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Effectiveness of using the opportunities of bim technologies in developing the practical competence of construction students

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Abstract: The article analyzes scientific research on the development of practical competence of students of the construction education field based on modern computer technologies. Organization of teaching processes through programs based on modern computer technologies. The effectiveness of using the capabilities of BIM technologies in developing students' practical competence is studied.

Keywords: Education, technology, practical competence, engineering, modern, construction.

Introduction: The Concept of the Development of the Higher Education System until 2030 of the President of the Republic of Uzbekistan No. PF-5847 dated October 8, 2019 was developed based on the needs of the social sphere and economic sectors of the higher education system, in order to improve the quality of education, train competitive personnel, effectively organize scientific and innovative activities, and develop international cooperation based on ensuring a strong integration of science, education and production, as well as in accordance with the implementation of the Decree of the President of the Republic of Uzbekistan No. PQ-4391 dated July 11, 2019 “On measures to introduce new principles of management in the system of higher and secondary specialized education”. One of the main tasks of modernizing the education system is to develop the knowledge of students of the higher education system in the field, find their place in the labor market, contribute to the development of society, and thereby demonstrate their place in society. The desire to find one's place in society includes processes that are inextricably linked to the professional formation of students. The work being carried out in our country in this regard is also bearing fruit. In particular, the Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022 “On the Development Strategy of New Uzbekistan for 2022–2026” [1,2].

Using the capabilities of BIM technologies serves to make the educational process more effective. BIM technologies make the field of education interesting and effective for students, allowing them to study the visual and virtual modeling of construction processes. The use of these technologies in the process of teaching the subject "Energy-efficient engineering communications of buildings" allows students to familiarize themselves with real engineering problems, to present complex concepts to them in a simple and understandable form.

At the same time, BIM technologies are also important in developing teamwork, problem-solving and creative thinking skills among students. We analyze the effectiveness of using Virtual Modeling capabilities in the educational process in the field of engineering communications and determine its place in the development of practical competence. The use of BIM technologies in the educational process in teaching the subject “Energy-efficient engineering communications of buildings” is currently one of the most pressing issues.

Developing practical competencies for students in the field of construction education is one of the important goals of modern education systems. Students should acquire practical skills along with theoretical knowledge, as this will allow them to be successful in

their professional activities.

METHODOLOGY

Many scientific studies have been conducted on teaching using BIM technologies in higher education institutions. In particular, scientific and methodological works and studies have been conducted on the use of BIM technologies in teaching construction sciences (A.I. Abdurakhmonov), the possibilities of using BIM technologies in construction education (N.B. Sayfullayev), the use of BIM technologies in construction projects (A.R. Abdullayev), and the prospects for using Building Information Modeling (BIM) technology (Z.E. Matniyazov). As a result of the analysis of the above scientific works, it can be seen that research has been conducted on improving the effectiveness of the quality of education using BIM technologies. However, the problems of developing students' practical competence using BIM technologies have not been studied in the above scientific studies.

Scientific research on the effectiveness of using BIM technologies in developing practical competence of students of the construction education field is based on technological approaches of the modern educational process. Literature analysis shows that the use of BIM technologies serves to deepen students' practical knowledge, develop independent thinking skills, and form professional skills.

The opportunity to develop students' practical understanding through modern multimedia technologies is increasing day by day. Improving the illustrations, drawings and diagrams in the literature on the subject of "Energy-efficient engineering communications of buildings" through programs based on BIM technologies increases the opportunities for students to accelerate the processes of assimilation of information in the subject.

RESULTS

As a result of the development of modern computer technologies, it is possible to raise the efficiency of educational processes to a new level. The use of BIM technologies is an effective tool for developing the practical competence of students in construction education. These technologies ensure the integration of theoretical knowledge with practical knowledge. The acquisition of knowledge through new approaches is of great importance in the construction industry. In order to highlight the possibilities of BIM technologies, we will consider the case of creating a boiler house project based on these technologies.

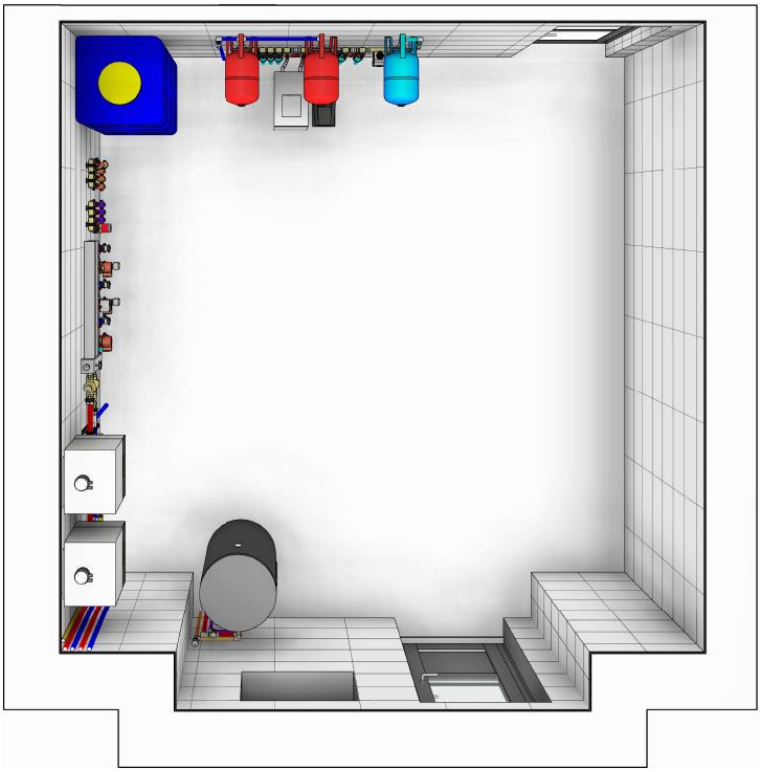

Figure 1 - 3D top view of the boiler room

The image above shows a top view of a boiler room drawn in 3D using BIM technology (Figure 1). This image shows the location of engineering equipment. We will be able to achieve high learning efficiency by designing engineering systems using BIM technology-based programs.

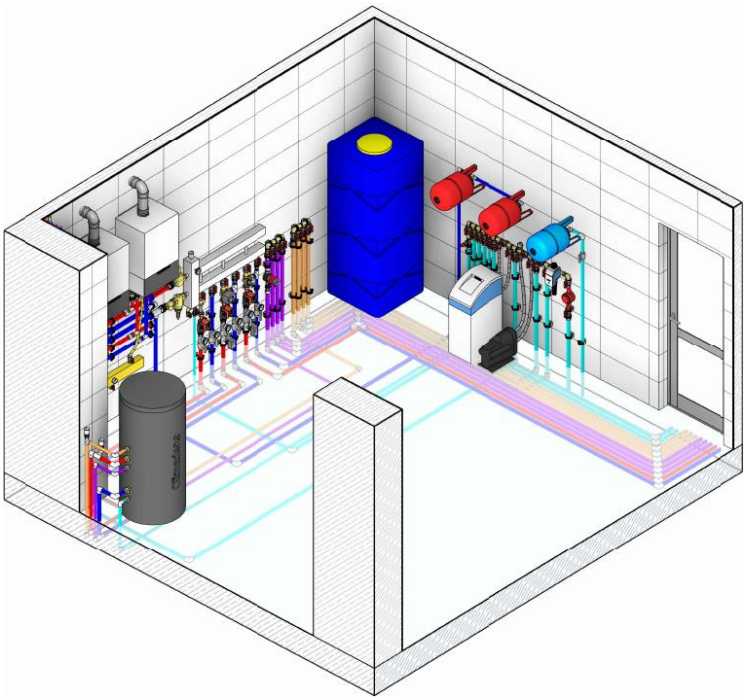

Figure 2 - 3D side view of the boiler room

In Figure 2 above, we can see that it is possible to gain knowledge on practical skills in assembling engineering equipment, placing and installing equipment. Since the role of virtual modeling in increasing the efficiency of teaching processes to a high level is considered high, it is advisable to organize teaching processes based on BIM technologies.

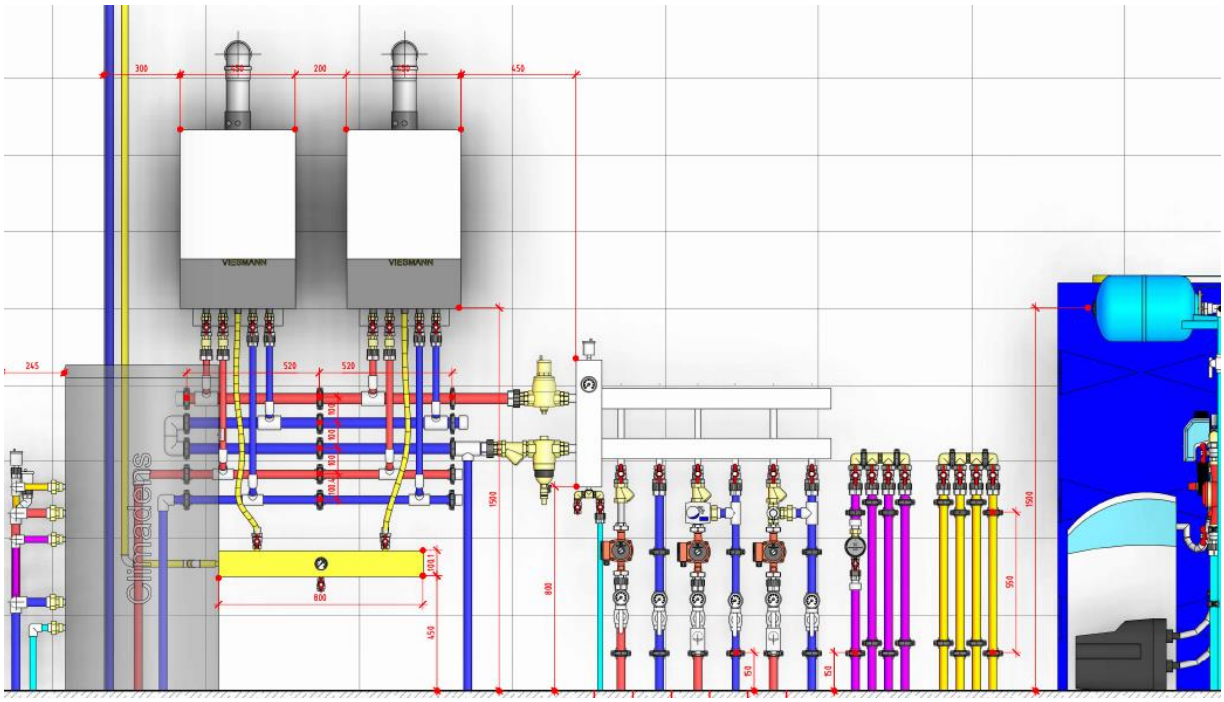

Figure 3—3D side view of engineering equipment

By explaining the topics of the subject “Energy-efficient engineering communications of buildings” based on BIM technologies, it serves as a necessary tool for achieving high efficiency in the formation of knowledge related to the field of engineering. In Figure 3, we can see that we have the opportunity to increase the practical competence of students by placing engineering networks, selecting modern energy-efficient equipment, fully understanding the equipment, connecting pipes to each other, and at the

same time performing these processes in front of them. By completing this process, the student will have information such as where to install the heating equipment, the location of the pipes, the placement of the turning angles, and the placement of the control crane. Through information modeling of buildings, we can understand the construction environment and develop creative thinking skills. Through BIM technologies, we have the opportunity to effectively organize the time allocated for lesson processes. Improving the topics of the subject “Energy-efficient engineering communications of buildings” using BIM technologies will increase the efficiency of lesson processes and improve the processes of mastering the subject.

CONCLUSION

In conclusion, it can be said that currently, increasing the rate of students' mastery of the subject "Energy-saving engineering communications of buildings" is one of the urgent problems. The use of BIM technologies is one of the effective methods for increasing the practical competence of students. By using BIM technologies in educational processes, we can significantly develop students' ideas about construction processes.

The organization of teaching processes using modern computer technologies and their effective use in the teaching process is of great importance. We can understand that using BIM technologies is one of the effective ways to increase students' interest in science and practical competence.

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