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PROBLEMS IN DEVELOPING STUDENTS' LEARNING-COGNITIVE COMPETENCE

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Abstract:
One of the pressing challenges in contemporary medical education is students' insufficient active engagement and their limited capacity for independent and critical thinking. Traditional teaching approaches no longer align with rapid technological advancements and the evolving demands of modern healthcare systems. Consequently, the integration of interactive technologies has become a necessity rather than an option.Interactive teaching methods promote active learning, enhance students' analytical and cognitive abilities, and facilitate the development of learning-cognitive competencies. Ultimately, such approaches contribute to the formation of essential professional skills required of a modern healthcare practitioner.

Keywords: Challenges, interactive learning, critical thinking, independent learning, medical education digital learning environment, clinical competency, pedagogical innovations.

The medical education system is currently experiencing extensive reforms aimed at aligning teaching practices with modern professional training standards. Updating the content of medical curricula in accordance with local needs, establishing a competency-based and technology-supported learning environment, and integrating innovative and interdisciplinary teaching methods

are essential for cultivating students' professional skills, personal attributes, and core competencies required in clinical practice. Consequently, the implementation of evidence-based, efficiency-oriented instructional strategies has become a critical priority for enhancing the quality of contemporary medical education [1].

Considering the specific structural and methodological features of the medical education system, the purposeful and well-designed use of interactive teaching methods by instructors plays a crucial role in ensuring the effective organization of the learning process. Such an approach not only promotes active acquisition of knowledge by students but also contributes to the development of their clinical reasoning, independent decision-making, and practical skills [2].

In particular, the instructor's professional competence, creative approach, and innovative thinking are key factors in selecting the most appropriate and effective teaching method for clinical training environments. Moreover, the teacher's methodological preparedness plays an essential role in determining the timing, content, and sequencing of interactive methods. These factors collectively contribute to improving the quality of the educational process in medical training, enhancing students' competencies, and optimizing learning outcomes [3].

Identifying challenges that arise in the medical education process within the framework of modern innovative technologies, as well as substantiating the effectiveness of a teacher's ability to properly select and apply instructional methods, is of particular importance. In practice, educators often encounter various difficulties and limitations when using interactive teaching methods. These include insufficient or incomplete knowledge about the methods themselves, a lack of understanding of their underlying principles, and the inappropriate or ineffective use of active learning strategies during the instructional process [4]. Additionally, the absence of practical skills necessary

for the effective application of such methods during classroom sessions, inefficient use of pedagogical technologies, or the inability to adapt them to specific teaching conditions represent some of the pressing challenges faced in medical education.

In addition, limitations in selecting and applying interactive technologies, insufficient information about methods relevant to specific topics, and the lack of adequate time to prepare discussions and question–answer activities for interactive sessions can negatively affect the effectiveness of the pedagogical process. Studying these issues and developing scientifically grounded approaches to overcome them is essential for improving the quality of medical education[5].

Teaching methodology is not merely a set of methods; it is a fundamental mechanism that shapes students' knowledge, skills, and competencies. The correct selection of instructional methods is closely linked to how deeply a student masters the learning material, how effectively they acquire professional skills, and how well they develop independent thinking, analytical abilities, and decision-making skills.

One of the major challenges of modern education is the inappropriate selection of teaching methodologies. An incorrectly chosen approach—such as the overuse of passive, memorization-based instruction in the form of lectures, theoretical courses, or modular teaching—may hinder the development of essential competencies, including appropriate decision-making in real clinical situations, preventive reasoning, and communication skills.

Therefore, selecting an appropriate methodology directly depends on the teacher's pedagogical expertise and professional competence. A well-chosen instructional method not only imparts knowledge but also fosters students' independent thinking, decision-making, analytical and communication abilities; prepares them to work in complex and uncertain clinical environments; enhances

their practical readiness to provide patient care in real-life conditions; and develops multifaceted competencies such as communication, clinical reasoning, and professional adaptability. Conversely, when teaching methods are chosen incorrectly, the educational process becomes predominantly memorization-based, detached from clinical practice, and increasingly passive.

Assessment of students' difficulties in studying biochemistry

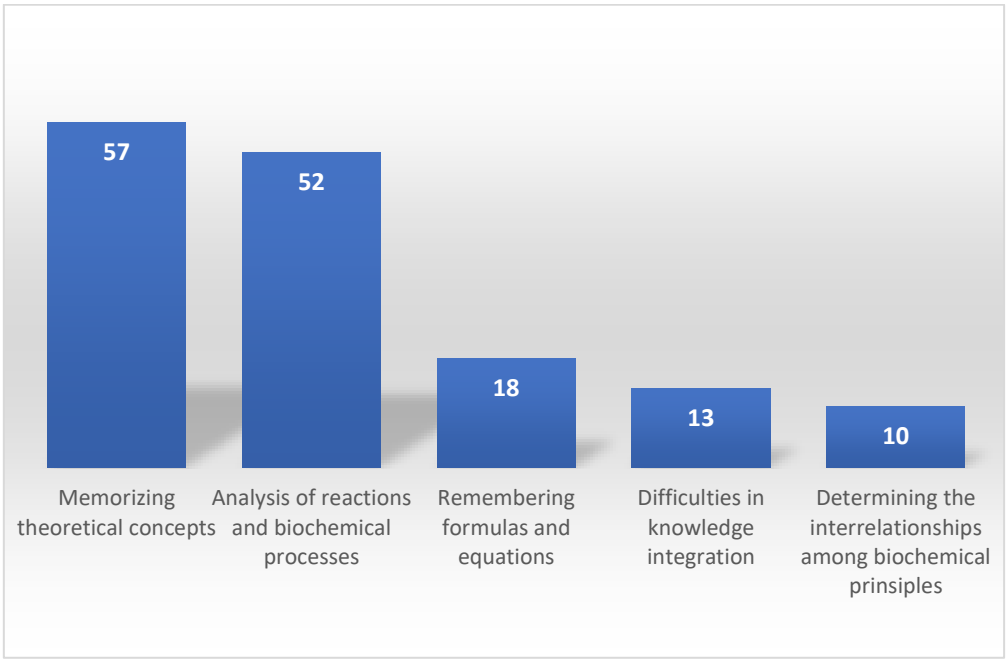

Figure 1.1. Results of a survey administered to 150 general medicine students at Tashkent state medical university

The data presented in the diagram indicate that students face several major difficulties in learning biochemistry. The most significant challenge is memorizing theoretical concepts (57 responses). This is largely due to the abundance of terminology, complex biological processes, and lengthy reaction

chains that characterize the subject. Students often struggle to retain these concepts.

The second major difficulty is analyzing reactions and biochemical processes (52 responses). Students find it challenging to understand the sequence of reaction steps, the role of enzymes, and the overall logic of biochemical pathways. This, in turn, hinders deep comprehension of the subject. Memorizing formulas and chemical equations (18 responses) also poses a challenge for some students, although to a lesser extent. Nevertheless, topics such as enzyme kinetics or energy balance remain problematic for many learners.

Another notable challenge is generalizing learned knowledge (13 responses). Even when students understand individual topics, they may struggle to connect them with other concepts, which prevents the formation of a holistic understanding of the subject. The lowest indicator relates to identifying relationships between biochemical laws and processes (10 responses), suggesting that students have difficulty visualizing how metabolic pathways are interconnected.

Overall analysis shows that the primary obstacles in mastering biochemistry are difficulties in remembering theoretical concepts and analyzing biochemical processes. Due to the high complexity of terminology, multi-step reactions, and interconnected metabolic pathways, students often find it difficult to fully grasp the subject. In addition, challenges in generalizing knowledge and identifying relationships between topics indicate that many students have not yet formed an integrated conceptual framework of biochemistry.

To enhance subject mastery, it is essential to incorporate more simplified explanations, visual schemes, practical examples, and medically relevant case studies into lessons. These strategies will improve students' ability to understand, connect, and apply biochemical concepts in practice.

The analysis also demonstrates that the integration of interactive teaching methods is crucial for developing medical education in line with modern requirements. Choosing effective instructional approaches based on interactive technologies, digitalizing the learning environment, improving teachers' professional skills, and ensuring active student participation are essential components of a contemporary educational model. When implemented correctly, interactive methods do not remain formal procedures but evolve into powerful instructional tools that strengthen clinical thinking, competency

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