THE ROLE AND IMPORTANCE OF SOFTWARE IN THE DEVELOPMENT OF STUDENTS' CARTOGRAPHIC COMPETENCE

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Abstract:
In this work, the role of software tools in the development of cartographic competence of future engineers in technical higher education institutions is discussed.

Keywords: engineer, cartographic competence, software tools, Geoinformation system (GIS).

Introduction

At present, great researches and studies are being conducted in all sciences and fields, and unprecedented results are being achieved. In particular, the fact that cartography and geoinformatics are developing as fields of science, technology and production is not a secret to any specialist. The introduction of geographic information systems (GIS) into science has led the field to develop more rapidly with images.

Research of demographic processes in different regions of our country on the basis of modern geo-information technologies and cartographic methods, collection, storage, creation of a database, digitalization, analysis, processing, registration of demographic data when drawing up maps, assessment, automatic forecasting, modeling, integration and visualization based on spatial data are understudied. For this reason, there was a need to study demographic processes based on geo-information technologies and cartographic methods.

Taking this into account, it is important to use geoinformation systems created on the basis of information and communication technologies in the formation and development of cartographic competence in future engineers.

Geoinformation system is a generalized software system under the control of experts and analysts, whose main tasks are to collect, store, manage, analyze, model and describe geospatial data of natural and social phenomena using special tools.

The geographic information system helps to describe objects on the earth, including buildings, cities, roads, rivers, and countries through a computer. Currently, this system is being used to describe and analyze human activities and changes in the world, to identify and understand problematic situations. Analytical problems described by cards help a person to understand more visually than various numbers and diagrams. This is due to the fact that currently there are many methods used to

describe a problem visually through GIS. These methods include different colors, three-dimensional views, and vector rendering, which in turn reveal aspects that are difficult to understand through text or numbers. Therefore, although this system belongs to the group of technological systems, it is also widely used in the social, economic and health sectors. Currently, the scientific basis of the geographic information system is widely studied, and now mapping through maps has become one of the proven methods in the field of geographic knowledge. When we start to understand and solve problems in any field, we can now immediately develop a digital map of that problem, look for solutions by assessing the scope of the problem, and make decisions accordingly. Special programs used in the geoinformation system are mainly divided into two types, and they consist of the following:

1. Paid programs. They include programs from the ArsView family of the now popular ESRI company, GIS MapInfo Professional, AutoSAD Map 3D, Geomedia Professional, Panorama, Remoteview, Bentley Map, Erdas Imagine.

2. Open source software. These free GIS software include Quantum GIS (QGIS), GRASS GIS, gvGIS, ILWIS, JUMP GIS, MapWindow GIS, SAGA GIS, Sapaware, FalsonView, Kalypso, TerraView, Whitebox GIS.

ArsView software system. ArsView is a program from ESRI, which is developed in several series as a generation. The first generation of ArsView was created in 1993 as a plug-in for the Ars/Info system and was intended for mass users. ArsView is a very convenient program for creating, analyzing and displaying cartographic data. The first and second versions of ArsView were developed as the simplest and at the same time effective program for viewing and analyzing geographical data (objects and events) distributed over a certain area. The fields of application of this program are diverse, namely business and science, education and management, social field, demographic and political research, industry, production and ecology, transportation and oil and gas industry, land use and cadastre and other fields. .

Creation of thematic cards and plans, their processing, formation, integration and visualization of databases were considered as one of the main tasks of GIS technology. Today, in the field of cartography, we can clearly see the activity of methodological and technological aspects of new geo-informational cartography. Geoinformation cartography and geographic information systems are of great importance in the creation of maps, instead of analog methods, the methods of creating a database and electronic maps based on GIS software.

GIS technologies - collection of geodetic and cartographic information on all events occurring in nature and society, their processing and systematic analysis, updating of data, storage of results and collection of automated programs providing processing at

the necessary time it is appropriate to give a definition. It should be noted here that another great opportunity of the GIS programs is that if the cartographic basis for the created map is prepared, it will allow to quickly and qualitatively prepare maps of all topics with the help of statistical data. In this case, it is necessary to prepare a large-scale cartographic basis from the map scale that will be created. The popularization of GIS technology programs for displaying population cards is software aimed at performing a number of practical tasks and research related to the population. When mapping demographic processes, it is first necessary to create a database in many GIS programs that collect all statistical and other information. GIS technologies serve as the main tool for mapping the population. In this case, each demographic data is represented in separate layers. All data displayed on the basis of demographic digital map layers compiled in GIS programs will be analyzed and will provide an opportunity to automatically compile forecast maps in the future.

Pedagogical software tools are a didactic tool designed for partial or complete automation of the educational process with the help of computer technologies. They are considered one of the promising forms of increasing the effectiveness of the educational process, and are used as teaching tools of modern technologies. Pedagogical software tools include: a software product (set of programs) aimed at achieving specific didactic goals in this subject, technical and methodical support, additional auxiliary tools.

In the course of the research, it becomes clear that, on the basis of GIS technology, there is a need to develop a new methodology for creating new-generation maps reflecting demographic processes. Based on these, the technology for creating the following demographic digital cards was developed (Fig. 3). The sequence of work in the introduction and implementation of the technology for creating population cards is as follows:

1. Study the demographic situation of the region. At the same time, digital data is collected and databases are formed by collecting original author's materials, stock cards and remote sensing materials. At this stage, the scope of work includes the process of geographically studying the demographic situation of the selected area

2. Classification and analysis of demographic objects. Existing tables (attributes) and textual data collected in this process are entered into computer memory.

3. Development of a conditional sign system. In this case, a library of conditional symbols describing demographic processes is created, as well as legends explaining local events and events are created based on the library of conditional symbols created according to the standard.

4. Work with thematic layers of the card. In this case, thematic layers are correctly placed in the selected sequence, and cartographic image creation and their editing are carried out.

5. Thus, after the above steps have been successfully completed, the composition of the card (the border of the depicted area, its placement in relation to the card frames, the name of the card, the scale, the legend, various numerical and textual data, tables, graphics, additional sections appropriate placement of cards and other similar information) will be developed, prepared for publication and published. It is possible to create population digital cards in various directions based on the methodology of the technology of creating demographic digital cards developed above. When creating cards reflecting demographic processes in GIS programs, data is digitized and displayed on a computer screen, that is, complex editorial preparation is carried out. The process of digitalization of maps is carried out by scanning cartographic materials using special devices, and at the next stage, by converting raster data into vector. The technology of creating digital cards improves the quality of electronic digital population cards based on the use of a single system for creating cards. The fact that it was created using special GIS programs and cartographic research methods made it possible to improve the accuracy and speed of creating thematic cards, analyzing the information on the cards.

GIS technology and maps are constantly complementing each other, and we see this in the creation of maps and plans, their processing and data integration. Creation of thematic cards and plans, their processing, formation, integration and visualization of databases were considered as one of the main tasks of GIS technology. Based on the fact that the reflection of demographic processes on cards based on GIS programs is aimed at the implementation of a number of practical tasks and researches related to the population, a systematic technology was developed for the analysis of demographic situations in the southern region and the creation of their electronic digital cards.

During the research, we developed the following conclusions on the development of cartographic competence of future engineers:

1. The problem of developing the professional competence of future engineers is of particular importance in the process of training highly qualified specialists in the continuous education system. The development of the scientific-methodological foundations of this problem allows for the effective organization of the noted process, the creation of programmed educational tools based on a systematic approach to their theoretical and practical basis, as well as to the improvement of the professional training system of engineers.

2. The types of professional activities of engineers: constructive, organizational, communicative, informational, developmental, mobilizing, control, technical, etc. was found to be.

3. The expediency of using the computer-based programmed educational method as a basis for improving the process of professional training of future engineers was substantiated.

4. The procedure for using computers in the process of the formation of their professional activities of future engineers, the fact that it consists of tasks that create and control teaching skills, and their classification was clarified.

5. In the process of studying general and specialized sciences, the basis of preparing the future engineer of professional sciences for professional activity based on electronic software tools was created and didactic possibilities were revealed.

REFERENCES

1. Zuxurov Y.T. "Dasturiy vositalardan foydalanib talabalarning kartografik kompetentligini rivojlantirish metodikasi (5311500-geodeziya, kartografiya va kadactr (qurilish))". P.f.b.f.d., (PhD)., diss., Toshkent – 2022 y

2. Zuxurov Y.T. Talabalarda kartografik kompetentlikni shakllantirishning pedagogik sharoitlari. "Kasb-hunar ta'limi" ilmiy-uslubiy, amaliy, ma'rifiy jurnal. Toshkent, 2021-yil, 1-son.

3. Zuxurov Y.T. Texnika oliy ta'lim muassasalari talabalarining kartografik kompetentligini shakllantirish uchun kasbga yo'naltirilgan ta'lim texnologiyalarini loyihalash. Ishlab chiqarishning texnik, muhandislik va texnologik muammolari innovatsion yechimlari mavzusidagi Xalqaro miqiyosidagi ilmiy-texnik anjumani materiallari to'plami-Jizzax: JizPI, 29-30 oktabr 2021-yil. 2-QISM. 1013-bet

4. Zuxurov Y.T. Texnik oliy ta'lim muassasalarida talabalarning kartografik savodxonligini shakllantirishning nazariy modelini yaratish. Texnologik va professional ta'limni modernizatsiyalash, muammolar va yechimlar mavzusidagi Respublika onlayn ilmiy-texnik anjuman materiallari to'plami. Buxoro, 2020-yil 20-noyabr.