American Journal of Applied Science and Technology

Methodology For Developing Students' Special Competencies In The Educational Process

Egamberdiyev Akmal Olimjanovich

Teacher, Namangan State Technical University, Uzbekistan

Abstract: This article discusses the methodology for developing students' special competencies using software tools in the educational process.

Keywords: Mock-up, model, skeleton, project, model.

INTRODUCTION:

The widespread application of pedagogical innovations in 21st-century education has become a global trend in world development. As the scope of pedagogical innovations expands and the process of modernization in the country develops rapidly, special attention is being paid to the systematic introduction of new approaches in the field of education.

Indeed, it is an important demand of today that every teacher regularly studies innovations related to their subject and the training of qualified personnel, and possesses the skill to consistently apply them in their professional activity.

METHODOLOGY

In improving the methodology for developing students' special competencies using software educational tools, several teaching methods were employed in the process of teaching the subject "Construction Physics and Energy Efficiency Engineering of Buildings," in accordance with the content, essence, and objectives of the topic. These included: the "cooperative learning" method, the project method, "Problem-Based Learning," "Think-Pair-Share," the "video puzzle" method, and the "SCAMPER" interactive method.

Self-development, the ability to engage in independent learning, and self-assessment are of great importance in developing the special competencies of students at technical higher education institutions. In the process of studying the subject "Construction Physics and Energy Efficiency Engineering of Buildings," students learn to select and calculate energy-efficient materials and structures for buildings in accordance with engineering requirements using software educational tools, and so forth. As a result, students develop skills in inventiveness, logical thinking, independent work, and the design of creative processes [2].

DISCUSSION

The use of video puzzles and visual methods plays a special role in ensuring the quality and effectiveness of education. The necessity of visual methods lies in the appropriateness of adhering to the principle of visual demonstration. Approximately 30% of the human brain consists of neurons responsible for vision, and only 3% for hearing. Research results show that nearly 85% of the knowledge acquired by a person is absorbed through vision [1].

Demonstrating phenomena or processes in their natural state yields greater didactic results; however,

such demonstrations are not always feasible. For this reason, faculty members resort to artificial environments when demonstrating natural objects (for example, visiting a production facility to become acquainted with modern energy-efficient insulating materials or structures on-site) or use artificially created objects (mock-ups, models, skeletons, etc.) [1].

Using video puzzles and visual methods, faculty members must guide students toward independently studying objects, conducting necessary measurements, establishing connections, and comprehending the essence of phenomena-in other words, directing them toward an active process of cognition. In many respects, the effectiveness of a demonstration depends on whether the faculty member correctly selects the visual material in accordance with the level of students' preparation, and directs their attention as much as possible toward the essential aspects of the object being demonstrated [1].

The faculty member consolidates students' knowledge, organizes events, and carries out practical actions related to special competencies on the basis of independent work and the exchange of experience.

In order to achieve effectiveness in the process of using visual methods, it is appropriate to follow the key conditions below.
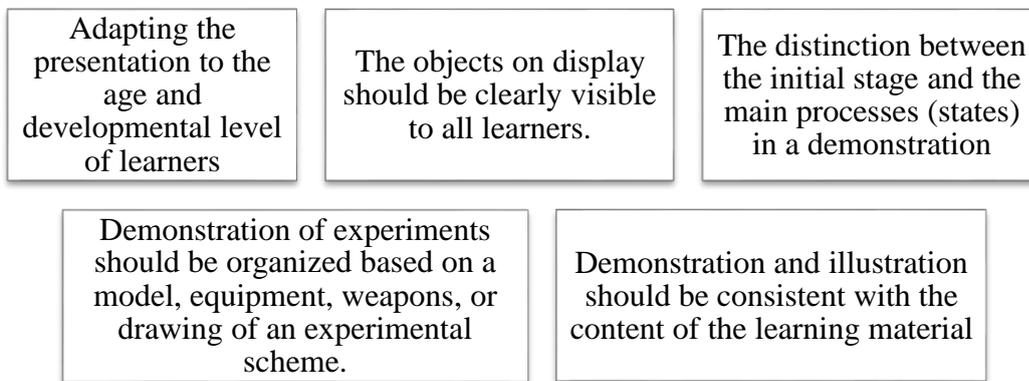
Adapting the presentation to the age and developmental level of learners	The objects on display should be clearly visible to all learners.	The distinction between the initial stage and the main processes (states) in a demonstration
Demonstration of experiments should be organized based on a model, equipment, weapons, or drawing of an experimental scheme.	Demonstration and illustration should be consistent with the content of the learning material	

Figure 2.3.1. The process of using visual methods

Observations and research conducted during the study showed that it is necessary to develop the methodology for teaching the subject "Construction Physics and Energy Efficiency Engineering of Buildings" based on software tools, and through this, to increase students' interest in technical fields and thereby organize career guidance activities.

The subject "Construction Physics and Energy Efficiency Engineering of Buildings" has always taken into account social, political, and ideological factors and developed in accordance with them. Future construction engineers, working primarily with the technical aspects of architecture, must clearly envision the aesthetic possibilities reflected in construction methods for structures. The experience of architectural development not only provides broad knowledge but also teaches theoretical thinking about problems and helps resolve multifaceted theoretical issues related to the interrelationship of structures and artistic forms.

It is important to develop the effectiveness of software educational tools in technical higher education institutions and to elaborate their implementation functions and organizational-pedagogical aspects. This is because software educational tools require the fulfillment of tasks such as modernizing educational materials, increasing students' cognitive activity, employing interactive teaching methods, developing tools and techniques for monitoring students' knowledge, improving independent work skills, and shaping creative thinking.

Forming and developing professional readiness in students of technical higher education institutions requires a systematic and comprehensive approach to this process. A teacher's possession of deep knowledge and the ability to work effectively depends on the extent to which sufficient theoretical and practical knowledge of the fundamentals of a given subject, as well as the skill to productively use innovations in the educational process, have been developed.

In modern conditions, the educational process is required to be oriented toward the development of the individual, their socialization, and the cultivation of independent, critical, and creative thinking in accordance with all its possibilities. Education that can demonstrate these possibilities is referred to as person-centered education [4].

The rapid development of information and communication technologies in modern conditions has created favorable conditions for utilizing their potential in the educational process. Learners assimilate knowledge 40-60% faster and in a shorter time using information and communication technologies (ICT) compared to traditional technologies. Today, it is difficult to imagine the activities of any individual without computer technology. Indeed, the computer, as an essential tool of the global information age, is playing an increasingly important role in all spheres of social life. The existing organizational-technical, functional, and software capabilities of computer technology are creating opportunities for its broad and active use in all areas of social life.

The effective use of project-based learning technology in teaching the subject "Construction Physics and Energy Efficiency Engineering of Buildings" creates opportunities for a differentiated and individualized approach to developing students' special competencies. Project-based learning technology makes it possible to address the following pressing educational challenges:

- ensures that learning takes place in a situation highly approximated to real life;

- connects theoretical knowledge with practical activities;

- enables students to be actively engaged in independent cognitive processes;

- ensures the formation and development of professional competency.

Academic projects are specific assignments whose outcome involves solving a simple problem or task-for example, preparing a technological map, or creating a methodology for solving a problem or challenge. However, it should also be noted here that the concept of "project" does not always refer to a product prepared through practical actions. This is because, within the framework of a project, one may be required to solve a given problem or challenge on the basis of developing theoretical, practical, and methodological ideas.

The practical instructor plays an important role in the preparation of academic projects. A number of responsibilities are assigned to them. These include:

- defining a specific topic or problem for the project work;

- developing project assignments;

- incorporating the project work into the course schedule;

- pre-developing a model of the project process and adapting the assignments to the students' capabilities;

- introducing students to the project work;

- monitoring their practical activities.

This method develops in students a sense of responsibility and the skills to solve problems scientifically, while also preparing them for professional activity.

Familiarizing students with field-related information, conducting question-and-answer sessions and

discussions further develops their knowledge, skills, and competencies.

CONCLUSION

Students' special competencies develop in the process of faculty members engaging in discussions and debates with them on topics, preparing theses, exchanging information, working collaboratively, and conducting conversations.

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