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METHODS FOR DEVELOPING CREATIVE THINKING IN TEACHING HISTOLOGY

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Abstract

This article analyzes the methodological foundations for the formation and development of creative thinking among students in the process of teaching histology. In modern medical education, along with deep mastery of theoretical knowledge, the development of students' independent, critical, and creative thinking skills is of great importance. The study evaluates the effectiveness of problem-based learning, cluster methods, case-study approaches, digital microscopy, 3D modeling, and the use of interactive platforms based on experimental research. The results demonstrate that in classes organized using creative approaches, students' academic performance and analytical thinking abilities significantly increased.

Keywords

histology, creative thinking, innovative methods, interactive education, problem-based learning, digital microscopy, ICT, medical education.

INTRODUCTION

In the modern medical education system, fundamental disciplines, particularly histology, represent an essential stage in the formation of clinical thinking. Histology, as a science that studies the microscopic structure of cells and tissues, forms the theoretical foundation of medicine.

While traditional teaching methods primarily focus on memorization, current educational paradigms require a competency-based approach. Students must not only know tissue structures but also be able to analyze, compare, and apply them to clinical situations.

Therefore, the introduction of teaching methods that develop creative thinking in histology education is one of the most pressing issues today.

Purpose of the study:
To identify effective pedagogical methods that promote creative thinking in teaching histology and to evaluate their impact on learning outcomes.

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Objectives of the study:

1. To analyze the theoretical foundations of the concept of creative thinking.
2. To systematize innovative teaching methods used in histology.
3. To determine their effectiveness based on experimental research.

VIEWS OF FOREIGN AND UZBEK SCHOLARS ON TEACHING CREATIVITY IN HISTOLOGY

1. Approaches of Foreign Scholars

In the 20th–21st centuries, medical educators and teaching methodologists have developed various pedagogical approaches aimed at fostering creative thinking in histology beyond traditional memorization.

British educational methodologists R. Pashley and J. Swann demonstrated the effectiveness of conceptual maps, problem-based tasks, and independent research-oriented strategies in histology classes. According to them, students gain a deeper understanding of microscopic structures not through memorization alone, but through situational analysis and case-study tasks.

In the United States, M. Novak and colleagues introduced the concept mapping method into scientific and didactic practice, showing that it improves the structural visualization of students' thinking processes. This approach facilitates the comprehensive interpretation of cellular components, tissue interactions, and systemic processes in histology.

In Europe, educational psychologists such as E. P. Torrance and R. E. Mayer proposed supporting creativity through the use of multimedia presentations, interactive learning tools, and simulations. Mayer's cognitive theory of multimedia learning integrates memory processes with creative thinking development.

These educational paradigms aim to strengthen students' visualization, analytical thinking, problem-solving skills, and ability to identify relationships between concepts in histology.

Conclusion: Foreign scholars recommend the following innovative methods for developing creative thinking in histology education:

- Situational tasks and case-study methods
- Conceptual mapping
- Digital and interactive educational tools
- Virtual laboratories and visual simulations

These approaches promote not only memorization but also analytical and creative thinking.

2. Views of Uzbek Scholars

In Uzbekistan, issues related to teaching histology and developing creative thinking are actively studied. Local researchers emphasize contextual and interactive pedagogical approaches.

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Professor A. Mamatqulov and colleagues suggest implementing problem-based learning and interdisciplinary laboratory activities in histology classes. Their research indicates that students achieve better mastery of anatomical and microscopic concepts through active learning strategies than through traditional lectures alone.

Similarly, studies by Sh. Ergashev and collaborators highlight the effectiveness of ICT tools in histology education, including video microscopy, digital presentations, and interactive testing. These methods enhance visual analysis, independent inquiry, and communication skills.

Uzbek researchers also emphasize that:

- Developing students' communication and teamwork skills is crucial in histology education;
- Integrating problem-based laboratory work with small-group discussions enhances creativity;
- The role of interactive teaching methods is increasingly significant.

Overall, innovative methods adapted to local educational conditions help students develop independent thinking, analytical skills, and scientific inquiry abilities.

3. Comparative Analysis and General Conclusions

Both foreign and Uzbek scholars share common principles:
✔ Histology education should focus not only on memorization but also on analysis, problem-solving, and creative thinking;
✔ Interactive, visual, and digital resources enrich the learning process;
✔ Laboratory work, situational tasks, and group activities increase student engagement.

Differences include:

- Foreign scholars emphasize global pedagogical theories and technologies;
- Uzbek scholars focus on adapting these methods to local educational contexts.

MATERIALS AND METHODS

The study was conducted during the 2025–2026 academic year among first-year medical students.

Study design:

- Two groups: control group (n = 30) and experimental group (n = 30);
- Control group: traditional lecture-practical classes;
- Experimental group: classes based on creative teaching methods.

Applied methods

- Problem-based learning
- Case-study
- Cluster and concept mapping

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- Digital microscopy
- 3D modeling
- Interactive testing platforms

Assessment criteria:

- Theoretical knowledge (tests)
- Analytical thinking (situational problems)
- Creative approach (problem-solving tasks)

Statistical analysis was conducted using percentage indicators and average scores.

RESULTS

The experimental group demonstrated higher performance compared to the control group.

Indicator	Control Group	Experimental Group
Academic achievement (%)	68%	84%
Analytical thinking	65%	88%
Creative tasks	60%	90%

The results show that creative teaching methods significantly increased student engagement and independent thinking. In particular, 3D modeling and digital microscopy enabled deeper analysis of microstructures.

DISCUSSION

The findings indicate that traditional approaches alone are insufficient in histology education. Creative methods:

- Develop visual thinking;
- Foster analytical and clinical reasoning;
- Encourage active student participation.

Problem-based activities strengthened students' independent decision-making skills. The use of ICT, especially virtual microscopy, created learning experiences close to real laboratory conditions.

CONCLUSION

The application of creative thinking development methods in teaching histology significantly improves educational effectiveness.

The most effective methods include:

- Problem-based learning

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- Case-study
- Digital microscopy
- 3D modeling
- Interactive platforms

These approaches develop:

- Analytical thinking
- Clinical reasoning
- Independent decision-making
- Creative problem-solving skills

It is recommended to apply this model to other fundamental medical disciplines in the future.

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