

The use of interdisciplinary integration in the development of graphic competence of future teachers of mathematics and informatics

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Abstract. This article presents proposals and recommendations regarding the use of integration of geometry, mathematics and computer graphic programs in the development of graphic competence of future informatics teachers.

Key words: computer graphics, competence, mathematics, geometry, independent education, GeoGebra, Aurora 3D.

Today, due to the transition of higher education institutions to the credit-module system, there is a need to improve the system of organizing independent education of future specialists and introduce modern approaches to developing their competence.

One of the ways to introduce modern approaches to the development of the professional competence of future informatics teachers, including graphic competence, it is considered appropriate to focus on the algorithms and methods of solving the fundamental problems of computer graphics in their independent educational activities and to ensure their interdisciplinary integration [1- 3].

The use of interdisciplinary integration can be an important area of interactive, practical, developmental education, at the same time, future informatics will not be an object of the educational process of teachers, but will become a real subject in which independent learning of educational subjects prevails. The use of this teaching method allows for competent problem solving and the formation of research skills.

When using the recommended methodology, future informatics teachers directly participate in the cognitive process, plan all possible options for solving the problem, select the necessary information, formulate the educational task independently, analyze their decisions and make relevant draws conclusions [4]. Therefore, it is necessary to organize future informatics teachers in higher education institutions on the basis of integration of computer graphics programs in their independent education with subjects, especially mathematics [5]. A good mathematical preparation of the future informatics teacher is the fundamental basis for successfully solving computer graphics problems.

In this regard, according to M. V. Shvetsky, computer science can be achieved through a combination of theory, abstraction and application to educational content [2]. By studying mathematical algorithms and special data structures with the help of certain practical and instrumental programs, it allows future informatics teachers to acquire fundamental knowledge and develop their competence. This indicates the need to study mathematical algorithms of raster, vector, fractal graphics, two-dimensional and three-dimensional graphics, and independently complete complex projects related to graphics [1].

For this, it is necessary to solve the following series of problems: 1) to study the mathematical foundations of building a graphic object; 2) study the computer (machine) graphics algorithm for building a given object; 3) knowledge of object modeling; 4) Learning to work with graphic object visualization tools, i.e. raster and fractal graphic programs; 4) computer implementation of the graphic object construction algorithm in the selected visualization environment; 5) to know the rules of creating colors and designs for built shapes and objects; 5) analysis of the obtained graphic object (analysis of the selected method, testing of the program, saving of results).

In order to improve the effectiveness of teaching computer graphics and develop the graphic competence of future informatics teachers, the type of graphics, the level of the problem, and the means of solving it are important [6].

Therefore, it is considered appropriate to provide tasks by providing interdisciplinary integration in the organization of independent education of future informatics and future mathematics and informatics teachers from the subjects "Computer graphics" and "Computer graphics and web design". The following sample examples of assignments are recommended by ensuring interdisciplinary integration. Achieving a high level of mathematical training of future informatics and mathematics and informatics teachers is observed when solving mathematical problems, especially geometric problems. Geometry is a propaedeutic course in terms of content for computer graphics. The basic concepts of geometry, point and line, the concept of computer pixel and segment, graphs, basic axioms and theorems are necessary knowledge for solving computer graphics problems [7]. On the other hand, solving geometric problems with the help of computer graphics allows to increase interest in geometry, to repeat and deepen the knowledge and skills of solving geometric problems, and to visualize the results of solving geometric problems. There are a number of conditional classifications of geometric problems: practical; standard and non-standard; application of individual theorems and formulas; educational, investigative, problematic, etc.

The most common classification of geometric problems are the following problems: calculations; prove; constructive issues for building. Geometric problems in geometry courses in higher education institutions are standard and non-standard, have ready-made algorithms or these algorithms are derived from definitions and theorems, and are studied before graphic programs. It does not take much time to learn the mathematical solution.

In short, in today's education system, interdisciplinary integration is becoming more and more popular. This is natural, because the integration of disciplines aimed at the development of independent scientific research, the ability to pose a problem, collect and process data, conduct experiments, and analyze the obtained data are among the active teaching methods used by experts. is one. Trainings and organized independent education with the help of integration of sciences, mathematics and computer graphics will help to develop the analytical thinking of future informatics teachers, creative approach to reality phenomena, formation of skills of objective assessment of these phenomena and use helps to develop the ability to use additional sources of knowledge and resources. The result is the development of graphic competence of future informatics teachers.

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