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Medicine High Education in its Institutions Media Literacy in the Formation Innovation Pedagogic Technologies Support Efficiency

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Abstract: This article systematically analyzes the importance of media literacy for medical workers in the digital age and the role of innovative pedagogical technologies in its formation. It is justified that in the conditions of the modern information environment, in particular, the "infodemic", the traditional concept of medical media literacy has expanded and turned into a complex competence that includes not only the critical evaluation of scientific literature, but also the neutralization of the influence of pharmaceutical marketing, the orientation of patients in digital communication, and the ethics of digital professionalism.

Keywords: media literacy, medical education, innovative pedagogical technologies, simulation education, gamification, virtual reality, critical evaluation, digital professionalism, infodemic.

INTRODUCTION

The modern world is characterized by the unprecedented development of information technologies. This process has had a profound impact on the healthcare sector, radically changing the relationship between doctor and patient, the dissemination of medical knowledge, and decision-making mechanisms. However, along with the widespread dissemination of information, new and serious problems have also emerged. The most important of them is the “infodemic”, that is, the flow of excessive information, including incorrect and false information. [1] This situation poses a serious threat to public health, causes confusion among the population, and hinders the effective functioning of the healthcare system. [1]

The practice of medicine is inherently communication-based, and today much of this communication is done through digital technologies and social media. [2] Future doctors must not only have traditional medical knowledge, but also be prepared to communicate effectively with patients who are searching for medical information online. [2] Traditional medical education programs often do not pay enough attention to developing these modern competencies. [2] Surveys of practicing doctors show that the majority of them rate their digital literacy as average or below and believe that these skills should be formally taught in medical schools. [2] Therefore, rethinking the paradigm of medical education and developing media literacy skills in future doctors has become one of the most urgent tasks today.

A comprehensive definition of medical media literacy - An analysis of the modern information environment shows that media literacy for a doctor is no longer a single skill, but a set of several key competencies that are closely related to each other. Today's concept of a "literate" doctor is not limited to the ability to read and understand scientific journals, as it used to be. He should be a specialist who can understand commercial influences, manage communication with patients in the digital world, and combat disinformation in society. This expanded definition further clarifies the need for innovative teaching methods. The modern model of medical media literacy includes the following four main components:

Critical Appraisal of Scientific Literature: This is the foundation of Evidence-Based Medicine (EBM). [4] This competency refers to the process of systematically evaluating research for its reliability, value, and applicability to practice. [3] The ability to distinguish between the vast volume of scientific articles published each year and those that are truly valuable and of practical value is vital for every clinician. [4]

Neutralizing the Influence of Pharmaceutical Marketing: An often overlooked but crucial aspect of media literacy is the ability to analyze and resist the influence of persuasive and promotional messages from the pharmaceutical industry. For example, the “SMARxT” program is recognized as a successful initiative aimed at teaching medical students to understand the influence of marketing on drug prescribing. [7] This competency requires critical evaluation of commercial media products in addition to analyzing academic texts.

RESEARCH METHODOLOGY

This article is based on a systematic review and synthesis methodology. The analysis was carried out on the basis of a targeted collection of scientific articles, reports and academic resources. Based on the analysis of the literature, the innovative pedagogical technologies considered in the research were divided into three main groups:

- ✓ Simulation education (Simulation-Based Learning - SBL)
- ✓ Gamification (Gamification)
- ✓ Virtual and Filled Reality (Virtual and Augmented Reality - VR/AR)

This " Efficiency " of technologies from sources taken exactly designated criteria based on was evaluated . This criteria the following own inside takes :

- ➢ Skills Acquisition (Skill Acquisition): Practical , demonstration to be done of abilities development . [10]
- ➢ Knowledge mastery and save stay (Knowledge Acquisition and Retention): Factual the information remembering stay and time to pass with in memory to keep ability . [10]
- ➢ Critical thinking and clinical thinking (Critical Thinking and Clinical Reasoning): Complex the information analysis to do , one-sidedness determination and reasonable conclusions to release competence . [12]
- ➢ Attendance and motivation (Engagement and Motivation): Students interest level , participation and to study was internal aspiration . [11]
- ➢ To himself Confidence : Students necessary tasks will do to take to the ability was subjective confidence . [10]

RESULTS

This in the department every one of technology media literacy skills in development efficiency according to generalized conclusions present will be allowed .

Simulation of education media literacy skills in development effectiveness - systematic comment and meta - analysis to the results according to , simulation education practical skills in formation other teaching to the methods than noticeable to the extent more efficient that defined (standardized average difference (SMD) = 1.01), however theoretical knowledge in the process of mastering noticeable to advantage owner not (SMD = 0.41). [10] Up accurate simulations (high-fidelity) are low to low -fidelity simulations relatively higher efficiency expression will . [10]

Simulation of education main advantage that is , he to students patients for no what risk - safe , control to be done and repetitive in the environment practical skills exercise to make mistakes road to put and fast again communication to take possible gives . [16] Such purposeful Deliberate practice is professional skill and to oneself trust development for very important . [10]

To media literacy implementation when done , simulation education the text analysis to do directly if not taught , media literacy central element was interpersonal conversation and advice to give skills in practice trying to see for the most acceptable is a tool . For example , students standardized (custom taught actor) patients participating in scenarios following to situations shower their arrival possible :

- ✓ Social from networks taken lie the information present doer sick
- ✓ On TV advertising seen , strong marketing done certain medicine writing to give asking sick
- ✓ On the Internet to each other contrary was medical from the data head frozen sick

Such exercises to students own their knowledge to reality close , pressing in situations to apply possibility gives and this through theory and practice between the space fills .

of gamification critical thinking in formation effect - gamification - education to the process scores , rating tables , competitions like game elements integration to do - of students motivation , training to the process attraction being and knowledge remembering stay ability noticeable to the extent increase proven . [11] Successful gamification exactly goals and rules , prompt again communication , competition and success feeling like to oneself characteristic to mechanisms relies on . [13]

Virtual and filled Augmented reality (VR/AR) capabilities and limitations - virtual and filled reality (VR/AR) is high to the extent immersive (deep) diving feeling giver), standardized and expandable training their experiences present These technologies allow for the modeling of complex clinical situations with a high level of [realism] . 12

VR technology is particularly effective in improving clinical skills and can be implemented with less cost and resources than physical simulations. [10] It is also suitable for practicing teamwork and communication skills in emergency situations. [25]

, the unique ability of VR to create a sense of presence can be used to build cognitive resilience in students against misinformation. For example, in a VR scenario, a student is placed in a virtual emergency room. There, he or she must make urgent treatment decisions while being confronted with a variety of distracting information streams: a social media feed on a monitor, a pharmaceutical representative’s offer, conflicting advice from a virtual colleague. Such a simulation simulates real-world cognitive strain and teaches the student to filter information under pressure and focus on evidence-based protocols. This approach goes beyond analyzing a single media product to help develop higher-level skills in navigating a complex, multi-networked information environment.

Table 1. Comparative analysis of the effectiveness of innovative pedagogical technologies in the formation of media literacy

Technology	Advantages	Disadvantages	Media literacy is a key skill to be developed
Simulation education	Forms practical skills at a high level; safe and repeatable environment; increases self-confidence. [10]	It has no advantage over traditional methods in acquiring theoretical knowledge; it requires resources. [10]	**Consultation and counseling:** The practice of discussing misinformation and marketing issues with patients.
Gamification	Dramatically increases student motivation and engagement; improves knowledge retention; simplifies complex concepts. [11]	Bad design can distract from learning; competition can be stressful for some students.	**Critical Appraisal and Analytics:** Interactive Analysis of Error, Bias, and Statistical Methods in Scientific Articles .
Virtual Reality (VR/AR)	Highly immersive; simulation of complex, multi-level decision-making; standardized and scalable learning. [17]	High initial cost; requires technical infrastructure; may cause discomfort to the user. [25]	**Cognitive resilience and situational appraisal:** Disinformation filtering and evidence-based decision making in complex information flows.

DISCUSSION

Interpretation of results and theoretical foundations - the presented results show that the effectiveness of these technologies is not accidental, but is based on fundamental theories in the field of education. The high effectiveness of simulation- **based education** is explained by the theory of experiential learning. According to it, students learn best through concrete experience and reflective observation. [16] Gamification, on the other hand, uses powerful motivators such as **behaviorism** (through rewards and feedback) and **self-determination theory** , which strengthen the sense of independence, competence and belonging. [13] The immersive power of VR technology creates a strong **sense of presence** , which enhances the learning and retention processes by making the virtual experience feel real. [26]

Therefore, a progressive curriculum should integrate them, not separate them. For example, a learning module might begin with a gamified online course that teaches the principles of critical appraisal. [14] The student then participates in a high-fidelity VR simulation in which they are required to apply these principles in a chaotic clinical setting. [17] The module might conclude with a debriefing session with a simulated patient, in which the student practices communicating their findings to the patient. [18] Such an integrated model creates a consistent learning path from fundamental knowledge to complex practical application, and provides a more powerful pedagogical strategy than using any single technology.

“Competence versus content”: A shift in pedagogical paradigm— the effectiveness of these technologies, especially simulation-based learning, in developing skills rather than knowledge [10] , suggests a shift in medical education from a model of simply transferring knowledge to one that focuses on developing competencies. Traditional medical education is often based on memorizing facts (content). Innovative technologies are proving to be the most powerful tool for developing skills and behaviors (competence). Simulation doesn’t

just teach you about communication, it *teaches you how to communicate* . A gamified module not only explains what one-sidedness is, but *also teaches you how to identify it* .

is the ability to navigate, analyze and communicate in a complex information environment . Therefore, the introduction of these technologies is not just a technical innovation, but a fundamental change in the philosophy of education. The goal is no longer just to educate a knowledgeable student, but to educate a practicing physician who is competent, resilient and has high ethical principles.

Most importantly, successful implementation depends on strong teacher development programs that ensure teachers are skilled in using these new tools effectively. Existing research on innovative pedagogy conducted in Uzbekistan27 [can] serve as a local foundation for these initiatives.

CONCLUSION

The evidence summarized in this study clearly demonstrates that innovative pedagogical technologies are not just an additional tool for effectively developing such an important competency as media literacy in future doctors, but an integral necessity. Their ability to develop practical skills, enhance critical thinking, and motivate students to a degree that traditional methods cannot, makes them an irreplaceable tool for adapting medical education to the demands of the digital age.

RECOMMENDATIONS

Phased integration into curricula: The Ministry of Health and the leadership of higher medical education institutions are recommended to develop a strategic plan for the phased integration of these technologies. This should include teaching fundamental skills through gamified platforms and digital applications in the initial stage, and in subsequent stages, moving to simulation and VR technologies for advanced training.

Establishing centers for faculty development: It is proposed to create specialized centers or programs to train medical teachers in the development and implementation of technology-based learning modules.

Launch national pilot projects: We encourage funding and implementation of pilot projects at leading medical universities in Uzbekistan (e.g., Tashkent, Samarkand, Bukhara) to test the effectiveness and cultural adaptability of these technologies and develop guidelines for best practices.

Infrastructure development and resource mobilization: To support these educational innovations, targeted investments in the digital infrastructure of medical universities, including high-speed internet, simulation laboratories, and VR equipment, are needed.

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