The Role Of Programming Technologies In The Training Of Highly Qualified Specialists

Azamatov A.R.
Candidate of Physical and Mathematical sciences
Alfraganus University, Tashkent, Uzbekistan
axat_ar@mail.ru
Kholmirzayev M.A.
Alfraganus University, Tashkent, Uzbekistan
mamir_221963@mail.ru

Abstract: This article aims to provide future teachers of mathematics and informatics with excellent knowledge and skills in specialized subjects, which are aimed at ensuring the coherence of subjects suitable for their fields. dedicated to the preparation and disclosure of educational programs. Teachers of mathematics and informatics study the content of specialized subjects mainly on the basis of a separate tendency or consider the possibilities of solving certain standard tasks with the help of electronic resources.

The article presents examples of educational programs that help to master and strengthen the knowledge of the topic of algebra, which has different requirements for training in programming languages. At the same time, several tasks for the project are presented. Tasks include some topics of algebra and geometry.

Key words: Teacher, project, programming languages, electronic resource, educational programs, algebra, geometry.

Yuqori Malakali Mutaxassis Tayyorlashda Dasturlash Texnologiyalarining O'Rni

Azamatov A.R.
Fizika-matematika fanlari nomzodi
Alfraganus university, Toshkent, O'zbekiston
axat_ar@mail.ru

Xolmirzayev M.A.
Alfraganus university, Toshkent, O'zbekiston
mamir_221963@mail.ru

Annotatsiya: Ushbu maqola bo'lajak matematika va informatika o'qituvchilarini mutaxassislik fanlari bo'yicha mukammal bilim va ko'nikmalarga ega bo'lishi uchun o'z yo'nalishlariga mos fanlar uzviyligini ta'minlashga yo'naltirilgan o'quv-o'rgatuvchi dasturlar tayyorlash hamda mazmunini ochib berishga bag'ishlangan. Matematika va informatika o'qituvchilari mutaxassislik fanlari tarkibini, asosan, alohida olingan tendensiya asosida o'rganishadi yoki ma'lum bir standart vazifalarni elektron resurslar yordamida hal etish imkoniyatlarini ko'rib chiqishadi.

Maqolada dasturlash tillarida tayyorlash uchun talablari turlicha bo'lgan algebra mavzusini o'zlashtirishga va bilimlarini mustahkamlashga yordam beruvchi o'quv-o'rgatuvchi dasturlardan namunalar keltirilgan. Shu bilan birga loyiha uchun bir nechta vazifalar keltirilgan. Vazifalar algebra va geometriya fanlarining ba'zi mavzularini o'z ichiga oladi.

Kalit so'zlar: o'qituvchi, loyiha, dasturlash tillari, elektron resurs, o'quv-o'rgatuvchi dasturlar, algebra, geometriya.

Currently, the main basis of economy, culture, education, social and other spheres of rapidly developing countries is digitized. Such a practice is a peculiar aspect of the 21st century. In the Republic of Uzbekistan, the digital transformation of the economy is one of the most important and priority directions of the country's development. The Decree of the President of the Republic of Uzbekistan No. PF-6079 dated 05.10.2020 can be cited as a clear example of this. In this Decree, "In our country, comprehensive measures are being implemented for the active development of the digital economy, the widespread introduction of modern information and communication technologies in all industries and sectors, first of all, in public administration, education, health and agriculture. ." it was noted [1]. At the same time, the automation of education management and the creation of a comprehensive

analysis system using modern information and communication technologies were also emphasized.

In order to achieve these goals, the young generation in our country should be able to find the necessary information to fulfill the tasks and solve the problems, to be able to build an informational model of the studied object or process, to be able to use new technologies effectively, to be able to clearly and necessary conditions are being created for him to have skills such as being able to plan perfectly. This situation can be seen from the attention and changes given to the field of education, for example, the teaching of computer science from the 1st grade and the adoption of the program "One million programmers" by students.

The digital transformation of the education system for our country shows that in order to improve the quality of the educational process and transition to personalized education, it is necessary to use the latest information technologies effectively and flexibly, including the personalization of the educational process based on the use of digital technologies. shows that it consists of teeth. In general, learners and educators are at the center of these processes, and the obtained results require educators to be highly qualified specialists in their field.

One of the most urgent issues is the use of digital technologies in guiding students to form independent thinking and action. Because it's no secret that pupils, students and even teachers, when necessary, first of all look for the answer to a question or assignment using a mobile phone or computer in social networks, international electronic resource base. The resources are also diverse, and almost all online services fully reflect not only the answer to the problem, but also the way to solve it. At this point, it is necessary to highlight ChatGPT - chats with generational artificial intelligence. Such chats have the ability to receive requests in different languages and work interactively, it can answer questions, prepare texts in different languages, and even develop programs in different programming languages. It should be noted that such electronic resources have been developed by creative and qualified people to help learners, strengthen and develop their knowledge. These creative and skilled people are also first-time learners and therefore are closely familiar with the problems of education.

A variety of educational software has been developed and is being produced

in our republic. As an example, a set of electronic manuals and games "Soz keti dan soz keral" and "Algebra" [2] can be cited. One of the main achievements of these electronic manuals is that they are oriented to provide knowledge through various games that can attract young students.

It is known that in the training of science teachers, it is necessary to solve a number of problems in education. One of these is the knowledge that science teachers should acquire, the second is pedagogical skills, and the third is the methods of organizing events to achieve such results. Methods of solving such problems change with time. For example, it is enough to compare the possibilities of the times when there were no digital technologies at all with the possibilities of today.

Let's focus on future teachers studying mathematics and computer science. There are ample opportunities for these teachers to get in-depth and excellent knowledge of specialized subjects, because these two subjects are inextricably linked. The science of computer science is based on the science of mathematics, using the positional number systems of mathematics and the theory of mathematical logic to develop the arithmetic and logical bases of calculation techniques, to develop information encoding processes using the possibilities of number theory, to develop the basis of logical schemes using the graph theory of discrete mathematics, and it is used in ensuring perfection, justifying the existence of algorithms and constructing them, etc. In turn, starting with office programs that are a part of computer science and are organized in a simple way to solve mathematical problems, to speed up calculations, to find solutions, at least approximate solutions, to problems. the possibilities of programming languages of different complexity are used. Of course, it is not possible to enumerate all the interrelationships, but the mentioned ones show the necessity of teaching mathematics and informatics in an interdependent manner. So, in this direction, it is very important to think about the development of methods for students to acquire deep knowledge and high skills.

In order to bring the students who are studying on the basis of the aforementioned to the level of excellent teachers in mathematics and informatics, it would be appropriate to develop tasks and methods aimed at ensuring the coherence of these two subjects and oriented towards independent research. In this direction, it is also important to develop

recommendations for performing various interesting tasks for "Designing and organizing models of mathematical problems" using visual programming languages.

It should be noted that the involvement of students in the development of such electronic resources also works in favor of the educational system. Such an approach has a great impact on the development of qualified "programmers" among students. Because, on the one hand, as a "user" of the program, they set the necessary requirements for their project, and on the other hand, they are "forced" to learn more about the possibilities of programming languages. And later, that is, in practical work, they can give in-depth knowledge to students and reveal the directions of these fields in a way that they can be clearly imagined.

It is known from history that games have accompanied people since ancient times. They help a person's physical and mental development while enjoying their free time. In ancient times, games formed young people's abilities such as hunting in a team and being able to protect themselves from enemies. The games improved over time and adapted to the needs of the times. The development of computers gave rise to a new type of games - computer games. Currently, with the development of digital technologies, games on electronic resources are also improving. For this reason, the possibility of imparting knowledge and creating skills on the basis of digital technologies is increasing in the educational system of various (mobile and computer) electronic resources organized in the form of electronic manuals and games or in other forms.

Below, we will provide information about several programs modeled and developed by high school students who are interested in the art of programming under the guidance of the authors of the article.

Figure 1. Overview of the Equation program interface and steps.

The above "Equation" program is intended for the 1st-2nd grades of primary classes, and one of the achievements of the program is that the unknown term is represented by an empty cell, not by the letter symbols learned by mathematicians. In the manual, the tasks become more complicated according to the stage and reflect the mistakes and successes of the students. One of the requirements of the program is that the number of correctly performed tasks in the stage must be 10, and this number is determined by the difference between correctly and incorrectly performed tasks. The main purpose of the program is mainly to create knowledge and partly skills, and the working time is not limited. During the trial period, it was found that if the student works a maximum of 30 equations in a regular math lesson, he worked about 300 equations with the help of this program. It should be mentioned that at first the students performed the actions in writing, but by the middle of the lesson, as their skills increased, they began to work only "in the brain". The program interface allows selection on the manipulator and typing on the keyboard.

The organization of the "Equation" program above:

The following "Equation 1" program is also intended for 2-4 grades of primary classes, and the unknown term in the program is represented by a question mark corresponding to the number of rooms of the answer. The main goal of the program is to build skills, so the time dimension is included.

The program encourages students to strengthen and deepen their knowledge by showing copyright-free cartoons.
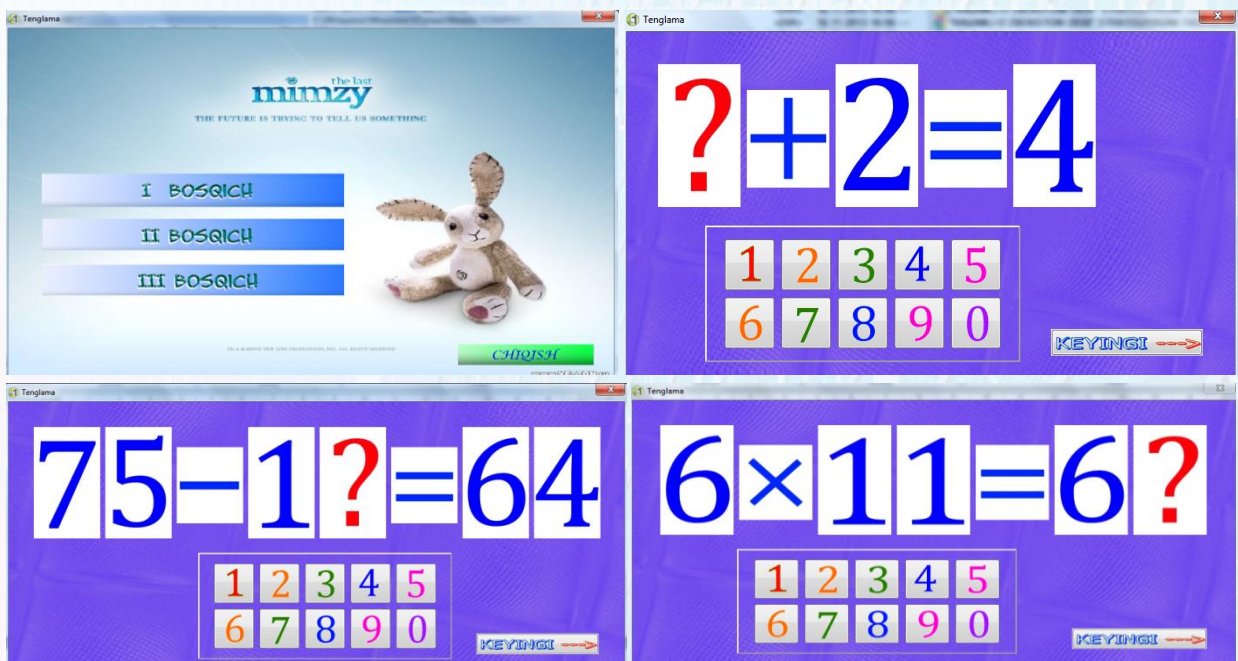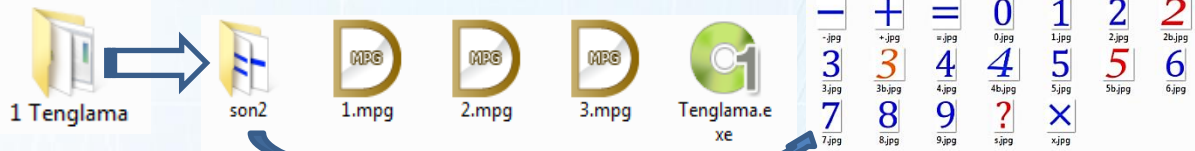

Figure 2. Overview of the interface and steps of the "Equation 1" program.

It is worth mentioning that, despite the complexity of the program's tasks and the strictness of the program's requirements, during the experimental period, the students worked in this program with great interest.

The organization of the above "Equation 1" program:

Such educational or assessment programs, organized in a game-style manner of varying difficulty and design, are engaging for students and provide opportunities for students to reinforce subject knowledge and identify gaps.

Programming languages are taught to students studying mathematics and computer science. It would be appropriate to give them independent work in these subjects, as above, and to direct the content of the developed software to the topics of mathematics. The number of topics does not have to be large, but it is important that one topic is expressed in the interpretation of several students.

Below are some sample topics.

1. Create a program with a user-friendly interface that draws various geometric shapes and requires defining the properties of these shapes.

2. Create a program with a user-friendly interface that determines the student's knowledge by creating an equation covering all types of quadratic equations.

3. Create a program with a convenient interface that creates a closed shape in a plane coordinate system corresponding to the coordinates of the entered points.

4. Create a program with a user-friendly interface that visually reflects the trajectory of the ball shot at an upward angle and determines the distance of the ball, based on the entered angle and acceleration.

5. Create a convenient interface program that draws triangle ABC, its height BD, bisector BE and median BF in the coordinate system of the plane corresponding to the coordinates of the entered points A, B and C, and determines their length.

6. Create a program with a convenient interface that determines the approximate solution of the N-order equation based on the entered coefficients and graphically describes it.

Presentation and defense of projects prepared by students is an important process, in which they have the opportunity to improve their knowledge and improve their skills. It is known that for a future teacher, it is an important part of his profession to have the ability to fully convey his opinion to the student, justify his opinion, and explain the answer to the questions that arise in a clear and understandable way. During the defense process, students will improve their knowledge using PowerPoint, an office program, or other opportunities.

Assigning the same subject to several students depends on the students of the future teachers. Because every student is a unique world. If a recommended method or manual does not work, the reader should not be left without knowledge, but it is necessary to present the second, third and, eventually, the hundredth method or manual. Because the **"Goal and mission, and also the duty to the Motherland"** of pedagogues and employees of the education system is to provide students with deep knowledge.

References:
1. "Raqamli O'zbekiston–2030" strategiyasini tasdiqlash va uni samarali amalga oshirish chora-tadbirlari to'g'risida O'zbekiston Respublikasi Prezidentining Farmoni. Toshkent sh., 2020-yil 5-oktabr, PF-6079-son.
2. Respublika ta'lim markazi. "So'z ketidan so'z kelar", "Aljabr" elektron qo'llanma va o'yinlar majmui. 2006 y.
3. A.R. Azamatov, A.B. Boymurotov. Geometriya, Planimetriya. O'quv qo'llanma. Toshkent, "Tamaddun", 2021 y, 420 s.
4. B.J. Boltayev, A.R. Azamatov, A.D. Rahimov va b., C++ tili asoslari. O'quv qo'llanma. Toshkent, "Akademnashr", 2021 y, 400 s.
5. A.R. Azamatov, A.D. Rahimov. C++ tilida mulohazalarga oid masalalar yechish. Aniq va tabiiy fanlar metodikasi jurnali, 2018/9(17), 12-17 s.