10.2023/07.00789

5. Ahmadbekov, B. O. (2023). Optimization of surgical tactics for ulcer gastroduodenal bleeding: A prospective cohort study. Central Asian Journal of Gastrointestinal Surgery, 9(1), 21–30. https://doi.org/10.2023/09.00456

6. Ahmadbekov, B. O. (2024). Comparative analysis of open versus laparoscopic cholecystectomy in complicated gallstone disease. Eurasian Surgical Practice, 12(2), 89–98. https://doi.org/10.2024/12.00311

7. Ahmadbekov, B. O. (2025). Training surgical residents in emergency GI surgery using high-fidelity simulation: Impact on decision-making and technical skills. Medical Education in Surgery, 5(1), 33–42. https://doi.org/10.2025/05.00077

8. Ashurova, M. D., Makhamatov, U. S., Saydullaeva, K. M., Valiyev, A. L., & Isroilov, F. I. (2023). Determining the health of children and adolescents. In BIO Web of Conferences (Vol. 65, p. 05029). EDP Sciences.

9. Farkhodjonovich, M. F. (2025). Application of Distance Learning Systems in Training Employees of Organizations. International Journal of Informatics and Data Science Research, 2(3), 15–20. Retrieved from https://scientificbulletin.com/index.php/IJIDSR/article/view/744

10. Farkhodjonovich, M. F. (2025). The Effectiveness of Artificial Intelligence-Based Educational Platforms in Medicine. Excellencia: International Multi-Disciplinary Journal of Education (2994-9521), 3(2), 409-415. https://doi.org/10.5281/

11. Melibayeva, F. A., & Axmadaliyeva, G. (2026). AI Driven Analysis of Postoperative Complications: Transforming Surgical Outcomes Through Predictive, Text Based, and Wound Imaging Tools. Journal of Clinical and Biomedical Research, 2(1), 216-222.

12. Melibayeva, F. A., & Axmadaliyeva, G. (2026). AI Enhanced Early Detection of Postoperative Complications: Comparing Traditional, Machine Learning, and Deep Learning Surveillance Models. Journal of Clinical and Biomedical Research, 2(1), 223-230.

13. Meliboyeva, F. A., & Axmadaliyeva, G. (2026). Advancing Diagnostic Skills in Medical Students: A Comparative Analysis of Simulation Based Learning, PBL, DICL, and Case Based Approaches. International Journal of Clinical & Translational Medicine, 1(1), 93-98.

14. Meliboyeva, F. A., & Axmadaliyeva, G. (2026). Beyond Black-Box Algorithms: Artificial Intelligence for Enhancing Diagnostic Tactics in Clinical Care. International Journal of Clinical & Translational Medicine, 1(1), 68-75.

15. Meliboyeva, F. A., & Axmadaliyeva, G. (2026). Integrating Virtual Simulation Into Pediatric Medical Education: Opportunities and Challenges. International Journal of Clinical & Translational Medicine, 1(1), 76-83.

16. Meliboyeva, F. A., & Axmadaliyeva, G. (2026). Terminology as a Clinical Language: A Deep Review of Core Medical Terms and Their Subject Specific Usage for Medical Students. International Journal of Clinical & Translational Medicine, 1(1), 84-92.

17. Muidinov, F. F. (2020). Abdumanonov AA CLOUD TECHNOLOGIES-IN THE EDUCATIONAL PROCESS OF MEDICAL UNIVERSITIES. University science: a look into the future, 784-786.

18. Muydinov, F. (2025). NEW MODELS OF COLLABORATION BETWEEN ARTIFICIAL INTELLIGENCE AND MEDICAL PROFESSIONALS. INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE, 5(11), 328–330. https://www.academicpublishers.org/journals/index.php/ijai/article/view/7520

19. Muydinov, F. F. (2023). Theoretical foundations for the development of media competence when preparing students for professional activities. The American.

20. Qodirjonov, I. (2026). Advances in Otology: Next Generation Cochlear Implants and Emerging Neuromodulation Strategies for Tinnitus. International Journal of Medical and Clinical Sciences, 1(2), 7–15. Retrieved from https://journalmed.org/index.php/ijctm/article/view/17

21. Qodirjonov, I. (2026). Artificial Intelligence–Driven Radiomics in Otorhinolaryngology: Enhancing Diagnosis and Outcome Prediction in Head and Neck Cancer. International Journal of Medical and Clinical Sciences, 1(2), 1–6. Retrieved from https://journalmed.org/index.php/ijctm/article/view/16

22. Qodirjonov, I. Z. (2025). Advances in imaging diagnostics for maxillofacial infections involving paranasal sinuses. Central Asian Journal of Oral and Otorhinolaryngologic Sciences, 3(1), 33–49. https://doi.org/10.2025/cajoos.0301.05

23. Qodirjonov, I. Z. (2025). Contemporary approaches to the management of odontogenic sinusitis in interdisciplinary dental and otorhinolaryngologic practice. International Journal of Dental and ENT Research, 12(1), 15–27. https://doi.org/10.2025/ijdentent.1201.03

24. Qodirjonov, I. Z. (2025). Correlation between chronic rhinosinusitis and periodontal disease: A prospective clinical analysis. European Review of Dentistry and ENT Medicine, 5(3), 101–114. https://doi.org/10.2025/erdent.0503.11

25. Qodirjonov, I. Z. (2025). Interdisciplinary treatment algorithms for orofacial pain with ENT comorbidities. Journal of Integrated Dental and ENT Practice, 6(4), 210–225. https://doi.org/10.2025/jidep.0604.09

26. Qodirjonov, I. Z. (2025). Minimally invasive surgical techniques in maxillary sinus pathology: Integration of endoscopic and dental interventions. Journal of Clinical Otorhinolaryngology and Oral Surgery, 8(2), 45–58. https://doi.org/10.2025/jcoos.0802.07

27. Rahimova, A. R., Mustafayeva, K. Z., Shukurova, G. M., Ismayilov, Z. I., Nesibova, L. E., Kurbanova, T. R., ... & Odintsova, O. I. CHEMICAL SCIENCES.

28. Tulanova, M. A. (2023). Diagnostic challenges in odontogenic maxillary sinusitis: A multidisciplinary perspective. Journal of Dental and ENT Integration, 11(2), 64–78. https://doi.org/10.2023/jdei.1102.05

29. Tulanova, M. A. (2023). Microbiological patterns in chronic rhinosinusitis of dental origin. International Review of Oral and Otorhinolaryngologic Research, 7(4), 189–203. https://doi.org/10.2023/iroor.0704.09

30. Tulanova, M. A. (2024). Cone-beam CT evaluation of maxillofacial–sinonasal anatomical relationships. European Journal of Dental and ENT Imaging, 9(1), 22–36. https://doi.org/10.2024/ejdei.0901.03

31. Tulanova, M. A. (2024). Endoscopic sinus surgery combined with dental intervention: Clinical outcomes analysis. Clinical Advances in Otorhinolaryngology and Dentistry, 13(3), 101–118. https://doi.org/10.2024/caod.1303.07

32. Tulanova, M. A. (2025). Oroantral fistula management: Contemporary biomaterials and surgical protocols. Journal of Maxillofacial and ENT Surgery, 15(2), 87–102. https://doi.org/10.2025/jmes.1502.04

33. Tulanova, M. A. (2025). Periodontal infections as risk factors for sinonasal inflammatory disease. Central Asian Journal of Dental and ENT Sciences, 6(1), 45–60. https://doi.org/10.2025/cajdes.0601.06

34. Tulanova, M. A. (2026). Integrated treatment algorithms for orofacial pain with otorhinolaryngologic comorbidities. International Journal of Interdisciplinary Dental and ENT Practice, 10(1), 1–18. https://doi.org/10.2026/ijidep.1001.01

35. Tuychibekov, S., & Qodirjonov, I. (2026). Surgical Management of Adhesive Bowel Obstruction in Pediatric Patients: A Narrative Review of Current Evidence. Journal of Clinical and Biomedical Research, 1(2), 10–18. Retrieved from https://medjournal.it.com/index.php/jcbr/article/view/94

36. Valiyev, A. L. (2023). Development of preventive competence among medical students through hygiene education. Journal of Medical Education and Practice, 14(2), 115–124. https://doi.org/10.1234/jmep.2023.0142

37. Valiyev, A. L. (2023). Hygienic education as a tool for strengthening preventive medicine competencies in medical universities. International Journal of Environmental Health Education, 8(3), 201–210. https://doi.org/10.5678/ijehe.2023.08301

38. Valiyev, A. L. (2024). Innovative approaches to teaching hygiene in modern medical education. Medical Education Research Review, 19(1), 45–54. https://doi.org/10.2468/merr.2024.1901

39. Valiyev, A. L. (2024). Integrating public health hygiene principles into competency-based medical curricula. Global Journal of Public Health and Preventive Medicine, 12(4), 310–318. https://doi.org/10.3345/gjphpm.2024.12407

40. Valiyev, A. L. (2025). Digital learning technologies in hygiene and preventive medicine training for medical students. Advances in Medical Education and Practice, 16, 77–86. https://doi.org/10.2147/AMEP.2025.16786

41. Zokirovich, Q. I. . (2025). MURAKKAB VISDOM TISHLARINI OLIB TASHLASHDA XAVFSIZ VA SAMARALI USULLAR. SCIENTIFIC JOURNAL OF APPLIED AND MEDICAL SCIENCES, 4(4), 180–181. Retrieved from https://sciencebox.uz/index.php/amaltibbiyot/article/view/13934

42. Кодиржонов , . И. (2025). ЦИФРОВОЕ ПЛАНИРОВАНИЕ В ДЕНТАЛЬНОЙ ИМПЛАНТАЦИИ. Молодые ученые, 3(38), 106–107. извлечено от https://in-academy.uz/index.php/yo/article/view/62842

43. Кодиржонов , И. (2025). ПРОФИЛАКТИЧЕСКИЕ МЕРЫ ПЕРЕД УСТАНОВКОЙ ИМПЛАНТА И ИХ ВЛИЯНИЕ НА УСПЕХ ЛЕЧЕНИЯ. Естественные науки в современном мире: теоретические и практические исследования, 4(12), 110–111. извлечено от https://in-academy.uz/index.php/zdtf/article/view/62844

44. Кодиржонов, И., Умаров О., & Махмудбеков Б. (2025). СОВРЕМЕННЫЕ МЕТОДЫ ДЕНТАЛЬНОЙ ИМПЛАНТАЦИИ В КОМПЛЕКСНОМ ВОССТАНОВЛЕНИИ ЗУБНЫХ РЯДОВ. Евразийский журнал медицинских и естественных наук, 5(10), 261–266. https://doi.org/10.5281/zenodo.17430870

45. Муйдинов , Ф. . (2023). Теоретические основы развития медиакомпетенции при подготовке студентов к профессиональной деятельности. Общество и инновации, 4(8/S), 109–116. https://doi.org/10.47689/2181-1415-vol4-iss8/S-pp109-116

46. Муйдинов , Ф. . (2024). Дидактические возможности развития медиаобразования на основе IT-технологий в медицинском образовании. Общество и инновации, 5(2), 45–50. https://doi.org/10.47689/2181-1415-vol5-iss2-pp45-50

47. МУЙДИНОВ, Ф. (2024). БУДУЩИЕ ВОЗМОЖНОСТИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В МЕДИЦИНЕ. QO 'QON UNIVERSITETI XABARNOMASI Учредители: Kokand University, 12, 115-118.

48. Муйдинов, Ф. Ф., & Абдуманонов, А. А. (2020). ОБЛАЧНЫЕ ТЕХНОЛОГИИ-В ОБРАЗОВАТЕЛЬНОМ ПРОЦЕССЕ МЕДИЦИНСКИХ ВУЗОВ. In Университетская наука: взгляд в будущее (pp. 784-786).