

DEVELOPMENT OF PRACTICAL AND CREATIVE SKILLS THROUGH THE EGC (ENGINEERING GRAPHIC COURSE) PLATFORM AS AN EXAMPLE OF STUDENTS OF TECHNICAL HIGHER EDUCATION INSTITUTIONS

Madaminov Javlonbek Zafarjonovich

Fergana Polytechnic Institute

“Drawing geometry and engineering graphics”

department associate professor, (PhD)

E-mail: javlonbek4847@gmail.com

ABSTRACT

This article describes the importance of the EGC (Engineering Graphics Course) platform in developing students' practical and creative skills in the design process and developing self-directed learning processes. Theoretical and practical results of the role of the EGC (Engineering graphic course) platform in the implementation of the design process are explained when students master it using modern graphics programs such as KOMPAS 3D V20.0.1., AutoCAD, SolidWorks, 3D Max.

Keywords: project, forms, engineering and computer graphics, graphic programs, platform, methodology, pedagogical, professional, abilities.

INTRODUCTION

On the state program of the President of the Republic of Uzbekistan “On the implementation of the Strategy of Actions on the five priority directions of the development of the Republic of Uzbekistan in 2017-2021 in the “Year of Development of Science, Enlightenment and Digital Economy” 2020 In order to ensure the implementation of the tasks defined in the decree №.PF-5953 dated March 2, the Cabinet of Ministers decided to gradually transfer the educational process to the credit-module system in the higher education institutions of the republic starting from the 2020-2021 academic year. done [1].

This, in turn, is related to the introduction of the credit-module system in more than 33 higher educational institutions in our country in the 2020-2021 academic year [3]. These higher education institutions mainly switched to the ECTS credit-module system [4].

According to this law, the general requirements for the quality of personnel training, the content of education, the necessary and sufficient level of knowledge of the training of students and the general qualification requirements for graduates of

higher education institutions, the size of the educational load, determines the procedures and mechanisms for evaluating the quality of the activities of educational institutions and personnel training [2]. In the process of training of future engineers to state educational standards in higher education and the implementation of the “National Personnel Training Program”, as well as the prospects of the country’s development in the field of production, society’s need for engineers, science, technology, technological and design achievements, was developed based on the world’s innovative technologies for the training of engineers.

So, based on this state educational standard, there are the following qualification requirements for engineers to develop practical and creative skills in engineering and computer graphics:

- to make independent decisions in his professional activities, to work with information, to know how to collect, store, process and use it effectively and quickly;
- to have competitive general professional training;
- independent knowledge of acquired new knowledge, ability to work on oneself and know how to organize work from a scientific-theoretical and practical-creative point of view;
- to be able to work independently in their positions in the fields of production, which should be occupied by engineers in the areas of technical higher education;
- formation of scientific-theoretical, practical knowledge, as well as knowledge, skills and qualifications;
- develop skills such as creating, compiling, storing and using information technology tools, modern graphic programs;
- in order to achieve the intended results of engineers, it is necessary to ensure the design, modeling and systematic implementation of educational processes, scientific-theoretical knowledge, and practical professional skills.

In addition, many factors affect the development of design activities, practical and creative skills of engineers in higher educational institutions. A trained specialist must first understand what a project is.

LITERATURE REVIEW

During the next decade, there was a rapid growth in the development of computer graphics systems needed in various fields of human activity related to the use of automated design systems. Currently, there is a great demand for engineers who master systems in the field of information technology, computer graphics. As part of our research, we will focus on the problem of determining the essence and stages of development of practical and creative skills of students of technical higher education institutions, as well as the role and importance of graphic and design competence. Modern approaches to the interpretation of professional competence are different, and

this concept is often used in the sense of defining the qualification requirements and the level of professional skills, expressing the specific nature of the quality of specialist training. At this point, we found it necessary to dwell on the content and structural structure of the concept of professional competence. This will help to fully reveal the essence of our research.

In our republic, scientists such as A. Kholmurzaev, O. Alijonov, S. Saydaliev, N. Shokirova, N. Yodgorov, Sh. Murodov, T. Riksiboev conducted scientific research on the methodology of developing practical creative skills of engineers by means of engineering and computer graphics. . Pedagogical-psychological issues of development of engineering design competences of students of technical higher educational institutions, practical creative skills with the help of computer graphics, the role of computer graphics, peculiarities of information communication in the educational process D. Achilova, U. Nasritdinova, I. Rasulov, A. Khakhorov and others studied in scientific research.

From the scientists of the Commonwealth of Independent States (CIS) J. Dzhanabaev, M. Smirnov, O. Vlasenko, T. Russkikh, L. Votyakov, D. Mukhataev, N. Kaygorodtsev, D. Dasheev, T. Tkachev, T. Chernyakov, O.Griban, O.Filatov, etc. have researched the issues of development of engineering design competences by means of computer graphics and improvement of the methodology of teaching "Engineering graphics and computer design" in technical higher education institutions.

R.Mukundan, Z.Zou, L.T.Erig, A.P. Research problems of developing practical creative skills of engineers using computer graphics based on different approaches. Godse, Dr. D. A. Godse, R. L. David, G. Gambetta, B. Jones, R. S. Ferguson, A. Jalleralli, J. Rerenia, G. Frederick, A. Mitchell, E. Ronald, D. Juricic, T. Krueger, F. .Elucidated by foreign scholars such as Amari.

Particular attention is paid to the role of computer graphics science in the training of engineers in the scientific researches of the above-mentioned scientists, as well as the existing problems in the design process, the development of competence, spatial imagination, practical creative imagination.

METHODS

The use of modern graphic programs of computer technologies in the design activities of students of technical higher educational institutions in the subject "Engineering and computer graphics" plays an important role in the development of their practical and creative abilities, helps to show the creative and intellectual potential of a developing engineer. Applying them to the educational process of technical higher education institutions requires a deeper study of the methodology of teaching general professional and special subjects and the field of teaching.

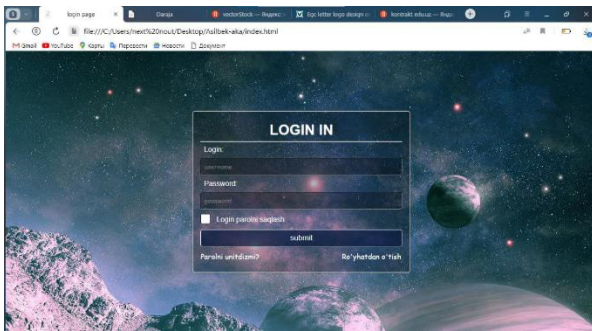
There are several main conditions in the process of teaching students of technical education majors in the "Engineering and Computer Graphics" department of higher technical educational institutions. Mastering the basics of "Engineering and computer graphics" by students has its own characteristics in relation to the types of project activities. In this regard, the development and improvement of efficiency is important. "Engineering and computer graphics" should be taught taking into account the technologies, its visual tools and technical characteristics [5].

When comparing the directions of teaching "Engineering and computer graphics" in technical higher education institutions, it should be noted that the understanding of the qualitative role of engineering and computer graphics is not unique, and it is also related to certain directions of training graduates, remains dependent on specialties. This subject is studied by students, depending on the qualification level of professors and teachers. The technique consists of automating the design process of graphic programs (KOMPAS 3D V20.0.1, AutoCAD, Solid Works, 3D Max) [7], creating drawings and creating project documents in the process of teaching students of engineering and computer graphics. . The basis of teaching "Engineering and computer graphics" here is the development of design systems using graphic programs (KOMPAS 3D V20.0.1, AutoCAD, Solid Works, 3D Max).

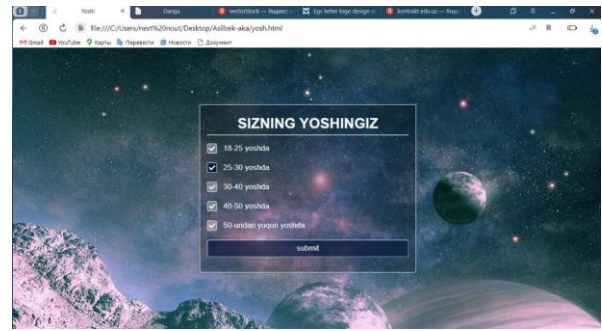
The mastery of computer graphics by students is equally important. Taking into account the current trends in teaching computer graphics, it is possible to conditionally distinguish the main groups of software training areas:

- for technical and construction specialties – KOMPAS 3D V20.0.1. and foreign AutoCAD, Solid Wors, 3D Max;
- for social humanitarian specialties - Photoshop, Flash, Power Point,

Let's first focus on the concept of a project in the formation of students' practical and creative skills in the design activity. Information about the project, it is recommended to register in the "project passport" according to all the provided signs. This section contains information about the implementation period. These include information such as: project participants (age), project type, number of participants, project coordination, project duration. In addition, the "project passport" serves as its training letter. It should also present the goals and objectives of the project. Expected results of the completed project and the final product of the project. At the end of this project, the form of presentation and the products of project activities will be given special attention. It is very important that the results of the implemented projects are clear. For example: If this is a theoretical problem, its specific solution should be presented on a theoretical basis; if practical, a ready-to-use concrete output should be provided. Thus, engineers should have sufficient information about the project, its types, and the essence of the project.



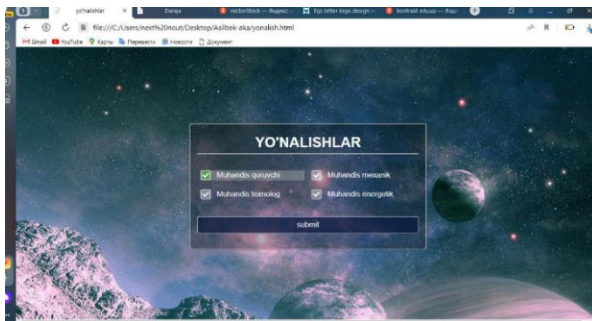
a)



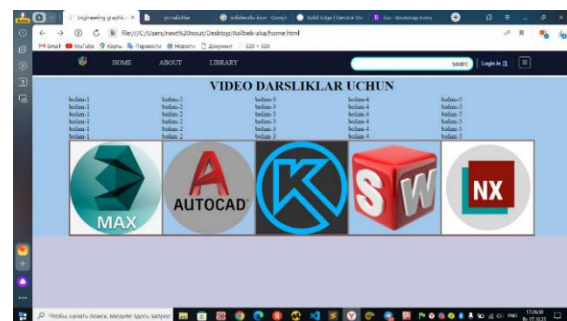
b)

Figure 1. EGC (Engineering graphic course) platform launch processes

Each user registers on this platform by himself (Fig. 1, a). After that, the platform asks for information about the user's age (Fig. 1, b).



a)



b)

Figure 2. The main sections of the EGC (Engineering graphic course) platform

The platform gives the user the opportunity to choose directions according to their specialty. That is, a construction engineer, a technologist engineer, a mechanical engineer, and an energy engineer are selected from the window. After that, it allows to develop practical and creative skills by entering the platform. The platform has video guides, literature, presentations on topics.

In the conditions of the modern economy, production is rapidly developing, the document defining the requirements for the training of engineers of technical higher education institutions in various specialties is the state educational standard and qualification requirements of higher education. The current DTS lists the types of professional activities of engineers in the field of engineering and technology.

There are didactic conditions for professional training of students in “Engineering and computer graphics”, which are as follows:

- directing the formation of information competence of future engineers;

- clearly and impartially clarify the priority information competences of engineers, informative, analytical - modeling (technical task analysis, justification of economic efficiency) and project activity,
- determining the scope of tasks to be solved during continuous education,
- development of electronic training manuals for special subjects, and organization of didactic algorithm for introduction into the educational process;
- new approaches, redevelopment of the technology of formation of information competence of engineers based on corporate adaptation,
- comprehensive corrective-diagnostic evaluation of the formed information competence.

CONCLUSION

It is desirable to have an electronic textbook that includes all types of educational activities, lectures, practical exercises, methodical instructions, departmental tests. Such a textbook on "Engineering and computer graphics" completely frees students from searching for information, increases their interest in science. The electronic textbook is a great help in the work of the teacher, it creates more opportunities for teaching the subject. And the most important condition for its effectiveness is the presence of operational feedback that allows you to evaluate the successful development of a particular topic. For this purpose, control activities are carried out: written survey, test control, fulfillment of individual assignments. The obtained results allow students and teachers to change their actions.

A distinctive feature of studying graphic arts is the individualization of education, the teacher's careful control of each student's work. The teacher does not need to describe the solution to any problem on the board, because the entire sequence of the solution can be placed on separate slides. For example, in "Mechanical drawing" there are working drawings of details, sketches, structural drawings, etc. In "Engineering and computer graphics", it is recommended to use Kompas 3D V20.0.1 software to create technical drawings of complex parts, assembly drawings, part drawings, part sketches, diagrams, etc. Thus, the modern educational process is aimed at developing students' design competencies and not only graphic literacy, but also new information technologies, and it has been theoretically proven that the science of "Engineering and computer graphics" plays a major role in these processes.

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