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USE OF EUROPEAN EXPERIENCE IN TEACHING EXACT SCIENCES TO STUDENTS

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Annotation: This article analyzes the best practices of European countries in teaching exact sciences - mathematics, physics, computer science and chemistry. The role of the competency approach, STEM principles, interactive methods and digital technologies used in the European education system is studied. Also, the possibilities of using these experiences in higher education institutions of Uzbekistan, methods of adapting them to the national education system are considered.
Keywords: European experience, exact sciences, higher education, competence, STEM, interactive methods.

INTRODUCTION

Today, due to the increasing global integration in the educational process, the study and use of advanced foreign experiences is of urgent importance. Especially in the field of teaching exact sciences, the systems, methodologies and technologies developed in European countries can be a useful experience for higher education in Uzbekistan. Interdisciplinary integration, a competency-based approach, innovative technologies and real-life education are the main pillars of the European experience. This article discusses how to effectively teach exact sciences to students based on these approaches, as well as ways to adapt these experiences to the local educational environment.

MAIN PART

One of the main principles of teaching exact sciences in the European higher education system is a competency-based approach. That is, a student must not only have theoretical knowledge, but also acquire the competencies to solve problems, analyze, think and make decisions through the subject he is studying. For example, in Germany, mathematics courses are organized based on problem assignments and students are required to develop practical solutions. In France, chemistry laboratories are linked to real industrial processes, which helps students understand the connection between science and production [1].

In most European countries, teaching based on the STEM (Science, Technology, Engineering, Mathematics) concept is widely used. In this model, subjects are taught in an interconnected manner, based on a single problem or project. For example, students are given the task of developing a robotics project based on physical laws, or artificial intelligence algorithms integrating mathematics and computer science. This approach helps to master knowledge not in isolation, but in a systematic and real context.

In Europe, digital technologies are widely used in teaching exact sciences. Lessons are becoming more interesting and understandable with the help of visual simulations, interactive graphic programs, digital laboratories, virtual reality (VR) and augmented reality (AR) technologies in education. For example, in Sweden, students can safely and repeatedly perform experiments in chemistry through a virtual laboratory. In mathematics courses, complex graphs are visually

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analyzed using platforms such as Desmos and GeoGebra. This improves the quality of teaching and increases students' interest in the subject [2].

Interactive and collaborative teaching methods are also an integral part of the European experience. Teachers conduct lessons with the participation of students, which means that students acquire knowledge not as passive listeners, but as active participants. For example, by solving problems in groups based on projects, participating in discussions, peer evaluation and exchange of ideas, the student becomes the center of the learning process. These methods develop the student's analytical thinking, teamwork skills and communication culture.There is also an opportunity to gradually introduce these experiences in higher education institutions of Uzbekistan. To do this, first of all, it is necessary to increase the professional capacity of teachers, study European educational standards, expand the use of digital technologies and revise lesson plans. At the same time, it is advisable to develop an adaptation strategy taking into account existing national traditions, and test modern methodologies in accordance with local needs [3].

Another relevant approach to teaching exact sciences in European higher education institutions is the contextual education model, which is closer to real life. Based on this methodology, mathematical or physical problems presented in textbooks and practical classes are not based only on theoretical concepts, but are connected with situations taken from real realities of everyday life. For example, when studying an electrical circuit, a student compares it not only as a diagram, but also with systems in household appliances. In mathematics, models are built based on economic forecasts or statistical demographic data. As a result of this approach, the student feels a direct connection between his subject and life and does not perceive the subject he is studying as “detached from life”. This facilitates the mastery of subjects and increases motivation.

Also, in the European experience, the method of modularizing educational materials is widely used. Usually, traditional courses are divided into semesters or years, but based on the modular system, the student masters each section as a separate module. Each module includes lectures, practical exercises, independent work, projects and assessment sections. For example, in the “Statistical Methods” module, statistical foundations, graphical analysis, calculations using computer programs and project work are mastered sequentially. This approach allows you to create an individual educational trajectory and provides the student with the freedom to act in accordance with his learning speed, interests and abilities [4].

CONCLUSION AND DISCUSSION

European experience shows that in order to increase the effectiveness of teaching exact sciences, the educational process must be organized on the basis of modern technologies, a competency-based approach and interdisciplinary integration. Seeing the student as an active knowledge-acquiring subject, encouraging them to solve real problems and using innovative methods will take education to a new level. Higher education institutions of Uzbekistan have the potential in this regard and, by deeply studying the European experience and implementing it in a way that is appropriate for national conditions, can expand the opportunities for training competitive and modern knowledge-capable personnel.

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