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

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ABSTRACT: At present, great researches and studies are being carried out in all sciences and fields, and unprecedented results are being achieved. The development of geography, cartography, and geoinformatics as science, technology, and production is beyond anyone's knowledge. The introduction of geographic information systems (GIS) into science has led to the development of the world at an even faster rate.

KEYWORDS: Cartographic competence, geoinformation technologies, engineer, geoinformation system, demographic processes.

INTRODUCTION

Research of demographic processes in different regions of our country using modern geoinformation technologies and cartographic methods, collection of demographic data in the creation of maps, verification, creation of a database, digitalization, analysis, processing, registration, evaluation, automatic forecasting, spatial data modeling, integration and visualization studies are understudied. Due to such geo-information technologies and cartographic methods, the need to study demographic processes has arisen.

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.

A geoinformation system is a computerized system under the control of managers and analysts, the main tasks of which are to collect, store, manage, analyze, model and interpret geospatial data of nature and society using special resources.

The geographic information system helps to visualize objects on the earth, including buildings, cities, roads, rivers, and countries through a computer. Currently, this system is used to describe and analyze human activities and changes in the world, identify and understand problematic situations. Analytical problems described by cards help people to understand more visually than various numbers and diagrams. This is because there are currently many methods used to describe a problem visually through GAT. These methods include different colors, three-dimensional views, vector rendering, and this in turn reveals 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 ArcView family of the now popular ESRI company, GIS MapInfo Professional, AutoCAD 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, Capaware, FalconView, Kalypso, TerraView, Whitebox GIS.

ArcView software system. ArcView is a program from ESRI, which is developed in several series as a generation. The first generation of ArcView was created in 1993 as a plug-in for the Arc/Info system and was intended for mass users. ArcView is a very convenient program for creating, analyzing and displaying cartographic data. The first and second versions of ArcView 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 computer are diverse, namely, business and science, education and management, social field, demographic and economic research, navigation, production and ecology, transportation and oil and gas navigation, land use and design, and other fields.

Creation of thematic cards and plans, their processing, formation of databases, integration and visualization were considered as one of the main target tasks of GAT 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 GAT software.

It is appropriate to describe GAT technologies as a set of automated computers that collect, process and systematically analyze geodetic and cartographic information on all phenomena occurring in nature and society, update data, verify results and process when necessary. It should be emphasized here that another great opportunity of GAT computers is that when a cartographic map is prepared for the map being created, it allows for the quick and high-quality preparation of maps of all subjects with the help of statistical data. In this case, it is necessary to prepare a large-scale cartographic acoc from the map scale that will be created. The popularization of GAT technology software for displaying population cards is software aimed at carrying out a number of practical tasks and researches related to the population. When mapping demographic processes, it is necessary to first create a database in many GAT programs that collect all statistical and other information. GIS technologies serve as the main tool in mapping the population. In this case, each demographic data is represented in separate layers. All the data displayed on the basis of demographic digital map layers created in GIS programs will be analyzed and will provide an opportunity to automatically create forecast maps in the future.

Pedagogical computer programs - didactic programs intended for partial or complete automation of the educational process with the help of computer technologies. They are one of the most promising forms of increasing the camaraderie of the educational process, and they are used as a teaching tool of modern technologies. Pedagogical computer resources include: computerized products (complex of computers), technical and methodical support, additional auxiliary computers aimed at achieving specific didactic goals in this subject.

In the course of the research, it becomes clear that on the basis of GIS technology, the need to develop a new methodology for creating new generation maps reflecting demographic processes is evident. 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 of the demographic situation of the area. At the same time, digital data is collected and databases are formed from author's originals, 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 will be created, as well as legends explaining local events and events will be created in the library of conditional symbols created according to 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 editing are carried out.
5. Thus, after the successful implementation of the above steps, the composition of the card (the border of the depicted area, its placement in relation to the card frames, the name of the card, scale, legend, various numerical and textual information, tables, graphics, additional cross-sectional cards and other similar information suitable placement) is developed, it is prepared for publication and publishing works are carried out. On the basis of the above-developed demographic digital card creation technology methodology, it is possible to create population digital cards in various directions. When creating cards reflecting demographic processes in GAT 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 fact that the cards are created based on a single system. The fact that it was created using Maxcuc GAT computers and cartographic survey devices made it possible to improve the accuracy and speed of creating thematic maps, analyzing the information on the maps.

GAT 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 most important tasks of the GAT technologist. Based on the fact that the display of demographic processes on the cards of GAT computers 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.

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