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Modern methods of teaching computer programs in education system research

Abstract. The article is an overview, analysis, and generalization of information about methods of teaching computer graphics. The article is devoted to the use of modern teaching methods in education. Teaching computer graphics is one of the most important areas of using a personal computer, which is considered today the most important component of training. The article also considers the data of the study on the use of the electronic method of training. It can be noted that it is necessary to introduce modern teaching methods that contribute to the development of a versatile personality.

Attention should be paid to the widespread use of various information sources, and interactive technologies. In addition, the introduction of modern electronic methods in the training process will intensify the training process, save time, and create the possibility of performing virtual demonstration shows using available equipment.

The methods of teaching computer graphics presented in the article are based on the interconnection of several components that are closely intertwined in the educational process. Methods are associated with the choice of appropriate methods, forms, and the development of didactic teaching tools. Also, methods are aimed at the formation of creative abilities, considering the individual preferences of the student, as well as the modern requirements of society.

Keywords: computer programs; computer graphics training; computer graphics training methodology e-learning.

Introduction

Computer programs teaching has an important role, as it is a social order of society, the needs of the labor market, and the development of the Internet sphere. Computer programs are used in all spheres of human activity, including scientific research, art, advertising, and educational programs. In regard to the appearance of new areas of software use, there is a need for professionally qualified specialists. Based on this, the tasks of training include the search for a scientific and methodological basis for the preparation of a student, the creation of textbooks, and methodological recommendations for the study of computer graphics disciplines. The essence of the problem is reduced to the systematic use of information that will provide self-education. Teaching by modern methods differs significantly from traditional methods. It should be noted that the main thing is to create the appropriate prerequisites for self-study. In this regard, it is necessary to start developing an e-learning methodology that meets all the requirements of modern education.

The method of learning is the ability to transfer and assimilate information. To ensure that the information is received correctly, it must be presented, recorded, transmitted, and

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must be correctly perceived. Learning technology in this sense requires high computer literacy in all subjects of the educational process. We can say that the willingness of teachers to use information technology in the educational process, through the development of his method of applying this technique on the one hand, and computer literacy training on the other, ensure the implementation of those rich opportunities for the intensification of the educational process, which includes information technologies. And, above all, to provide individualized training, while maintaining mass, increase the activity of students, formation of their interest in the learning process and to its outcome.

The main part

According to D. Mironov computer graphics is an automated information process associated with various aspects of working with images presented in digital form by a particular information model [1].

The dissertation of O.V. Arefieva is devoted to the training of designers. She teaches computer graphics in artistic and aesthetic conditions. Thus, the author reveals such an important question as how to improve the professional training of students in teaching computer programs [2].

The authors of the textbook A.K. Mynbayeva and Z.M. Sadvakasova reveal the basics of the concept of innovative learning. The main value of the work lies in the modern approaches to pedagogical science. It is important to note that the manual includes a set of new teaching methods that have been tested and developed by the authors. The authors conclude that the result of e-learning is the development of a fully developed person [3].

It is important to note the traditional form of dividing teaching methods by the source of knowledge: word, visibility, and practice. As a rule, pedagogical activity is based on the verbal method of teaching. This depends on the available explanation of the material in the established timeframe of the lesson. However, it is necessary to consider this method of training together with visual and practical methods.

Various training methods are used in training computer editors that contribute to a better assimilation of knowledge. These methods will be used in the research part of the thesis. The method of analogies is a method of solving the problem. This method uses similar solutions taken from folk costumes, national clothing, engineering solutions, works of architecture, etc. "Analogy is a thought process in which from the commonality (similarity) of some qualities, properties or relations of the objects being compared, we come to the commonality of other properties or relations[4]. From this, we can distinguish that the analogy is based on objective connections and relationships. The next method of learning is the real-world method. To obtain results, it is necessary to identify the perception, experience, worldview, and perception of the world by students. The third method is a computer simulation. It is important to note that this method of learning develops creative imagination. Therefore, to develop the information culture of students, it is necessary to acquaint students with modern achievements in the field of modeling in production and in other areas of human activity.

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Currently, an electronic learning method has become available, the work of which consists in learning through electronic textbooks, applications, books, websites, and more. This method of teaching undoubtedly helps both teachers and students, given the large amount of equipment that can be used to teach computer programs [5].

Attention must be paid to the positive and negative aspects of working with the electronic learning method. The most common disadvantages of learning on electronic media are inconvenient reading from the screen compared to a sheet of paper, which in turn leads to fatigue of the visual organs, and lack of technical means. It is also important to note significant problems in the writing of electronic training resources for computer programs. In most cases, this is the lack of consideration of the target audience, namely, the individual characteristics of the work of the teacher, professional orientation, psychological and pedagogical requirements, interdisciplinary connections, and insufficient continuity of the material.

On the other hand, the positive aspects lie in the individual assimilation and receipt of information, the organization of new forms of interaction in the learning process, and changes in the content and nature of the activities of the teacher and student.

It should be noted that e-learning includes:
- multimedia lectures by teachers;
- multimedia presentations;
- electronic testing;
- implementation of business computer games and much more.

We should focus on the fact that the assimilation of information by electronic means helps to increase the level of interest in learning computer programs.

Graphic editors are divided into two types: two-dimensional and three-dimensional graphics. Two-dimensional, in turn, is subdivided into vector, raster, and fractal graphics. When using vector graphics, the image is built from geometric primitives (points, lines, circles, etc.), for which the color of lines and fill and other parameters are set. When saving an image, these parameters and mathematical equations of the lines are memorized, which takes up a relatively small area of memory. A vector image can be transformed with virtually no loss of quality since the image is rebuilt after transformations.

All of this allows us to highlight some of the positive and negative features of vector graphics. With its help, it is possible to create schemes, drawings, and animation that are quite voluminous in content and occupy relatively small amounts of memory, which may be necessary when transferring data to the Internet, etc. However, not every image (for example, a photograph) can be built from graphic primitives, which leads to the need to use raster graphics. Vector graphics editors include CorelDraw, OpenOffice Draw, Adobe Illustrator, Macromedia Freehand, etc.

A raster image is built from points (more precisely, from an array or matrix of points), for each the information about the location on the screen, color, brightness, etc. is stored. Raster images are distinguished from vector images, as a rule, by their high quality and large volume. In addition, it should be noted that such images are very difficult to edit. Thus, when

a bitmap image is reduced, no special distortions may be observed, but with an increase in the size of its component parts, the dots will begin to increase, which will lead to a deterioration in image quality. The greater the increase, the greater the deterioration.

The main advantage of a bitmap is that it allows you to create any image. As we noted, this type of graphics has its drawbacks: more memory is required to save the image, as well as losses during editing, especially when scaling. Raster graphics editors include MS Paint, Adobe PhotoShop, GIMP, etc.

Fractal graphics implies the construction of an object, the individual elements of which inherit the parent structures. The description of smaller elements follows a certain simple rule, which makes it possible to describe such an object with several mathematical equations (snowflake, Koch curve, etc.). Fractals can be used to create entire classes of images that require relatively little memory to store. The disadvantages of this type of graphic include the fact that for the construction of objects that do not belong to fractal classes, it is either very difficult or impossible to apply it. Fractal graphics editors include Art Dabbler, Ultra Fractal, and Fractal Explorer.

The type of 3D technologies such as 3D modeling has a wider application for educational purposes.

«3D modeling is the process of creating a three-dimensional model of an object. The task of 3D modeling is to develop a visual volumetric 24 image of the desired object. In this case, the model can either correspond to objects from the real world (cars, buildings, hurricanes, asteroids), or be completely abstract (projection of a four-dimensional fractal).

This technology can be used in the subject area of such disciplines as:

- Architecture, design - for modeling and visualization of terrain in three-dimensional virtual space;

- Art history - for the purpose of three-dimensional presentation of individual episodes of historical events of paintings, and archaeological finds;

- Anatomy - to visualize various parts of the body and organs.

Due to the ability to design a specific model of an object or phenomenon, the main advantage of this technology is realized in the form of increasing students' interest in the disciplines studied. By involving students in research and creative activities, the use of 3D technologies in general creates conditions for an active learning process. As mentioned above, the list of areas where 3D modeling can be applied can be quite extensive. However, 3D modeling can be of great benefit if we consider it as a tool for developing abilities that affect the success of mastering most disciplines. One of such extremely important abilities, considered in this work, is spatial imagination, the development tool of which can be 3D modeling.

3D graphics and animation hold a special place among computer technologies. In the professional software market, commercial distribution programs are still leading, but there is a large selection among free distribution 3d-editors.In addition, 3D modeling develops logical thinking, spatial imagination, contributes to the development of intrasubject connections between mathematics, geometry, stereometry, computer science.

Today there is just a huge number of software products specializing in the creation of

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3D graphics and 3D animation. It is very difficult to choose the right one from all the variety. To do this, first of all, you need to decide on the purposes for which you need a 3D editor. 3D graphics can be used by a teacher as demonstration material.

Data, and software must meet the following requirements: taking into account age characteristics and the level of initial training of users; minimum financial costs; computer system requirements; the approximate characteristics that a computer must meet in order for it to be able to use any specific software; compatibility with other graphics packages; orientation to the use of the acquired skills in professional activity.

It should be noted that we have created an electronic textbook for teaching computer programs CorelDraw and Photoshop. The task of which is to get information as efficiently and interestingly as possible for educators, find the necessary information, work with it, and, most importantly, apply knowledge in practice.

Discussion

Computer training programs are an important priority at this time. It is important to note that computer programs have already been introduced into the school course. Students of the 11th grade study a new subject "graphics and design", in which they learn the program CorelDRAW and Photoshop. The purpose of the training is to introduce and assimilate the basics of image theory, knowledge of the laws of the projection method and graphic modeling, to promote the development of the project and creative activities, the formation of graphic culture and skills of working with traditional and modern means of graphics[6]. To achieve this goal, the are needed methods of analogy, reality, transposition and modeling.

To analyze the state of learning through modern teaching methods, a survey was conducted among undergraduates. During the survey, conclusions were drawn on the use of e-learning for computer programs. The survey involved 10 people. To evaluate the study, the following questions were asked:

Do you think e-learning is more effective than face-to-face training (live training, seminars, etc.)?

How do you assess the use of e-learning?

How is it convenient for you to study computer editors?

What are the benefits of e-learning that are most important to you at the moment?

What difficulties do you have with e-learning?

Will the quality of your education improve with the use of an e-learning system?

Have you increased your motivation to learn through e-learning?

What platforms are convenient for you to study the material through?

What computer editors do you use?

Are you going to use e-learning in the future?

Most of the respondents (Fig.1) consider e-learning to be more effective than live trainings and seminars.

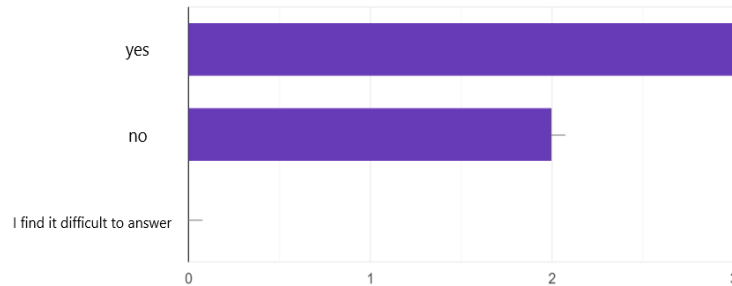Do you think e-learning is more effective than face-to-face training (live trainings, seminars, etc.)?

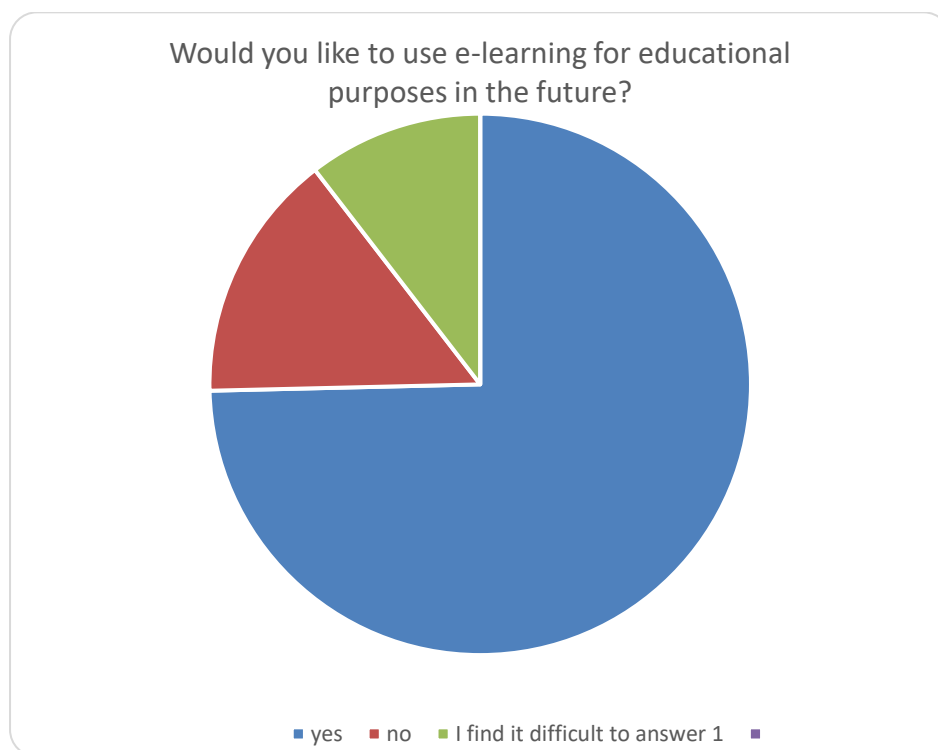**Figure 1. The ratio of the number of people willing to accept e-learning**

Figure 2. Percentage of using e-learning

According to the diagram (Figure 2) we can see that a large number of people surveyed are inclined to use e-learning in the future.

Based on the research, most students are interested in e-learning (Figure 3). Since it creates the conditions for an effective educational process, the possibility of learning

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according to an individual plan.

What are the benefits of e-learning that are most important to you at the moment?
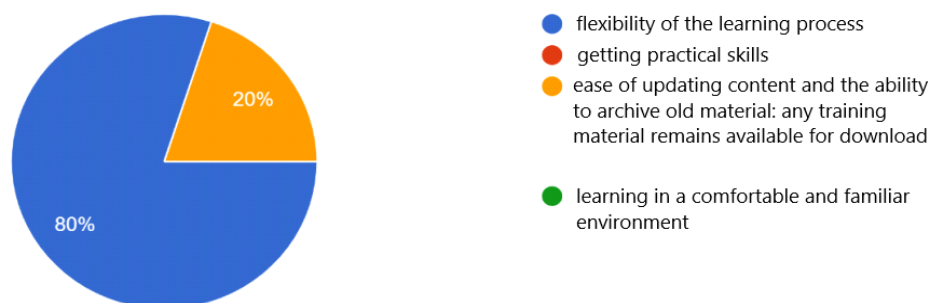

Figure 3. Percentage of the benefits of using e-learning

Based on the results of the survey, the flexibility of the educational process became important in the electronic learning method for the majority of respondents. It is necessary to highlight the main advantage, namely the ability to consider the individual characteristics of each student. For example, he can independently choose the appropriate pace, time, and place of classes for him.

Conclusion

In conclusion, it is important to note that the study on the use of e-learning is related to school education. In this regard, an experiment was conducted in one of the schools in the city of Nur-Sultan.

The analysis of teaching methods revealed that the main electronic learning tools significantly exceed the traditional ones in the ability to find information, clarity, while the lack of feedback between students and teachers leads to further research.

It is important to note the correct direction of computer graphics training, as it contributes to the development of artistic abilities and broad opportunities for self-realization. Thus, at present, e-learning has broad prospects for development. This proves the fact that there are already a huge number of different e-learning methods that are successfully applied in pedagogical practice. It can be argued that e-learning is the future for our entire generation. Perhaps in the future, e-learning will be transformed into some new directions, but the essence will remain the same. It is thanks to information technologies that there is a unique opportunity for the greatest possession of information and exchange of it.

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References

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1. Mironov D.F. Computer graphics in design: Textbook for universities/D.F. Mironov. – Saint Petersburg, 2004. – 224 p.
2. Arefeva O.V. Professional training of design students in the process of teaching computer graphics: dissertation. Magnitogorsk State University. – Magnitogorsk, 2007. – 174 p.
3. Mynbaeva A.K., Sadvakasova Z.M. Innovative teaching methods, or how to teach in an interesting way: A textbook. – 11th ed., Almaty: Evero, 2018. – 356 p.
4. Friedman L.M.Visibility and modeling in training // New things in life, science, and technology. – 1984. – No. 6. – P. 80.
5. Kodzhaspirova G.M., Petrov K.V.Technical means of training and methods of their use: A textbook for students of higher educational institutions. 2nd ed., revised and supplemented. – Moscow: Publishing Center «Academy», 2005.
6. «Graphics and design» for grades 10-11. The standard curriculum for the academic subject of the level of general secondary education according to the updated content [Web source]. – 2022. – URL: http://sumativ.kz/umzh-dsp-grafika-i-proektirovanie-dlya-10-1/ (accessed 05.05.2022).

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Білім беру жүйесіндегі компьютерлік бағдарламаларды оқытудың заманауи әдістерін зерттеу

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Аңдатпа. Мақалада білім беру жүйесіндегі компьютерлік бағдарламаларды оқытудың заманауи әдістерін зерттеуге байланысты мәселелер қарастырылады.

Мақала білім беруде оқытудың заманауи әдістерін қолдануға арналған және компьютерлік графиканы оқыту әдістері туралы ақпаратты шолу, талдау және жалпылау болып табылады. Компьютерлік графиканы оқыту – дербес компьютерді қолданудың маңызды бағыттарының бірі қазіргі кезде білім берудің маңызды компоненті ретінде қарастырылуда. Сондай-ақ, мақалада электрондық оқыту әдісін қолдану туралы зерттеу деректері талқыланады. Зерттеулер негізінде тұлғаның жан-жақты дамуына ықпал ететін заманауи оқыту әдістерін енгізу қажеттілігін атап өтуге болады. Әр түрлі ақпарат көздерін, интерактивті технологияларды кеңінен қолдануға назар аудару керек. Сонымен қатар, оқу үдерісіне заманауи электронды әдістерді енгізу мүмкіндік береді: оқу процесін белсендіру, уақытты үнемдеу, қолда бар жабдықты қолдана отырып виртуалды демонстрациялар жасау мүмкіндігі. Мақалада келтірілген компьютерлік графиканы оқыту әдістемесі білім беру үдерісінде тығыз байланысты бірнеше компоненттердің өз ара байланысына негізделген, оқытудың дидактикалық

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құралдарын, әдістерін, формаларын таңдау мен байланысты және оқушының жеке қалауын, сонымен қатар қоғамның қазіргі талаптарын ескере отырып, шығармашылық қабілеттерін қалыптастыруға бағытталған.

Түйін сөздер: компьютерлік бағдарламалар, компьютерлік графиканы оқыту, электронды оқыту әдістемесі, компьютерлік графика.

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Исследование современных методов обучения компьютерных программам в системе образования

Аннотация. В статье рассматриваются вопросы, связанные с исследованием современных методов обучения компьютерным программам в системе образования. Обучение компьютерной графике – представляет в данное время один из ключевых моментов в образовании. В статье представлены исследования современных методов обучения компьютерным программам в системе образования. Материал, изученный в статье приводит к необходимости внедрения современных методов обучения, способствующих развитию всесторонней личности. Исходя из результатов опроса, важным в электронном методе обучения для большинства опрошенных, стала гибкость учебного процесса. Широкие возможности использования информационных технологий приводят к детальному изучению современных методов обучения. В результате исследования были сделаны выводы по выявлению тенденции развития принципиальных основ обучения компьютерным программам в системе образования.

Ключевые слова: компьютерные программы; обучение компьютерной графике; Методика обучения компьютерной графике электронное обучение.

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