



TEACHING COMPUTER GRAPHICS ON THE BASIS OF MODERN METHODS AS A PEDAGOGICAL PROBLEM IN THE CONDITIONS OF DIGITAL EDUCATION.

Bagbekova Laylo Kadirbergenovna
Teacher, TSPU after named Nizami

| Article history: | Abstract: |
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| Received: April 6 th 2023 Accepted: May 6 th 2023 Published: June 11 th 2023 | This article provides information on the concept of a public open online course and foreign experience in its application in the educational process, research on the current state of teaching computer graphics. |
| Keywords: massive, open, online, course, computer graphic, information, education, electronic resource, 2D graphics, 3D graphics. | |

The concept of development of the higher education system of the Republic of Uzbekistan until 2030 envisages "raising the content of higher education to a qualitatively new level, establishing a system of training highly qualified personnel who can make a worthy contribution to the sustainable development of the social sphere and economy."

At present, the issues of content and quality of education are considered a priority in society, and special attention is paid to the use of information technology in the education system of developed countries. In this regard, ways to develop education, increase its effectiveness are being sought, research on the introduction of information technology in education is being improved. The introduction of information technology in the educational process is based on the organization of the educational process using information, multimedia and network systems. Information technology assists pedagogical staff in the organization and management of the educational process, in the development of recommendations for the development of curricula, study programs and teaching materials, testing and control.

The process of using information and communication technologies in the improvement of the education system in our country and abroad is considered as one of the active ways to develop an innovative approach to the organization of teaching and modernization of educational processes. Theoretical and methodological bases of development and improvement of teaching methods are reflected in the research work carried out by scientists of the Republic and foreign countries.

Today, millions of people around the world receive online education in almost all fields: law, engineering, programming, language learning and more. Online education is becoming more widespread with its freedom, universality and convenience. Among them, one of the most promising directions in the development of e-learning in recent years has been the formation of public open online courses, which are based on the idea

of public education with equal opportunities for all. Anyone from all over the world has the opportunity to study for free on the Public Open Online Courses (OOC). Today, the number of OOC users is several million. Other leading universities and training centers in the world also place great emphasis on online education. It is also possible to read expensive textbooks online for free. It is now possible to work in groups on the Internet. This is also important in education. The data you work as a group has the potential to be stored online. They can also be used by next year's audience. In traditional education, however, this possibility is limited.

The analysis of scientific and methodological research shows that public open online courses are little studied due to the fact that they are a new direction, however, the effectiveness of the use of public open online courses in the educational process abroad T.Anderson, A.Bozkurt, Z.Airton, P.Arnold, D .Boven, S.Brown, D.Bruff, N.Breakwell, J.Gerber, M.Giannakos, J.Daniel, F.Donkor, S.Kornouskos, S.Raniah, M.Yusuf, B.Smith conducted research. These include a manual on the creation of online courses for the educational process by researchers of the Kazan National Research Technical University, a guide and a set of teaching methods for the creation of online courses in education by scientists of the Tomsk State National Research University, online by researchers of the Ural Federal University. science-based recommendations on the use of courses, guidelines for the development of mass open online courses have been developed by researchers from the Tyumen Industrial University. However, the problems of mass open online courses have been studied in scientific articles by a number of scholars. A.M.F. Yusuf, a scientist at the University of Fayoum (Egypt), "Assessment of learning analysis in the OOC environment", "Opportunities and challenges in the OOC experience"; EN Totosenko, TI Konovalova "OOC: a new model of e-learning in secondary special vocational education"; S.Karnouskos, M.Holmlundlar



"The impact of public open online courses on improving the innovative education system" is one of them.

S.Tursunov, Sh.Karimov, V.Khamidov on the possibilities of public open online courses in the country and the effectiveness of their use in the educational process; H. Shikhova, M. Rakhimbaeva on the study of problems and solutions for the creation of public open online courses; The importance of video resources in public open online courses is mentioned in the scientific articles of G. Artikbaeva.

The results of the analysis show that the problems of organizing the educational process in the higher education system using public open online courses have not yet been sufficiently studied.

It is known that the information received by the human visual sense organ is the most effective in the exchange of information, and it also leaves a deep mark on the memory. In particular, the information provided by sound has a positive effect. The least effective medium is written information, which takes more time to receive and process in the brain, and due to the physiology of each person, a certain amount of information is lost and stored in memory.

Given the demands of today and the times, it is clear that the science of "Computer Graphics" is inextricably linked with each field, and the need for it is growing. The scope of application of computer graphics is very wide, and first of all, the visualization of this field is remarkable. That is, the image serves as a key factor in computer graphics.

Many foreign scientists have conducted research on the advantages of teaching the subject of "Computer Graphics" and its effective results. Including, David J.Eck conducted research on "Basics and Software of Computer Graphics".

In his research, J. Rash showed that the main purpose of teaching the subject "Computer Graphics" should be to develop students' knowledge and skills in designing production problems on a computer.

Z.Zuo conducted research on the introduction of computer technology in the teaching process of "Computer Graphics" and the improvement of teaching. In his scientific research, he scientifically substantiated the conduct of "Descriptive Geometry and Engineering Graphics" in connection with the subject of "Computer Graphics".

A.W.Bargteil, B.Jones, S.Ward, A.Jallepali, J.Perenia in their research work have scientifically substantiated the mastery of automated design process in the training of professional designer, engineer educators, while using the capabilities of 2D and 3D modeling.

L.T.Erig, H.J.Chery, R.L.Davids conducted research on the use of three-dimensional interactive graphics to teach equipment manufacturing processes.

UA Nasritdinova recommended the scientific and theoretical basis for the use of three-dimensional modeling tools in the development of spatial imagination of students in higher education institutions on the subject of "Computer Graphics".

In the research work of EI Ruziev he created an integrative course "Graphics" and developed a method of teaching it. It describes the problems of teaching the subject of "Computer Graphics" and its connection with other disciplines, the graphic requirements that a teacher of this subject must have. The study partially focused on the use of computer technology in the teaching of graphic sciences.

In his research, VL Tedeev stated that students organize independent work on the basis of information technology in the disciplines of "Information Technology" and "Computer Graphics", as a result, it is desirable for students to learn more individually, to conduct laboratory classes in computer classrooms.

GA Baydrakhmanova Status and analysis of computer graphics teaching; the role of computer graphics in the formation of professional qualities of future teachers of computer science; basic classification of computer graphics functions; conducted research on the effectiveness of working with basic computer tools in the study of computer graphics.

In his research, L.N. Turlyun emphasized that computer graphics is a popular form of mass art and fine art. He noted that computer graphics give effective results in the process of drawing and processing various drawings in architecture and painting.

As a result of research conducted by LV Pavlova, interesting issues in the formation of students' knowledge of engineering graphics and computer graphics in the field of engineering and the use of computer graphics in teaching graphics and the development of creative activity of students using AutoCAD graphics program.

Although the analyzed research has developed methods and tools to improve the content of science, methods and tools used in its teaching, pedagogical conditions and methods of activating the learning process of students in graphic education, methods of developing the competence of future teachers in computer graphics. e-learning of future teachers i.e. the issue of teaching computer graphics through mass open online courses has not been considered and studied as a separate issue.

The analysis of the research showed that the problem of developing technology for the formation of



knowledge and skills of students using the capabilities of various graphics programs in the teaching of "Computer Graphics" in higher education has not been studied as a research work. The lack of scientific and pedagogical solutions to these problems, the inability of students to fully understand the purpose and content of teaching computer graphics in higher education institutions, the lack of knowledge and skills in graphing issues of their specialty using the capabilities of various graphics programs, the content of science based on foreign experience imperfection, the lack of knowledge of modern computer graphics, such as 3D modeling, CAD systems and RP technologies in the content of science, creates a number of problems.

Today in the teaching of "Computer Graphics" in pedagogical higher education institutions it is important to apply the necessary pedagogical and psychological tools in practice and scientifically substantiate them in the formation of purposeful actions of students in relation to science and thus the possibility of achieving any results.

According to the results of the research, in teaching the subject "Computer Graphics" in pedagogical higher educational institutions of the republic:

the process of teaching the subject "Computer Graphics" in pedagogical higher education institutions is not standardized system of lectures, practical and laboratory classes; lack of time norms for students to use the capabilities of graphics programs at the required level in the development of knowledge and skills in the field of "Computer Graphics"; Lack of scientific and methodological manuals and textbooks on "Computer Graphics"; lack of interdisciplinary connections in the field of teaching graphic sciences; lack of qualified teaching staff of graphic sciences; shortcomings such as the lack of e-learning manuals and video lessons required in science teaching were identified.

Therefore, to study the current problems of the science of "Computer Graphics"; development of technology for the formation of students' knowledge and skills using the capabilities of graphics programs; development of pedagogical bases for full implementation of the opportunities of specific graphics programs for each field in the process of training specialists; it is important to determine the psychological and pedagogical conditions of this process and to substantiate the criteria that determine its quality.

The essence of computer graphics education in higher education is that students should be able to fully implement the capabilities of computer technology-based automation, design and modeling, regardless of the field in which they study.

The main purpose of the science of "Computer Graphics" is to integrate all disciplines in computer technology and, as a result, to ensure that future professionals can achieve practical results using the capabilities of various graphics programs.

The analysis shows that the further development of teaching the subject of "Computer Graphics" in pedagogical higher educational institutions of the country, the analysis of its modern issues is an important requirement of today, but research in this area is still insufficient. Therefore, the problems of systematization of the subject "Computer Graphics", the coordination of content and scientific substantiation of pedagogical requirements, the creation and implementation of modern technologies for the development of knowledge and skills of students using the capabilities of graphics programs in its teaching are among the urgent tasks.

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