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THE USE OF ELECTRONIC ATLASES FOR SCHOOL GEOGRAPHY TEACHING (FOR GEORGIAN SCHOOLS)

ABSTRACT

Over the centuries, methods and techniques for creation and use of maps and atlases have gradually developed and improved. Cartographic products today are used by a large number of individuals, groups, companies or organizations. They are used for decision making, navigation, training, relaxation, information and many other practical purposes. Accordingly, the objective of modern cartography is to broaden the knowledge of cartography and geographic information and methods of its use among the general public, especially among schoolchildren. Practical experience shows that modern technologies (phones, smartphones, tablets, etc.) are of particular interest to students, so electronic theoretical and illustrative material should occupy an appropriate place in the teaching of school subjects. Learning subjects not only by textbooks but also using digital explanation will make learning process easier and happier. This article discusses a project “Geography of continents and oceans, electronic atlas”, created for electronic teaching of geography in the school system in Georgia. The project is intended as supporting material for the 7th and 8th grades of public schools and will enter into force in the 2020–2021 academic years. Successful implementation of the project will allow us opportunity similarly develop an electronic education method for other classes in public schools and will allow method to be used in other disciplines or to be extended to special secondary and higher educational institutions.

KEYWORDS: geography, electronic maps and atlases, school education system, electronic teaching

INTRODUCTION

The creation and use of maps and atlases has a long history. Over the centuries, methods and techniques for their creation and use have gradually developed and improved. Ancient maps were illustrations that were executed on various materials (stone, leather, fabric). With the development of paper production and printing technology, humankind has received maps and atlases printed on paper, which can be freely called the “cartographic renaissance”. Despite several centuries of history, these technologies are still very important and are developing rapidly.

Since the 60s of the 20th century, the development of computer technology laid the foundation for a new era in this direction. During this period, the development of electronic (digital) maps, atlases and geographical information systems began. This technology is the fastest growing and developing today, and covers almost all areas of life and is widely used. The proof of this is that electronic maps can now be used through the most common technical means (computers, tablets, mobile phones), which is very important from a practical and cognitive point of view.

Former president of the International Cartographic Association Georg Gartner, in a book produced to accompany the International Map Year, notes that “Cartographic products today are used by a large number of individuals, groups, companies or organizations. They are used for decision making, navigation, training, relaxation, information and many other practical purposes. Accordingly, the objective of modern cartography is to broaden the knowledge of cartography and

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geographic information and methods of its use among the general public, especially among schoolchildren [The World of Maps, 2014, p. 147].

One of the tasks of modern school education system is that students could use the theoretical knowledge gained during the course of his studies in practice. In the course of studying geography, visual materials i.e. geographic maps are the main means of cognition, which makes educational material more understandable and memorable. Therefore, we can say that the map is an integral attribute in the teaching of geography [Gordeziani, 2004, p. 128]. Despite the fact that in many countries of the world, along with printed illustrations, they are already widely used, their electronic (digital) analogues, electronic illustrations in the educational system of Georgia have not yet been included.

Based on the foregoing, the objective of the presented study is to prepare illustrative materials (both individual maps and atlases) created on the basis of the best world experience and created using modern electronic (digital) technologies that will be used in teaching school geography.

Our working group has begun work, on the use of electronic maps and atlases for training, since 2007. The group brought together experts from different fields: cartographers, geographers, programmers, philologists, designers. Since Georgia had no practical experience in this area, it was necessary to overcome many difficulties from the very first day. First of all, work was carried out in the direction of school geography. During this period, several models were created — electronic atlases of various classes and electronic versions of geography lessons. Despite the problems, by joint efforts of specialists and with the help of a private investor was developed first project “Geography of Continents and Oceans, Electronic Atlas”¹. The project is intended for 7th and 8th grades² of public schools in Georgia as an auxiliary material, and will enter into force in the 2020–2021 academic year.

MATERIALS AND METHODS OF RESEARCHES

During development of the project, the aim of our study was to discuss and analyze methodological issues related to the teaching of school geography. For this purpose, it was necessary to study the existing methodological issues and concepts [Beruchashvili, 2005, p. 113–122] related to the process of teaching geography in the educational system, which includes the entire spectrum of school geography.

For teaching geography in Georgia at different times qualitatively different materials (textbooks, workbooks, maps, atlases, contour maps, etc.) were used. These materials were created by different authors and therefore, significantly differ from each other in major parameters: in content, structure, quality of the workload and pedagogical and methodological approach. The following task has been set for our group: to study and analyze all available material in the research process and based on this, create a new effective version that would meet the standards established by the National Curriculum. Based on the foregoing, the working group studied and analyzed dozens of school textbooks, atlases, and other additional materials on geography. Quite large differences were revealed not only between the works of different authors, but also between the chapters of individual textbooks created by the same author. This means that, for example, the study of the “African continent” is thought out and processed differently by different authors. Also, the structure of different continents is presented with a different approach in the same textbook.

¹ According to the standard of teaching geography at the general education level in Georgia, maps and atlases are classified as “supporting educational material” and do not require a license. Any natural or juristic person has the right to create and distribute such products. The selection, acquisition and use of auxiliary materials is carried out individually by a specific educational institution, which has complete freedom of action in this regard

² Schooling in Georgia comprises 12 academic years (classes). Geography study begins in 6th grade and continues until 11th grade

You should really have in mind that in most cases (except for individual cases) thematic maps in textbooks are presented on a small scale and do not meet the requirements for training both in content and in visibility. Physical and political maps deserve a special low assessment in this regard. Compared to maps shown in geography textbooks, a higher assessment can be given to maps placed in atlases, which are much better in all parameters. This once again indicates that in the case of using printed material, only textbook is not enough, and atlases and maps must be used.

As a result of studying and analyzing existing materials, was developed the methodology necessary for our project, where all the necessary issues were discussed in detail: Software parameters, electronic atlas structure, list of maps, load of content, amount of additional information, use of ready-made software or “electronic atlas”. In this methodology, were used research methods that are widespread in theoretical and practical cartography: cartographic forms of comparison, analysis, synthesis, abstraction, generalization and modeling. In addition, the methods of aerospace and geoinformation studies were used quite effectively, without which it would be almost impossible to achieve the final result.

Similar methods are already being effectively implemented in the educational systems of different countries. Therefore, we studied and analyzed several such methodologies on the examples of the USA¹ [Brysch, 2014], Germany², Great Britain³, Ukraine⁴. All of them have both common and significantly different signs. Despite the use of these materials in research, our project is completely authentic and is not an exact analogue of any of them.

RESULTS OF RESEARCHES AND THEIR DISCUSSION

As a result of the researches, the project — “Geography of continents and oceans, electronic atlas” was developed. The essence of our project is the use of electronic maps in the geography teaching process in public schools and introducing it as a new teaching method. The illustrative material created in electronic (computer) format has not been used in the Georgian education system up to the present. This method has several significant advantages compared to the existing method (using printed maps and atlases) [Chekurishvili, 2002]:

- the electronic format of the card allows you to use it on various scales and with different contents, providing a high degree of visualization and degree of detail;
- all major maps are accompanied by additional information and a search system that provides much more information than any geographic atlas;
- all students can participate in the learning process at the same time, regardless of their number;
- this method will help the student more easily and quickly find, remember and practically use the information received in the learning process;

¹ Digital World Atlas DVD-ROM — Klett-Perthes School Wide Site License — Fully Interactive World & Human Geography Atlas — Mac OS X and Windows PC Compatible. Web resource: <https://www.worldmapsonline.com/digital-world-atlas-dvd-rom-klett-perthes-school-wide-site-license-fully-interactive-world-human-geography-atlas-mac-os-x-and-windows-pc-compatible/>

Digital maps for interactive boards. Web resource: https://www.mozaweb.com/shop.php?cmd=software_details&type=mozamap

Brysch C. Status of Geography Education in the United States. A Report for the National Geographic Society Education Foundation. Washington, D.C.: National Geographic Society 2014. 77 p. Web resource: https://gato-docs.its.txstate.edu/jcr:42d98ff7-42d2-418c-b14a-55f288f9d99c/State_of_Geography_Report.pdf

² Educational Standards in Geography for the Intermediate School Certificate. Bonn: German Geographical Society, 2012. 95 p. Web resource: https://vgdh.geographie.de/wp-content/docs/2014/10/geography_education.pdf

³ National curriculum in England: geography programmes of study. Department for Education. 2014. Web resource: <https://www.gov.uk/government/publications/national-curriculum-in-england-geography-programmes-of-study>

⁴ The curriculum for general educational institutions, Geography, 6-9 grade. Ministry of Education and Science of Ukraine. 2017. 77 p. Web resource: <https://mon.gov.ua/storage/app/media/zagalna%20serednya/programy-5-9-klas/geografiya-6-9-14.07.2017.pdf> (in Ukrainian)

- electronic materials have a much faster and more efficient way of updating information than it is possible with printed materials. This is especially important in the case of maps and additional materials of social (socio-political) content, due to the rapidly changing nature of such information;
- the program has a “Help” button, which is the instruction of the program.

It should be taken into account that the software product developed within the framework of the project must meet the standards and results that must be achieved at each level of education in the country (in our case, in Georgia). This means that it should be compiled according to the curriculum of the corresponding class. In our case, the project exactly corresponds to the geography training program for grades 7th and 8th.

GEOGRAPHY OF CONTINENTS AND OCEANS Electronic Atlas

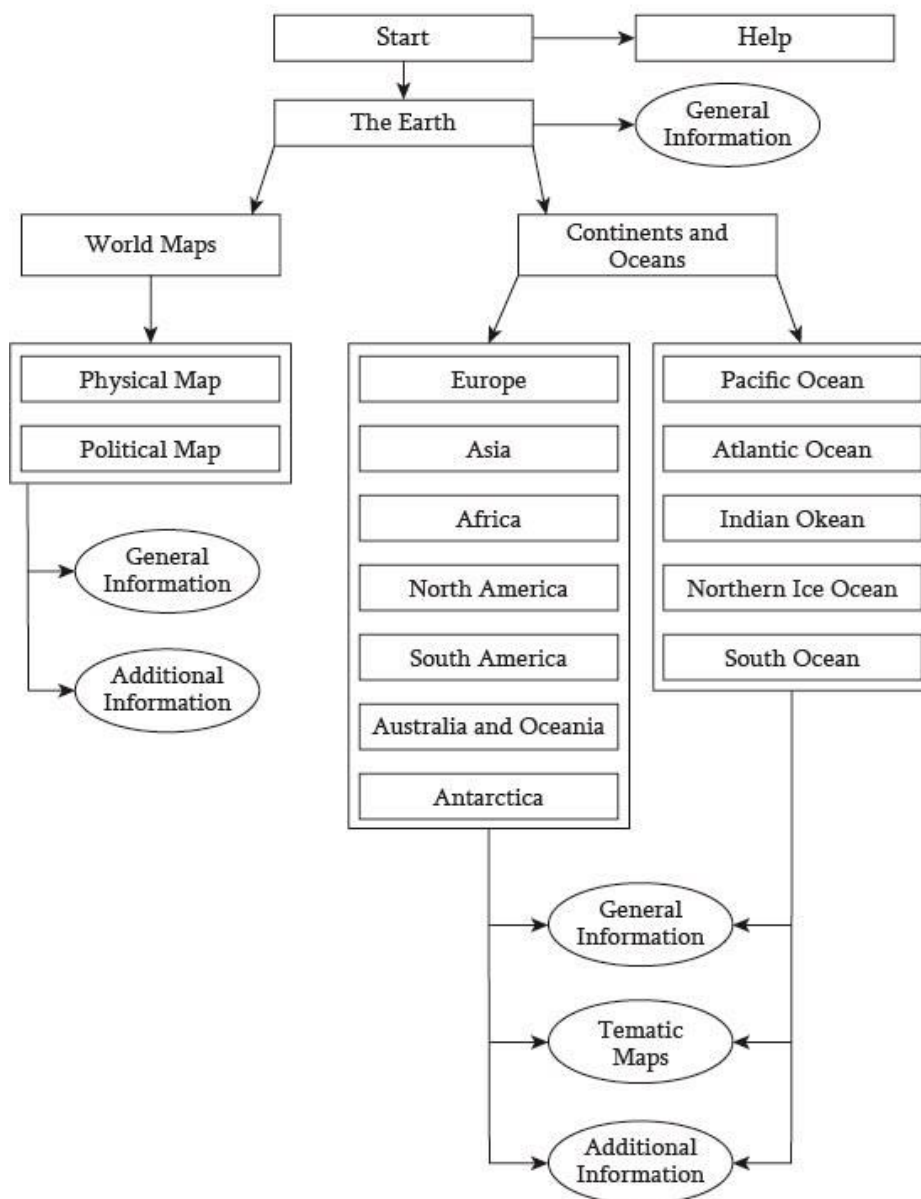


Fig. 1. The internal structure of the software

The project implementation process includes several stages:

- Creation of geographical maps of different content and scale;
- Development and creation of an internal structure of the software (fig. 1);
- Search and processing of geographic information from various sources;
- Integration of geographic maps and information with software;
- Software design;
- Running a completed project in test mode at a pre-selected public school;
- Take note of comments and recommendations of specialists;
- Batch Production of software product;
- Introduction of an electronic method of training throughout the country.

This scheme should be deployed to describe in more detail what information is contained in the electronic atlas.

- **Maps of various contents and scales for each continent:** physical, political, geological, climatic, for natural zones, hydrographic networks, soils, landscapes, etc. Among them, physical and political maps are larger and more detailed than other maps. Apart from this, these maps are accompanied by additional information of a large volume¹ (fig. 2, 3). In general, the program includes more than 50 maps and related information.

- **Additional information** on physical maps is given in the form of a search system and is sorted both alphabetically and by type (for example, mountains, peaks, rivers, lakes, etc.). The names of any objects shown on the map are very easy to find in the search system. By clicking on the name, the program will automatically move the map and show the location of the selected object (fig. 4).

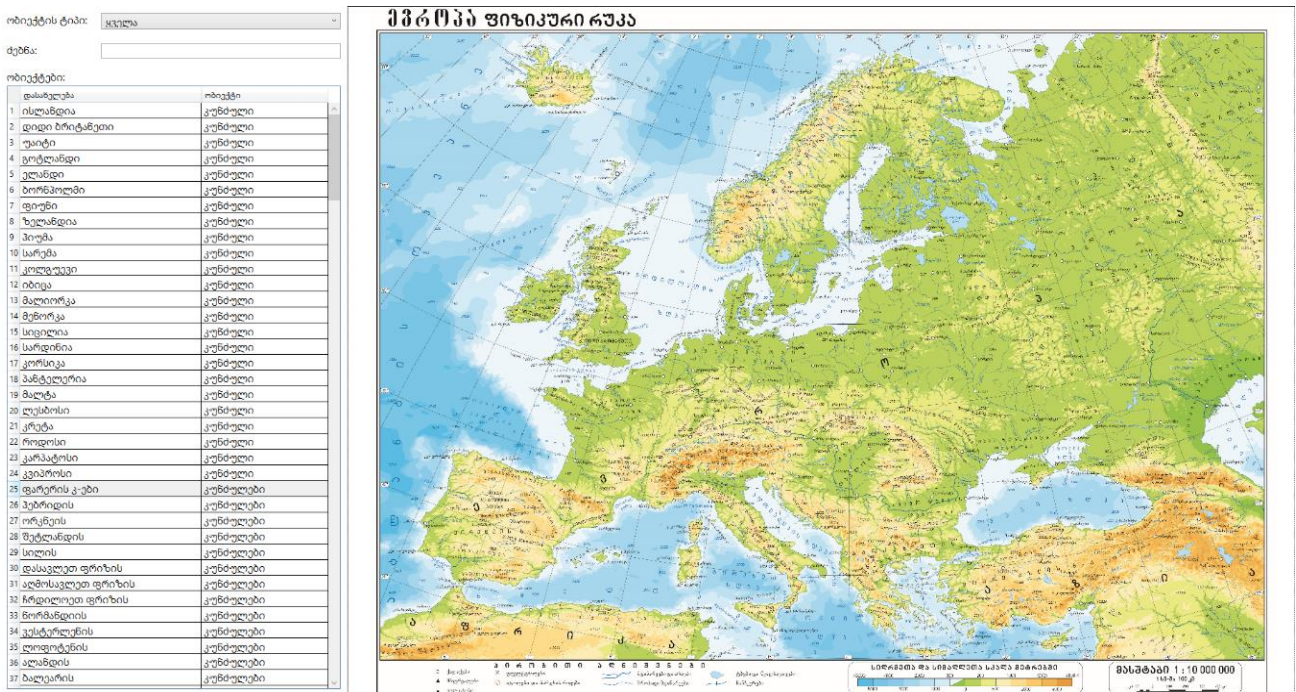


Fig. 2. Physical map of Europe (general view). Geographic map collection

¹ Since the project was created for the Georgian school education system, all maps and information are in Georgian



Fig. 3. Political map of Europe (general view). Geographic Map Collection

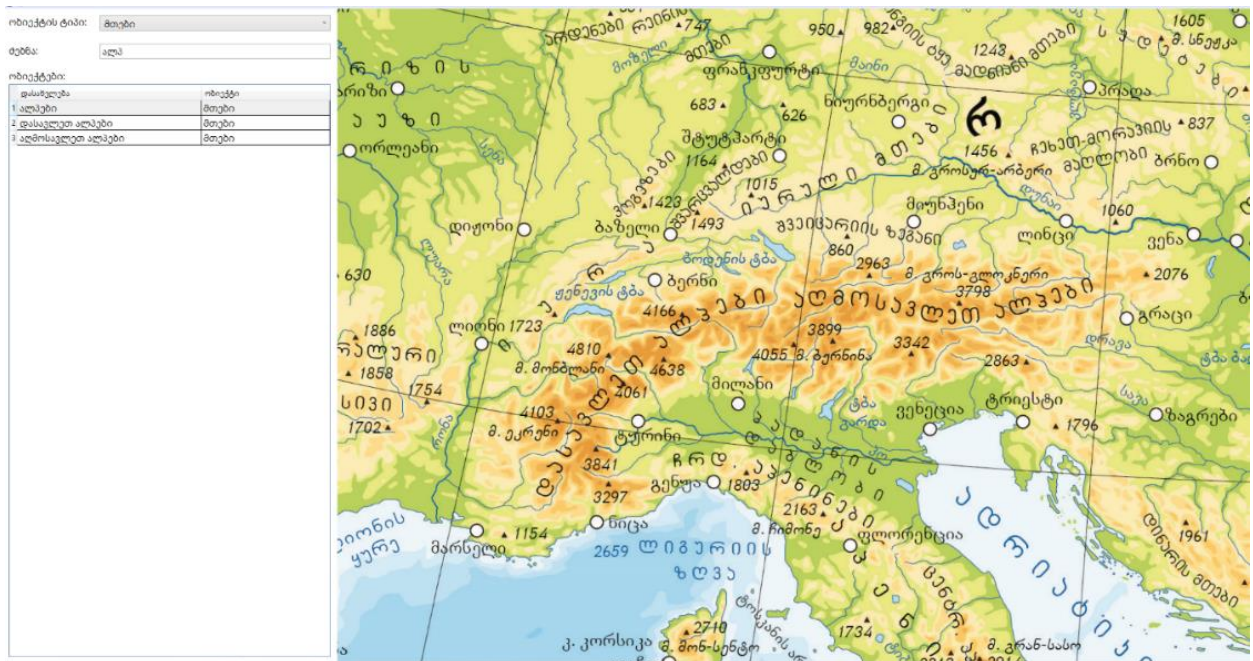


Fig. 4. Display of a specific physical-geographical unit (mountain system of the Alps) on the map by using the search system. Geographic Map Collection



Fig. 5. Display of a single country (Austria) on a map by using a search system. Geographic Map Collection



Fig. 6. Map of the Pacific Ocean (general view). Officer Atlas

- On **political maps**, search system gives the names of countries (in alphabetical order), the total area and population. All three types of information can be sorted in ascending or descending order with one click. This allows you to very quickly find out what place a particular country occupies in terms of area and population, and compare them with the corresponding data of other countries (fig. 3). Apart from that, one click on the name of any country gives us general information about this country - full name, location (region), total area, population, capital (population in it), largest city (population in it), date of independence, national holiday, state language, form of government, national currency, religious composition, ethnic composition, time zone, state flag, coat of arms and anthem (music files that turn on with click) (fig. 5).

- **Physical maps of the oceans** give the basic data of the World Ocean and individual oceans: conditional boundaries, surface area, water volume, maximum depth, average depth, seas that are part of individual oceans, major gulfs, coves and straits (fig. 6).

The presented scheme of project fully covers all maps and atlases used today for teaching school geography in Georgia, taking into account all their parameters. Besides that, the electronic format allows the program to optionally add any number of maps and information.

CONCLUSIONS

Practical experience shows that modern technologies are of particular interest to students, so electronic theoretical and illustrative material should occupy an appropriate place in the study of school geography.

Successful implementation of the project will allow us opportunity similarly develop an electronic learning method for other classes in public schools and will allow it to be used in other disciplines. Our working group is already working on the next project, which involves the use of a similar method in the teaching of history. In addition, in the future we plan to extend this method to special secondary and higher educational institutions in accordance with their curricula.

At a time of natural disasters, pandemics and risks of various kinds and scales, the development of electronic learning forms that are effectively used for remote learning is becoming increasingly important in the modern world. We hope that our project in this regard will be widely used both in the context of the current global pandemic and in the future when this threat will pass.

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