

## THE USE OF MODERN PEDAGOGICAL TECHNOLOGIES IN TEACHING MATERIALS SCIENCE

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**Annotation:** This article studies the emphasis on pedagogical technologies in teaching materials science. It also deals with the peculiarities of the pedagogical technologies and new approaches of teaching. It aims to help teachers to conduct their lessons effectively with the help of modern pedagogical technologies.

**Key words:** pedagogical technologies, materials science and engineering, physics, chemistry, processing, forensic engineering and failure analysis.

## ИСПОЛЬЗОВАНИЕ СОВРЕМЕННЫХ ПЕДАГОГИЧЕСКИХ ТЕХНОЛОГИЙ В ПРЕПОДАВАНИИ МАТЕРИАЛОВЕДЕНИЯ

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**Аннотация:** В данной статье исследуется акцент на педагогические технологии в преподавании материаловедения. В нем также рассматриваются особенности педагогических технологий и новые подходы к обучению. Она направлена на то, чтобы помочь учителям эффективно проводить свои уроки с помощью современных педагогических технологий.

**Ключевые слова:** педагогические технологии, материаловедение и инженерия, физика, химия, обработка, судебно-медицинская экспертиза и анализ отказов.

In the resolution of the president of the Republic of Uzbekistan “On measures for the further development of the higher education system”: “each higher educational institution should establish close cooperation with the world's leading scientific and educational institutions, broad introduction of advanced pedagogical technologies, educational programs and educational – methodological materials based on international educational standards into the educational process, active involvement of highly qualified” it will be highlighted. The main driving force of these fundamental tasks, which determines the success of the national and

spiritual and educational development of the Republic of Uzbekistan, is the application of innovative pedagogical technologies into practice. In this will have to abandon authoritarian pedagogy and adopt innovative technology. At present, the main purpose and content of education and training in Uzbekistan has been radically updated. Therefore, special attention is paid to the effective introduction of innovative technologies in higher and secondary special educational institutions in the Republic of Uzbekistan. In the management of innovative educational technologies in higher educational institutions, the teacher's competence, this set of interrelated requirements should be able to express the generalized model and basic requirements of the teacher;

- The teacher must know the skills of teaching, the skills of upbringing, the ability to objectively assess and control the knowledge of the educators on materials science;

- Must know the use of innovative pedagogical technologies in the organization of the educational process;

- The teacher-educator must have the following qualities for the formation of views and for the new approach to the educational process: modern scientific, deep understanding of the essence of cultural and innovative technological development;

- Deep understanding of the system of knowledge about the world;

- the teacher must know application of other technical means of computer education and training to the educational process;

- Having an understanding of the internet network and being able to analyze the content of Information Technology and full understanding of the essence of spiritual and educational reforms;

- Knowledge of the essence and principles of innovative pedagogical technologies, as well as its advantages in the traditional educational process, the person can apply pedagogical innovations in order to ensure the Prohibition and priority of education;

The use of modern pedagogical technologies in the educational process of higher education creates quite new possibilities of realization of didactic principles

of individualization and differentiation of instruction, influences positively on the development of cognitive activity of students, their creative activity, consciousness, realizes the terms of transition from teaching to self-education.

If the teacher of materials science is competent enough at his field and conduct lessons with the help of these skills mentioned above, the students will be good practitioners and then masters.

Using modern pedagogical technologies in material science make students' understanding easier and more clear. Below we give full description of the subject, materials science:

The interdisciplinary field of **materials science**, also commonly termed **materials science and engineering**, covers the design and discovery of new materials, particularly solids. The intellectual origins of materials science stem from the Enlightenment, when researchers began to use analytical thinking from chemistry, physics, and engineering to understand ancient, phenomenological observations in metallurgy and mineralogy.<sup>[1][2]</sup> Materials science still incorporates elements of physics, chemistry, and engineering. As such, the field was long considered by academic institutions as a sub-field of these related fields. Beginning in the 1940s, materials science began to be more widely recognized as a specific and distinct field of science and engineering, and major technical universities around the world created dedicated schools for its study.

Materials scientists emphasize understanding, how the history of a material (*processing*) influences its structure, and thus the material's properties and performance. The understanding of processing-structure-properties relationships is called the materials paradigm. This paradigm is used to advance understanding in a variety of research areas, including nanotechnology, biomaterials, and metallurgy.

Materials science is also an important part of forensic engineering and failure analysis – investigating materials, products, structures or components, which fail or do not function as intended, causing personal injury or damage to property. Such investigations are key to understanding, for example, the causes of various aviation accidents and incidents.

What are the modern tools of education of materials science

- 1 Audio and video.
- 2 Computers, tablets and mobile devices.
- 3 Collaborative and social learning.
- 4 Whiteboards.
- 5 Virtual classroom. 5.1 Augmented reality.
- 6 Learning management system. 6.1 Learning content management system. 6.2 Computer-aided assessment. 6.3 Training management system.<sup>[3]</sup>

Materials science evolved, starting from the 1950s, because it was recognized that to create, discover and design new materials, one had to approach it in a unified manner. Thus, materials science and engineering emerged in many ways: renaming and/or combining existing metallurgy and ceramics engineering departments; splitting from existing solid state physics research (itself growing into condensed matter physics); pulling in relatively new polymer engineering and polymer science; recombining from the previous, as well as chemistry, chemical engineering, mechanical engineering, and electrical engineering; and more.

The field of materials science and engineering is important both from a scientific perspective, as well as for applications field. Materials are of the utmost importance for engineers (or other applied fields), because usage of the appropriate materials is crucial when designing systems. As a result, materials science is an increasingly important part of an engineer's education.

The field is inherently interdisciplinary, and the materials scientists or engineers must be aware and make use of the methods of the physicist, chemist and engineer. Thus, there remain close relationships with these fields. Conversely, many physicists, chemists and engineers find themselves working in materials science due to the significant overlaps between the fields.

Considering the relations of materials science and other fields, such as physics, chemistry, new pedagogical technologies are easy to implement. Because the students know these other subjects well and it helps them to fulfill their tasks easily.

Furthermore, independent work activities encourage students to learn new things in this subject. Practically, Independent Work Time has two goals. The first goal is to provide students with opportunities to practice and independently apply the skills, strategies and knowledge that teachers have taught them during the lesson. The second goal is to support and nurture students' upcoming career. Self-regulation is a critical component of independence. It is the process of planning, monitoring, reflecting upon, and assessing one's own behaviors. While implementing this activity to the lessons, teachers want their children to be aware of and understand how well they are carrying out their responsibilities during Independent Work Time.

Teach children how to examine and reflect upon their behaviors.

Support and nurture self-regulation and independence by encouraging children to reflect on how well they are using their time and how they might adjust.

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