

усвідомлення значення математики та інформатики в повсякденному житті людини;

формування вміння моделювати реальні ситуації на мовах алгебри і геометрії, а також дослідити побудовані моделі математичними методами;

розвитку навичок роботи зі статистичними даними;

розуміння фізичних основ і принципів роботи машин і механізмів, засобів пересування і зв'язку, побутових приладів, промислових технологічних процесів і т. д.

Введення в освітній процес STEM дасть право продукувати в наступників найважливіші якості, що характеризують компетентного фахівця та дає принципово нову модель природничо-математичної освіти з новими змогами і наслідками, як для викладачів, так і для учнів.

Список використаної літератури

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STEM-EDUCATION: EXPERIENCE OF BELARUS AND PERSPECTIVES

Smirnova Natalia

PhD in Psychology, Associate Professor,
Head of Department of Psychology State educational institution «Academy of Postgraduate Education»,
nnnnnnnn@gmail.com

Melnik Volha

Head of Postgraduate Department, Senior Lecturer at the Department of Psychology,
State educational institution «Academy of Postgraduate Education»,
infoence@gmail.com

According to the National Strategy for Sustainable Socio-Economic Development of the Republic of Belarus until 2030, the strategic goal of modern education is «the formation of a high-quality education system that fully meets the needs of the post-industrial economy and sustainable development of the country» [1, с. 35–38]: the transition to an innovative economy objectively requires a new paradigm of education in the Republic of Belarus. Post-industrial education is being formed, the process of transition to its more innovative form – education for sustainable development.

Education for sustainable development is a future-oriented education, education that will ensure stability and sustainable growth of the economy, worthy positions in the development of science and the socio-cultural sphere of the country. In this regard, STEM education has great perspectives.

STEM education is based on the interdisciplinary and applied approach, as well as on the integration of all five disciplines into a single curriculum. STEM: S – science, T – technology, E – engineering and M – mathematics, which involves organizing a

mixed environment in an educational institution in which students begin to understand how scientific methods can be applied in practice.

Through the synergy of science, technology, engineering and mathematics, STEM education provides a holistic, complex and multifaceted mastery of the world by students. Interdisciplinarity, a project-based approach and the applied nature of STEM education allow to increase the scientific literacy of students, ensure awareness of the importance of theoretical knowledge for solving real life problems, stimulate curiosity and cognitive motivation, develop critical and engineering thinking, master the basics of management, form the skill of teamwork and self-presentation of its results, to solve the problem of career guidance.

Currently, the problematics of STEM education is actively becoming an object of psychological and pedagogical research (Krylov D. A., Lovyagin S. A., Repin A. O., Teplova A. B., Tserkovnaya I. A., Chemekov V. N. and etc.). The publications of the above authors substantiate the relevance of STEM education, consider the psychological and pedagogical conditions for its implementation, analyze foreign experience, provide the results of studying the didactic possibilities of certain areas of STEM education, its role in the development of engineering thinking, etc.

In educational practice, the ideas of STEM education are widely supported by the professional and pedagogical community and are implemented in various forms. In accordance with the general trend in the education system of the Republic of Belarus, the STEM movement began to actively develop since December 2017.

The promotion of STEM education in the regions of the country is carried out through the creation of STEM centers based on robotics classrooms and as part of the implementation of educational programs for additional education for children and youth.

In the operating STEM centers, students study programming, robotics, LEGO construction, 3D prototyping, study to operate unmanned aerial vehicles and create digital media content. In addition, the educational process in STEM centers, organized on the basis of the project method, is aimed at acquiring students of the skills of the 21st century: teamwork, communication, project management, idea generation.

Since 2019, 14 educational institutions of the Republic of Belarus have been implementing an innovative project «Implementation of the STEAM education model as a means of pre-profile training». As part of the work on the project, the following key areas of STEAM education have been identified: design; robotics; prototyping; digital laboratories.

In addition to the above key components of STEAM education, it is necessary to make extensive use of digital metasubject laboratories, which allow to demonstrate and study various environmental parameters, processes and phenomena, the operation of devices and structures.

The implementation of the STEAM approach will create the necessary conditions for high quality education through the use of new information and communication technologies in the educational process. When studying the above areas of work, there is an intersubject and metasubject connection (physics, technology, computer science, mathematics, etc.). Early career guidance of talented young people in engineering and

design specialties is provided. In addition, as part of the development of STEAM competencies, students are actively involved in competitive practice in robotics, the Olympiad movement and other programs for the development and support of technical creativity.

The implementation of an innovative project will allow each student in an educational institution to try their capabilities at any of the above areas for further self-determination with the profession, will provide early career guidance, which is considered as one of the functions of modern education, associated with a person's conscious choice of his future profession and the implementation of professional plans.

The Academy of Postgraduate Education, as an institution of additional adult education, is actively involved in the process of preparing teachers for the implementation of interdisciplinary and applied approaches, the organization of project and teaching activities as a modern educational trend. The staff of the academy has developed a program of professional development of teachers «STEAM – an approach in the educational process». The program includes acquaintance of students with the features of STEAM-education, development of skills to use modern information and communication technologies in combination with the ability to carry out professionally oriented communication, ensuring a high level of interaction between teachers and students in the STEAM approach.

Thus, on the basis of the Academy of Postgraduate Education, with the support of the Goethe Institute, the first advanced training was held, which was attended by teachers from all over the country. Students got acquainted with the concept of «algorithm» and drew ideas from everyday life, developed in groups their projects, which were presented at the end of training. Working together brought a lot of positive emotions and new ideas. The main result – ready-to-implement mini-projects, new acquaintances, good mood and inspiration for the new school year.

Another significant event of the Goethe Institute on the basis of the Academy of Postgraduate Education is the international camp Mint-PASCH-Camp. Teenagers and teachers from Ukraine, Poland, Russia and Belarus came to us. Experts from Austria conducted classes on Python and Scratch programming. Students from different countries formed small groups and worked on their projects. Every day started with energizers and games to create community and dating. After intensive classes during the quest rally, the children looked for landmarks of Minsk, prepared a themed party and represented their countries. They also visited an IT company, where they had the opportunity to get acquainted with Belarusian developments in this field, ask questions to experts, tried themselves in the role of testers.

Summarizing the above, it can be noted that, in general, the development of STEM education has a steady positive dynamics. At the same time, there is a number of promising tasks, the solution of which would create new points of growth, increase the attractiveness and quality of STEM education.

It seems that the primary task is to develop a comprehensive scientific and methodological support for both STEM education and training (retraining, advanced training) of teaching staff for its implementation in educational practice.

Fundamental for the development of STEM education is the task of creating a special spatially-subject educational environment in mass practice.

The task of concentrating efforts on promoting all segments of STEM education remains relevant, since today the priority is given exclusively to technology (digital modeling, mobile technologies, programming, prototyping, 3D printing) and engineering (robotics, electronics, electrical engineering). The current situation is in conflict with the idea of STEM education as an interconnected, interdependent and interpenetrating development of objects, processes and phenomena of reality from the standpoint of science, technology, engineering and mathematics.

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