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METHODS FOR DEVELOPING CREATIVE THINKING IN TEACHING HISTOLOGY

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ABSTRACT

This article analyzes the methodological foundations for developing creative thinking among students in the process of teaching Histology. In modern medical education, along with mastering theoretical knowledge, it is essential to develop students' independent, critical, and creative thinking skills. The study evaluates the effectiveness of problem-based learning, cluster methods, case studies, digital microscopy, 3D modeling, and interactive platforms based on experimental research. The results demonstrate that classes organized on the basis of creative approaches significantly improved students' academic performance and analytical thinking.

Keywords

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

INTRODUCTION

In the modern medical education system, fundamental sciences, particularly Histology, play an important role in the formation of clinical thinking. As a science that studies the microscopic structure of cells and tissues, histology forms the theoretical foundation of medicine.

While traditional teaching methods mainly focus on memorization, contemporary competency-based approaches require more. Students must not only know tissue structures but also analyze, compare, and apply them to clinical situations.

Therefore, introducing methods that foster creative thinking in teaching histology has become a pressing issue.

Research objective:

To identify effective pedagogical methods that promote the development of creative thinking in teaching histology and to evaluate their impact on educational effectiveness.

Research tasks:

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

FOREIGN AND UZBEK SCHOLARS' APPROACHES TO TEACHING CREATIVITY IN HISTOLOGY

1. Approaches of Foreign Scholars

During the 20th and 21st centuries, medical scientists and educational methodologists developed various pedagogical approaches aimed at fostering creative thinking in histology beyond traditional memorization.

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British education specialists R. Pashley and J. Swann demonstrated the effectiveness of conceptual maps, problem-based tasks, and independent inquiry strategies in histology classes. According to them, students understand relationships between microscopic structures more deeply through situational analysis and case studies rather than rote learning.

American bioeducation researcher M. Novak and colleagues introduced the concept map method into scientific-didactic practice, improving students' structural visualization of thinking processes. This approach helps interpret cellular components, inter-tissue connections, and systemic processes in a comprehensive manner.

European educational psychologists such as E. P. Torrance and R. E. Mayer proposed using multimedia presentations, interactive tools, and simulations to enhance creativity in learning histology. Mayer's cognitive theory of multimedia learning integrates memory processes with creative thinking development.

These educational paradigms aim to strengthen students' visualization skills, analytical reasoning, problem-solving abilities, and the capacity to identify relationships between data.

Conclusion: Foreign scholars recommend the following innovative methods for fostering creative thinking in histology teaching:

- Situational tasks and case-study methods
- Concept mapping
- Digital and interactive learning tools
- Virtual laboratories and visual simulations

These approaches move beyond memorization and reinforce analytical and creative thinking.

2. Approaches of Uzbek Scholars

In Uzbekistan, issues related to histology teaching and the development of creative thinking are actively researched. National scholars emphasize contextual and interactive pedagogical approaches.

Professor A. Mamatqulov and colleagues propose enriching histology lessons with problem-based learning and interdisciplinary laboratory work adapted to local educational conditions. Their research shows that active pedagogical strategies yield better results than lecture-based instruction alone.

Sh. Ergashev and co-authors highlight the effectiveness of ICT tools—such as video microscopy, digital presentations, and interactive testing—in histology education. These methods develop presentation skills, visual analysis, and independent inquiry.

Uzbek researchers emphasize that:

- Enhancing communication and teamwork skills is essential in histology classes;
- Integrating laboratory work with problem-solving discussions in small groups increases creativity;
- Interactive teaching methods play a central role in improving learning outcomes.

Thus, innovative methods adapted to local conditions promote analytical reasoning, independent research, and creative decision-making skills among students.

3. Comparison and General Conclusions

Common principles between foreign and Uzbek approaches include:

✔ Moving beyond memorization toward analytical, problem-based, and creative thinking;
✔ Enriching the pedagogical process with interactive, visual, and digital resources;
✔ Increasing student engagement through laboratory practice, situational tasks, and teamwork.

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Differences include:

Foreign scholars emphasize global pedagogical theories and advanced 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.

Research design:

- Two groups: control (n=30) and experimental (n=30).
- Control group: traditional lecture-practical format.
- Experimental group: lessons organized using creative methods.

Methods applied:

- Problem-based learning
- Case-study
- Cluster and concept mapping
- Digital microscopy
- 3D modeling
- Interactive testing platforms

Assessment criteria:

- Theoretical knowledge (test)
- Analytical thinking (situational problem)
- Creative approach (problem-based task)

Statistical analysis was conducted using percentage indicators and mean scores.

RESULTS

The experimental group demonstrated significantly higher results compared to the control group.

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

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

DISCUSSION

The results indicate that traditional approaches alone are insufficient in teaching histology. Creative methods:

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

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

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CONCLUSION

Applying methods that develop creative thinking in teaching histology significantly increases educational effectiveness.

The most effective methods identified were:

- Problem-based learning
- Case-study
- Digital microscopy
- 3D modeling
- Interactive platforms

These approaches contribute to the development of:

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

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

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