IMPROVING METHODS FOR DEVELOPING CREATIVE THINKING OF STUDENTS IN THE TEACHING OF INORGANIC CHEMISTRY IN MEDICAL UNIVERSITIES

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The teaching of Inorganic Chemistry in medical universities presents a unique challenge, as students need to grasp complex chemical concepts while fostering creative thinking for their application in medical sciences. This paper explores pedagogical strategies aimed at enhancing creative thinking among students studying Inorganic Chemistry. The goal is to bridge the gap between rote memorization and innovative problem-solving skills, which are critical in the field of medicine. By integrating active learning techniques, problem-based learning (PBL), and interdisciplinary approaches, educators can foster a deeper understanding and creativity in medical students.

Inorganic Chemistry is a vital component of medical education, providing foundational knowledge about the behavior and interactions of elements and compounds essential for physiological processes, drug development, and diagnostics. However, traditional chemistry teaching methods often emphasize rote learning, leaving little room for developing creative problem-solving skills, which are crucial for future medical professionals. Creative thinking here refers to the ability to approach chemical problems innovatively, synthesize interdisciplinary knowledge, and apply it to medical scenarios. This paper aims to explore various teaching methods that enhance creative thinking in Inorganic Chemistry courses at medical universities. The paper will outline a comprehensive approach to transforming traditional teaching methods by emphasizing active

engagement, interdisciplinary learning, and real-world applications, fostering both critical and creative thinking in students.

2. The Importance of Creative Thinking in Medical Education

Creative thinking is indispensable in medicine for diagnostics, treatment planning, and research. In chemistry, it translates into thinking beyond textbook knowledge to predict outcomes, design molecules for therapeutic uses, and apply principles creatively. The rapid advancement of medical science demands that future doctors not only understand foundational chemistry but are also adept at creatively applying it to clinical practice. For instance, knowledge of metal ions, coordination complexes, and redox reactions is crucial in understanding enzyme function, drug interactions, and diagnostic imaging. Creative thinking enables students to link these chemical principles to real-world medical applications, leading to innovations in drug development and clinical treatments.

3. Challenges in Teaching Inorganic Chemistry in Medical Universities

Inorganic Chemistry, often perceived as abstract and difficult, poses significant challenges for medical students, who may struggle to see its relevance to their future careers. Traditional lecture-based methods, which rely heavily on theory and memorization, do little to foster engagement or creativity. Students may find it difficult to connect Inorganic Chemistry content with clinical applications, leading to a lack of motivation and a superficial understanding of the material.

Additionally, the extensive content in medical curricula leaves little time for exploratory learning or innovative problem-solving exercises. Overcoming these challenges requires a shift toward pedagogical methods that prioritize active participation, critical thinking, and interdisciplinary connections.

4. Pedagogical Approaches to Foster Creative Thinking

4.1 Active Learning and Interactive Techniques

Active learning strategies, such as group discussions, debates, and laboratory experiments, enhance students' understanding of complex chemical concepts. Interactive teaching that encourages inquiry, alternative solution exploration, and critical questioning fosters creativity. Inquiry-based lab sessions,

where students predict reaction outcomes or design experiments, can enhance cognitive engagement and creative problem-solving.

4.2 Problem-Based Learning (PBL)

Problem-Based Learning (PBL) integrates real-world medical scenarios with chemistry, encouraging students to apply chemical principles creatively. Medical cases involving chemistry, such as drug interactions or the chemistry of diagnostic agents, provide a platform for students to explore creative solutions. Working through these cases in groups allows students to collaborate and understand the practical relevance of chemistry in their medical education.

4.3 Interdisciplinary Learning

In medical education, chemistry cannot be taught in isolation. Integrating chemistry with biology, pharmacology, and clinical medicine demonstrates broader applications of inorganic chemical principles. For instance, teaching about oxygen chemistry alongside respiratory physiology allows students to appreciate interconnected fields, encouraging creative application of chemical knowledge to medical problems.

4.4 Use of Technology and Simulations

Technology, such as virtual labs, simulations, and molecular modeling software, enhances the visualization of chemical processes. These tools allow students to experiment with different scenarios, fostering creative problem-solving. For instance, molecular simulations enable students to explore the structural effects of metal complexes on biological molecule interactions, promoting innovative thinking in drug design.

Conclusion

In the fast-evolving field of medical sciences, fostering creative thinking is essential. Inorganic Chemistry, with its relevance to drug development, diagnostics, and physiology, offers significant opportunities for nurturing this skill. Integrating active learning, PBL, interdisciplinary approaches, and technology into the curriculum enhances students' creative thinking abilities, critical for success in medical research and practice. Shifting towards interactive, interdisciplinary teaching methods demands educators' commitment to move

beyond traditional paradigms, fostering a learning environment that encourages creativity, critical thinking, and exploration.

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