Didactical Potential of Using the Electronic Textbook in the Process of Learning Computer Graphics

[1]Uktamjon Madaminov, [1]Anorgul Ashirova, [1]Sardor Kutliyev, [1]Khujatov Nurbek, [2]Abdikarimov Fakhriddin

[1]Urgench branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi, Urgench, Uzbekistan.
E-mail: uktam9527@gmail.com
E-mail: anorgul76@gmail.com
E-mail: sardor1986@gmail.com
[2]Lecturer, Department of Mathematical Engineering, Faculty of Physics and Mathematics, Urgench State University, Urgench, Uzbekistan.
E-mail: khujatov@bk.ru

Abstract: The article discusses the didactic potential for the use of a modern multimedia textbook as software, as an auxiliary visual means of teaching computer graphics. The article gives instructions and suggestions for teaching and popularization of the subject of computer graphics on the basis of modern electronic textbooks and their use.

Key words: Computer graphics, raster, vector, fractal graphics, Learn Graph, image, object, animation, 2D and 3D graphics, modern electronic textbooks.

INTRODUCTION.

The world pays special attention to the technologicalization of teaching processes, the achievement of effective education through information and communication technologies, the introduction of quality management paradigms. Given the role and importance of natural and exact sciences, including computer graphics, in higher education, there is a tendency to use the features of project-based approaches based on a block-modular system as an innovative form of teacher training.

Reforms in the country to ensure the integration of science, education and industry, the development of higher education, strengthening the material and

technical base, improving the forms and content of education expand the opportunities for the introduction of advanced pedagogical technologies in the educational process. At the same time, there is a lack of systematic approaches to improving the effectiveness of training of future teachers of computer graphics, a mechanism to ensure the positive effectiveness of the training of "Computer Graphics". The Action Strategy for the Further Development of the Republic of Uzbekistan prioritizes "continuing the policy of training highly qualified personnel in accordance with the modern needs of the labor market, improving the quality of education in higher education, in-depth study of important and demanding subjects such as computer graphics" [1]. tasks were assigned. In this regard, it is important to define a modern concept of designing the subject "Computer Graphics" in higher education, innovative modeling of teaching technology, improving the methodological support.

Decree of the President of the Republic of Uzbekistan No. PD 4947 of February 7, 2017 "On the Strategy for further development of the Republic of Uzbekistan", PF-5635 of January 17, 2019 "Strategy of actions on five priority areas of development of the Republic of Uzbekistan for 2017-2021" Decree "On the State Program for the Year of Active Investment and Social Development", PD 2909 of April 20, 2017 "On measures to further develop the higher education system", PD of July 27, 2017 -3151 "On measures to further expand the participation of industries and sectors of the economy in improving the quality of higher education" and the program "Learn Graph" created in the framework of this study in the implementation of the tasks set out in the regulations of this activity a certain level of service does.

A.Abdukodirov, T.Azlarov on the study of methodological aspects (content, purpose, methods and tools) of the disciplines taught in higher education institutions in the field of pedagogical education, problems in the teaching of computer graphics and the design of training projects , B.Boltaev, M.Ziyakhodjaev, N.Taylakov, A.Hayitov, U.Yuldashev, R.Bakiev,

M.Mamarajabov, A.Siddikov and others carried out scientific researches, CIS scientists Y.Gursky, K.Grebennikov , L.Ivannikova, O.Krainova, O.Odintsova, N.Petrova, E.Tretyakova, L.Turanova reviewed in their works [2].

Based on the above, we can say that today computer graphics is one of the fastest growing areas of modern information technology. Such development is taking place both in the field of hardware and software. They allow you to create video, multimedia products, moving images. Such software products are advertising tools and are used in the field of art and multimedia technology. There is also a strong emphasis on display graphics, geometric modeling, graphic interface design, animation, and the creation of visual objects.

We can create graphic objects in programming languages or in ready-made special programs. The key is how realistic the image is. The appearance of an object, the harmony of its colors, and the size of the image all testify to the importance of computer graphics. Computer graphics is taught as a separate subject in secondary special and higher education institutions on the basis of a special plan. This, in turn, requires the development of computer graphics software. There are several such software products available today. However, such programs focus less on offline and online learning, communication, and competition. Only one user can learn the program independently, but if the program is used by several users, ie in groups in schools or universities, with their own login and password, it will increase the effectiveness of reading and studying the textbook. That's why we created Leran Graph, taking into account the above-mentioned shortcomings.

This program was developed on the basis of the science program based on Annex 2 to the Order of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan dated March 27, 2018 No. 274. The program is designed primarily for university students and independent users. The program consists of 17 textbooks, theoretical and practical assignments, a forum with users and a graphical view of the results. The program basically

consists of 5 windows. After entering the program, a special code is displayed. To activate the program, this code is captured, sent by telegram to the phone number specified in the program, and the admin gives you a special code.
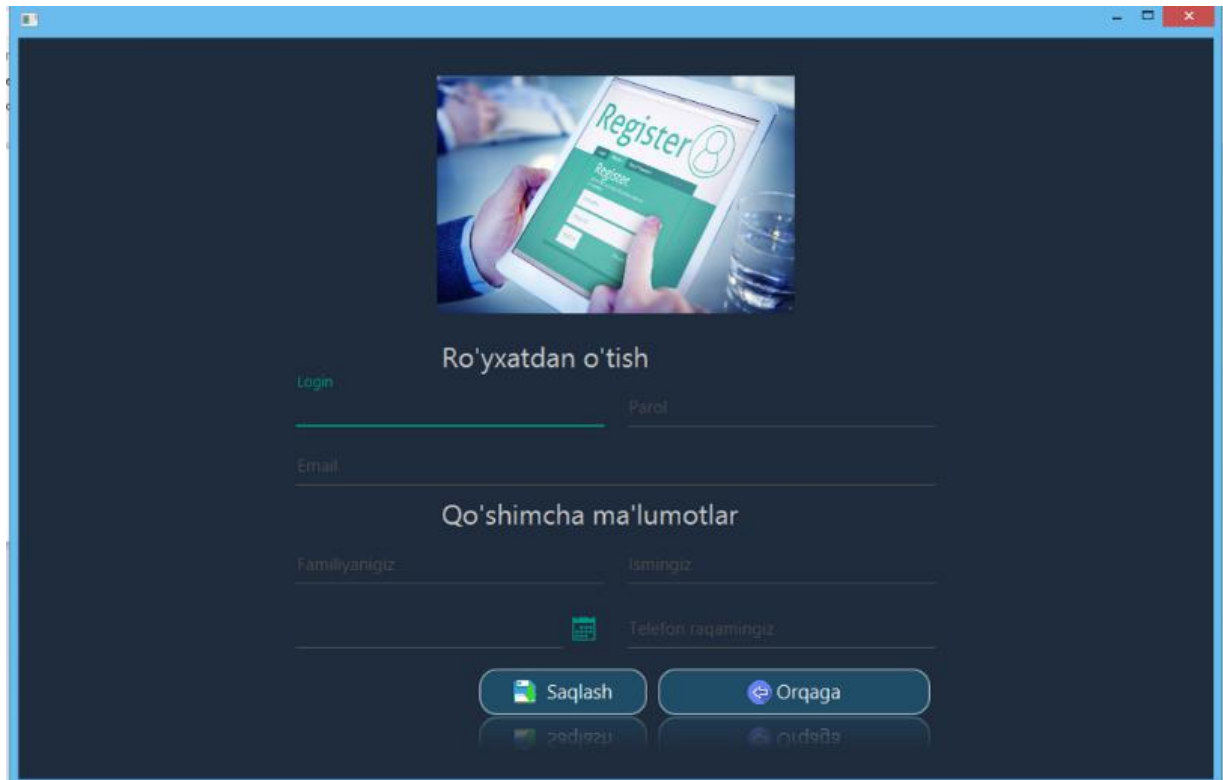

Figure 1. Registration window.

After installing the program, a special code will be issued, to activate the program, this code will be captured, sent by telegram to the phone number specified in the program, and you will be given a special code by the admin..

Figure 2. Key activation window.

You can only use the code once, ie when you uninstall and reinstall the program, the previous activation code will not work. After activating the code, you need to register to use the program.

As mentioned above, the program can be used as a group, and each has its own dialog box and its own results.

After logging in to the program with a login and password, a list of information and lessons relevant to you will appear (Figure 3).

Figure 3. Software homepage.

The program itself was developed in the JavaFX programming language. The program provides generalized and in-depth topics for teaching computer graphics and types of computer graphics: raster, vector, fractal graphics, detailed examples, practical examples, assignments and additional information (Figure 4).

Figure 4. Practical topics and assignments.

In addition, the sequence of working with graphic editors for each type of graphics, the creation of 2- and 3-dimensional images is described in detail.

Learners will gain a thorough understanding of computer graphics and the knowledge and skills to create raster, vector, and fractal images in graphic editors [4,5,6,7,8,9]. We will continue to get acquainted with the program. Students can test their knowledge and skills through the program (Figure 5).
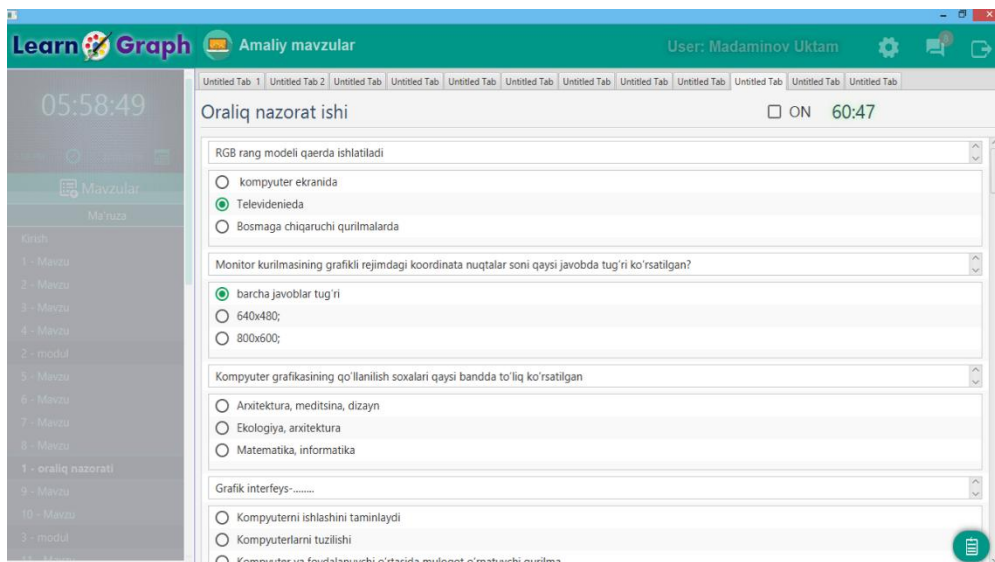
Figure 5. Test performance window.

The test results are stored in the application database and include a number of processes. Once the result is saved to the application database, it cannot be saved to the application database again. For example, if a student takes the 1st intermediate test but is not satisfied with the result, he / she will try to process it and try to get the result high and enter it into the program database. The program prevents these cases, and the results of the processed test are not stored in the database. These processes work the same way for all tests.

There is also a separate section for student users to view and analyze their results, which creates competition between users of the program and increases their interest in science and the lesson (Figure 6).
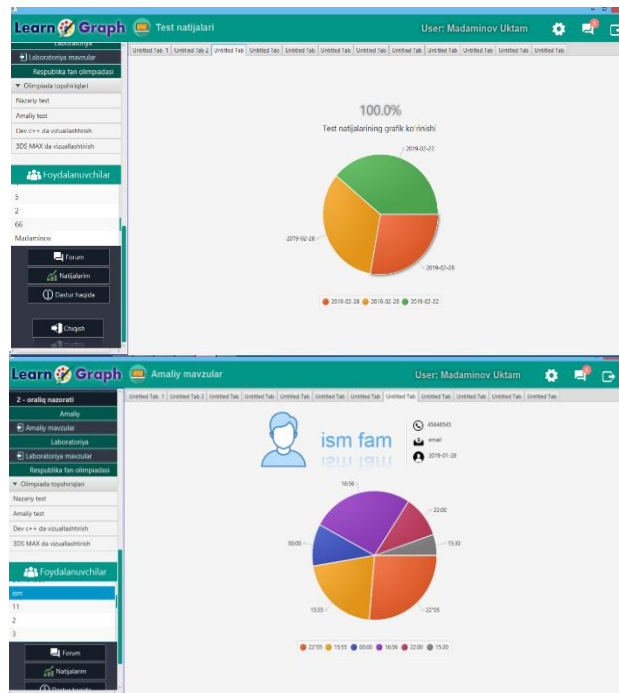
Figure 6. Graphical representation of user results.

Students learn science through the program, and in the process, they may have questions and misunderstandings on topics. In this regard, the student first sees the user rating of the program and can ask the user who is higher, which in turn forms the basis for working as a group among students. The program has a Forum section for interaction, where you can ask general questions. (Figure 7).
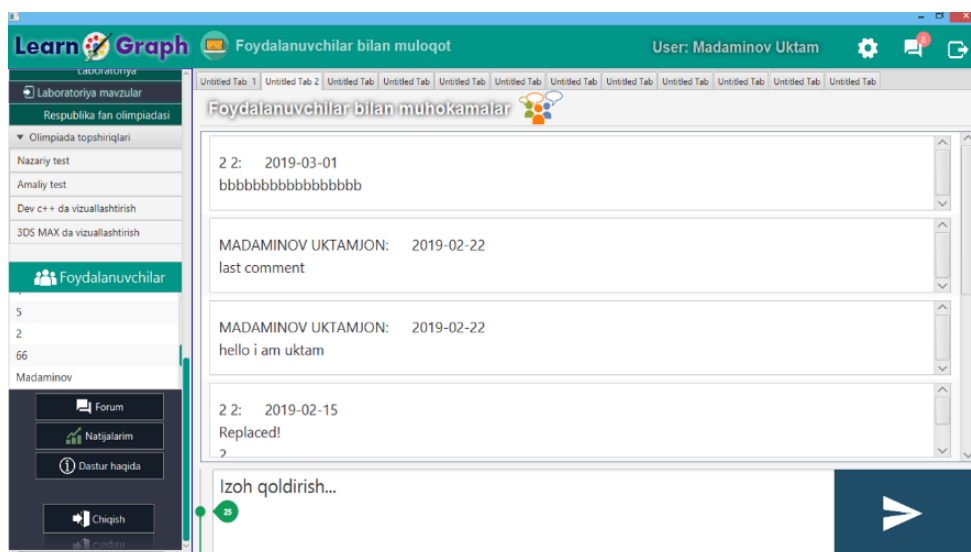

Figure 7. Forum window.

CONSLUSION

The research carried out by the author allowed to create the '' Learn Graph ''tool environment, which provides support for the formation of skills in solving computer graphics problems, contributing to an increase in the efficiency of the learning process of computer graphics. In short, the use of this Learn Graph program in the educational process will increase the effectiveness of education and improve students' new knowledge and skills. Students will be able to work independently on the subject of computer graphics, and if the subject is taught using the program, the human factor will not interfere in the assessment of students. The '' Learn Graph ''instrumental environment is embedded in the educational process at TUIT UV named after Muhammad al-Khwarizmi and is used in the study of the course" computer graphics ''.

REFERENCES

[1] . Decree of the President of the Republic of Uzbekistan No. PF-4947 of February 7, 2017 "On the Action Strategy for the further development of the Republic of Uzbekistan." Collection of Legislation of the Republic of Uzbekistan, 2017, No. 6, Article 70.

[2] . Faronov V.V. programming at the highest level of Java. - M., 2003.

[3] Ashirova A.I Programmatic shell for creation of electronic manual // State Patent Office of the Republic of Uzbekistan: Certificate № DGU 01541. 19.06.2008y.

[4] Zaripov O.Q., Madaminov U.A. Learn Graph program on the subject of "Computer Graphics" // State Patent Office of the Republic of Uzbekistan: Certificate № DGU 06992. 28.08.2019 y.

[5] Davronbek Yusupov, AnorgulAshirova, FirnafasYusupov, BekchanovBekchan (2020). Improving The Effectiveness Of Lecturesby Using The Methods Structuring The Composition Of The Programming Discipline. // European Journal of Molecular & Clinical Medicine , Vol. 07, pp. 1093-1107. ISSN 2515-8260.

[6] . Ashirova A.I., Yusupov D.F., Abdullaev A.A. Improving the effectiveness of practical training using a block modular training system (on the example of the basics of algorithms) IX International scientific and practical Internet conference "Trends and prospects for the development of science and education in the context of globalization (3-4 December, Pereyaslav-Khmelnitsy, Ukraine)" 2015.

[7] . Ashirova A.I. Development of software for creation electronic textbooks/ analele ştiinţifice ale universităţii de stat „bogdan petriceicu hasdeu" din cahul volumul vi, 2010. pages 116-119.

[8] . Madaminov U.A., Allaberganova M.R., Kutliyev S.O., Avezov M.A., O'razboyev N.U. (2020). Methodology of electronic educational resources creation and use of applications // International Journal of Applied Research. pp. 133-135. ISSN Print: 2394-7500.

[9] . Dagiene V, Grabauskiene V. (2011) Transformation of individual learning through informatics and information technology activities in primary school // Intern. Journal of Digital Literacy and Digital Competence, Vol. 2, No 3, pp. 1–14. ISSN 1947-34942011

[10] Fakhriddin Abdikarimov, Kuralbay Navruzov. Mathematical method of calculating the volume of the cavities of the heart ventricles according to echocardiography. European Journal of Molecular & Clinical Medicine, 2020, Volume 7, Issue 8, pp. 1427-1431.

[11] Fakhriddin Abdikarimov, Kuralbay Navruzov. Mathematic modeling of pulsation movement of blood in large arteries. European Journal of Molecular & Clinical Medicine, 2020, Volume 7, Issue 8, pp.1438-1444.

[12] Fakhriddin Abdikarimov, Kuralbay Navruzov. Determining hydraulic resistance of stationary flow of blood in vessels with permeable walls. Annals of the Romanian Society for Cell Biology, 2021, 25(3), pp. 7316–7322.

[13] Fakhriddin Abdikarimov, Kuralbay Navruzov. Modern Biomechanical Research in the Field of Cardiology. Annals of the Romanian Society for Cell Biology, 2021, 25(1), pp. 6674–6681.

[14] Fakhriddin Abdikarimov, Fotima Abdikarimova,Temur Khasanov, Madamin Abdirimov, Azamat Rajabov. Investigation Pulsation Motion of the Liquid in the Flat Channels. International Journal of Science and Qualitative Analysis. Volume 4, Issue 3, September 2018, pp. 69-73.

[15] Faxriddin Abdikarimov Baxromovich, Kuralbay Navruzov Navruzovich. Noninvasive Method Calculating of Volume of Cavities of the Heart According to the Echocardiography. Biomedical Sciences. Volume 3, Issue 1, January 2017, pp. 1-5.

[16] Abdikarimov F.B., Navruzov K.N., Razhabov S.X., Shukurov Z.K. Impendant method for determining the reduction of hydraulic resistance in large arterial vessels with permeable walls. Journal of Applied Biotechnology & Bioengineering, Volume 5 Issue 2 - 2018, pp. 79-82.

[17] F.B Abdikarimov, Q.N Navruzov, N.J Khujatov. New way scoping of a cavity of the left ventricle of heart according to an echocardiography. European Science review,–Vienna, pp. 44-46.

[18] Abdikarimov F. B., Navruzov K. N., Khujatov N. J., Babajanova Y. I. Ultrasonic methods determining volume of cavities of ventricles of heart. The European Journal of Biomedical and Life Sciences, Issue 2, 2015, pp. 3-7.