PROBLEMS AND SOLUTIONS OF TEACHING MATERIALS SCIENCE AND TECHNOLOGY OF CONSTRUCTION MATERIALS

Karshiev Fakhriddin Umarovich

Termez State University, Termez, Uzbekistan.

https://orcid.org/0009-0003-3067-7418

Annotation: This article is about problems and solutions of teaching materials science and technology of construction materials. Additionally, fostering a supportive learning environment where students feel encouraged to ask questions, explore concepts, and engage with the material can enhance the teaching and learning experience in materials science and construction.

Key words: Interdisciplinary Nature, Laboratory Safety, Complexity of Materials, Hands-on Experience.

ПРОБЛЕМЫ И РЕШЕНИЯ ОБУЧЕНИЯ МАТЕРИАЛОВЕДЕНИЯ И ТЕХНОЛОГИИ СТРОИТЕЛЬНЫХ МАТЕРИАЛОВ

Каршиев Факхриддин Умарович

Термезский государственный университет, Термез, Узбекистан.

Аннотация: В данной статье речь идет о проблемах и решениях преподавания материаловедения и технологии строительных материалов. Кроме того, создание благоприятной среды обучения, в которой учащиеся чувствуют себя заинтересованными в том, чтобы задавать вопросы, изучать концепции и изучать материал, может улучшить опыт преподавания и обучения в области материаловедения и строительства.

Ключевые слова: междисциплинарный характер, лабораторная безопасность, сложность материалов, практический опыт.

Teaching the science of materials science and construction materials technology can present several challenges due to the interdisciplinary nature of the subject, the need for hands-on experience, and the complexity of the materials themselves. Some common problems faced by educators in these fields include:

Interdisciplinary Nature: Materials science and construction materials technology involve concepts from various disciplines such as chemistry, physics, engineering, and even biology. Integrating these diverse concepts into a cohesive curriculum can be challenging for both educators and students.

Complexity of Materials: Many materials exhibit complex behaviors and properties that are not always intuitive. Teaching these concepts in a way that is accessible and understandable to students with varying backgrounds can be difficult.

Hands-on Experience: Understanding materials often requires hands-on experience with testing methods, instrumentation, and material properties. Providing students with adequate laboratory facilities and practical experiences can be resource-intensive and may not always be feasible, especially in resource-limited educational settings.

Rapidly Evolving Field: Materials science is a rapidly evolving field with new discoveries and advancements occurring regularly. Keeping course content up-to-date with the latest research and technological developments can be challenging for educators.

Teaching Abstract Concepts: Many concepts in materials science, such as crystal structures, phase diagrams, and material properties, can be abstract and difficult for students to grasp. Finding effective teaching strategies to convey these concepts in a way that promotes understanding and retention is crucial.

Linking Theory with Real-world Applications: Connecting theoretical concepts with real-world applications in fields such as engineering, construction, and manufacturing can be challenging. Students may struggle to see the practical relevance of the material without clear examples and case studies.

Diversity of Student Backgrounds: Students in materials science and construction materials technology programs often come from diverse educational backgrounds, ranging from chemistry and physics to engineering and architecture.

Tailoring instruction to meet the needs of this diverse student body can be challenging.

Laboratory Safety: Working with materials in laboratory settings requires strict adherence to safety protocols to prevent accidents and injuries. Ensuring that students understand and follow proper safety procedures can be a significant concern for educators.

Addressing these challenges may require a combination of innovative teaching methods, collaborative approaches, investment in laboratory facilities and resources, and ongoing professional development for educators. Additionally, fostering a supportive learning environment where students feel encouraged to ask questions, explore concepts, and engage with the material can enhance the teaching and learning experience in materials science and construction.

Materials science and construction materials technology involve concepts from various disciplines such as chemistry, physics, engineering, and even biology. Integrating these diverse concepts into a cohesive curriculum can be challenging for both educators and students. Integrating concepts from various disciplines into a cohesive curriculum is a significant challenge in teaching materials science and construction materials technology.

Interdisciplinary Approach: Emphasize the interdisciplinary nature of materials science and construction materials technology from the outset. Help students understand how concepts from chemistry, physics, engineering, and biology intersect and contribute to the understanding of materials.

Concept Mapping: Use concept mapping techniques to visually represent the connections between different disciplines and concepts within materials science. This approach can help students see the relationships between various topics and understand how they fit together within the broader context of materials science.

Integrated Projects: Design projects and assignments that require students to apply knowledge and skills from multiple disciplines to solve real-world materials-

related problems. This approach promotes interdisciplinary thinking and helps students see the practical applications of their learning.

Cross-Disciplinary Collaboration: Encourage collaboration between students with different academic backgrounds to work on group projects or problem-solving activities. This allows students to learn from each other's perspectives and expertise, fostering a deeper understanding of interdisciplinary concepts.

Case Studies and Examples: Use case studies and real-world examples to illustrate how interdisciplinary concepts are applied in materials science and construction materials technology. Highlighting the role of chemistry, physics, engineering, and biology in the development and use of materials can help students appreciate the interdisciplinary nature of the field.

Team Teaching: Collaborate with educators from different disciplines to co-teach interdisciplinary topics. This approach allows students to benefit from multiple perspectives and expertise while facilitating the integration of concepts from various disciplines.

Flexible Curriculum Design: Design a curriculum that allows for flexibility and customization based on students' interests and backgrounds. Offer elective courses or modules that explore specific interdisciplinary topics in more depth, allowing students to tailor their learning experience to their individual interests and career goals.

Active Learning Strategies: Incorporate active learning strategies such as problem-based learning, hands-on experiments, and interactive demonstrations to engage students in exploring interdisciplinary concepts. These approaches encourage active participation and deeper learning by connecting theoretical concepts to real-world applications.

By employing these strategies, educators can overcome the challenge of integrating diverse concepts from chemistry, physics, engineering, and biology into a cohesive curriculum in materials science and construction materials technology,

providing students with a comprehensive understanding of the interdisciplinary nature of the field.

Reference:

1. F. U. Karshiev, Y. J. Shamayev, & K. Ch. Jurayev. (2024). STUDY OF THE CONSTRUCTION OF A SMALL-SCALE GRAIN THRESHING MACHINE. British Journal of Global Ecology and Sustainable Development, 24, 132–137. Retrieved from https://journalzone.org/index.php/bjgesd/article/view/482
2. KarshievF. U., Shomirzaev M. K., TursunovS. C., & Shamaev Y. J. Theoretical determination of the speed and number of revolutions of the grain grinder hammer propeller. InE3S Web of Conferences(Vol. 390). EDP Sciences.(2023).
3. Mamatov F. M., KarshievF. U., Borotov A. N., Rasulov A. D., & Shamayev Y. J. The balance of power consumption of the process of grain grinding. InIOP Conference Series: Earth and Environmental Science(Vol. 1231, No. 1, p. 012008).(2023, August). IOP Publishing.
4. KarshievF. U., & MamatoF. Determining the parameters of the grinder rotor and its blades for grinding coarse feed. InIOP Conference Series: Earth and Environmental Science(Vol. 1076, No. 1, p. 012024). (2022, August). IOP Publishing.
5. Shamaev Y., Karshiev F. Research on the development of an energy-efficient grain grinding device for small livestock farms, international scientific and technical conference on the topic "Prospects of the development of the electric power sector in the south of the Republic". December 16-17, 2022, p. 339-341.
6. Abdurakhmonov Sh.K. Basing the parameters of the rotary grain grinder Doctor of Philosophy (PhD) dissertation in technical sciences -Tashkent, 2020 -120 p
7. Gapparov Sh., Karshiev F. Development chopper device that chops baled rough fodders. (2020) IOP Conference Series: Materials Science and Engineering, 883, 012158. – Pp.1-6. (IF –0.45: Scopus; No883).
8. Borotov A., Bekzhanov S., Nurjan D., Tursunov J., Tursunov Sh., Boykulov U., Ernazarov K., Karshiev F. Development of the construction of the feed mixer device of granulation line. IOP Conf. Series: Earth and Environmental Science 1284(2023) 012013. – Pp.1-7.
9. Astanakulov K.D., Mamatov F., Karshiev F., Bekzhanov S., Berdimuratov P., Khudaynazarov D., Gapparov Sh., Vitliemov P. Overview of the II International Conference on Environmental Technologies and Engineering for Sustainable Development –ETESD-II 2023. IOPConf. Series: Earth and Environmental Science 1284(2023) 011001. –Pp.1-5.
10. Karshiev F.U., Khudaynazarov D.Kh., Yunusova M.U., Raimkulov O.Q. Experimental determination of the number of blades and the number of revolutions of the rotor of a feed spreader device for small livestock farms. Newsletter of khorazm mamoon academy -6/2-2023. -B. 223-226.