THE NEW CARTOGRAPHIC PRODUCTS IN BULGARIA - MODERN SCHOOL ATLASES

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Abstract
Bulgarian new school atlases and wall maps provide the best learning support for students. The aim is to offer the best quality in modern cartographic products in the Bulgarian market.

The content of all the atlases, the outline maps and the wall maps is developed according to the school curriculum in Geography. After their compiling they are approved by the Ministry of Education.

The atlases are very interesting, detailed and contain accurate data. The last ones (5 issues) and also blank outline maps (2 issues) and wall maps (more than 20 issues) are designed for students in school years 1-8 (ages 6-15, respectively). The atlases match the needs and interests of students at these ages and support the learning in geography and history.

The presentation and design is based on classroom research into children’s thinking about maps. The children ideas are incorporated into the atlases and wall maps.

INTRODUCTION

The situation in Bulgarian schools concerning the school maps and atlases was not satisfying because of the old contents and designing of existing ones at least three years ago. The school curriculum was changed during the last fifteen years. "At the same time, the cartographic firms which offered educational atlases and wall maps have not been able to give what was necessary for the educational process" [Bandrova T. and V. Nikolova, 2000]. Still nowadays many schools have old wall maps with old contents, cartographic information and design; other ones do not have maps for every continent.

These new cartographic products, published by DataMap Ltd. are made available to students and teachers as a result of the expert’s advice, ideas and efforts of schoolteachers, university professors, cartographers and specialists in Geographic Information Systems. Professional artists illustrate them with skill and the art design makes them interesting and attractive. All of them are approved as school handbooks by Ministry of Education in Bulgaria.

STUDENTS’ HELP IN MAPS AND ATLASES DESIGNING

The purpose of the final cartographic products for Bulgarian schools was to find a way for the best communication with students. Their knowledge and information help us in the process of designing maps and atlases that will both facilitate our work and return maximum information about map objects and phenomena to students. As Professor Morita has suggested “The cartographer must learn how the non cartographer draws a map, what they want to communicate, what symbolism they use and what is their logic” [Morita, 1997].

The students’ help was used in all processes of presented atlases and maps compiling in different levels.

1. The experimental work with children in devising of maps for their education (see [Bandrova T., A. Deleva, 1998]). To estimate children's imagination and their understanding of maps, experiments with 80 first and second school year pupils in Sofia were held. Children are not acquainted with the use and reading of maps and that’s why it can be assumed that the result and the analysis of the research are very useful and are aimed at the specialists cartographers. The conclusions are made on the basis of the experiments. Children show great interest for the experiments and have a desire and possibility to use maps in their education even in their earliest school age. In making maps for children a new way of working with inquiries and experiments should be used, so that the maps are appropriate for certain age. A short road to children’s way of thinking and psyche is searched this way, and thus success in education and upbringing is also reached. Work with children should
be mutual and direct, and it should continuously accompany the process of creating and using of maps for children. The information given to the children by the maps should be amusing and understandable, easily accessible to them; it should help children get a broader and diversified view of phenomenon and objects; it should be made the best to stimulate the creation of children's views and knowledge of true reality. Appropriate for children's age symbols should be used in making of maps. The maps should be aesthetically and artistically drawn up. Highly contrast colors, pictorial images and rich illustrations are preferred that make maps attractive and amusing for children.

2. **Barbara Petchenik Competition in National level.** Bulgarian students are active participants in the National competitions. Some of them participate in more than one competition and present high quality pictures. They are under general title submitted by Commission on Cartography and Children (International Cartographic Association- ICA) and also have subtitles represented special map contents. Mostly for primary schools cartographic products are accompanied by children’s drawing from local entries to the Barbara Petchenik map competition. (see [Bandrova T., 2003 (3)]).

3. **Experimental research in secondary school about information extraction and map understanding.** The wall maps produced by DataMap Ltd have been have been tested with 85 students to ensure they can be effectively read and interpreted. The research was made for final definition of symbols and text sizes, colors, necessary information and designing view of all maps before pre-publishing process. The students were asked to give answers to some questions connected with represented cartographic information. Eighty-five students, 12-13 years old were very critical, with many ideas, recommendations and compliments. They felt in the process of map producing. This fact made them proud that they were chosen for this research. The students are in one of the elite school in Sofia. Some of children ideas and disadvantages of tested maps help the author for correcting some elements. Some of texts are enlarged, some colors were changed and some additional texts were situated. Then the maps were published.

In conclusion about experimental work and students’ help could be notice that there are no doubts this is the right way for compiling of students atlases and maps. The student’s criticism and ideas are the best way to show cartographers if they present modern with enough understandable information. Work with this specific king of users group will facilitate all efforts of people engaged with school cartographic products.

**CURRICULUM INSTRUCTION FOR SKILL’S ACHIEVEMENT OF STUDENTS**

The Ministry of Education approves the curriculums in Geography and shows rules, themes and student’s achievements, which should be covered by the teachers, students and also mapmakers for every school year. The contents of the atlases and wall maps are dependent of the curriculum, all textbooks in Geography (published by different publish houses), requirements of teachers, student’s ideas received by experimental researches and advises of all participants in compiling and design process.

For example, students in school year 7 should continue skill’s creation in the following way:

1. **The students should receive the information for different sources** (maps, schemes, photos, pictures); they could geographically oriented by using of maps; they should easily read geographical maps, climate graphs, hydro-graphs, column diagrams, circle diagrams and relief profile.

2. **The students should interpret the information:** skills assimilation can be achieved by describing and explanation of a geographical theme; introduction of new skills can be achieved by characterizing, comparing, and grouping of geographical objects.

3. **The students should present the information:** assimilation of new achieved skills – this could be done by scheme drawing, map painting, diagrams drawing, mapping of trip route, compiling of thematic maps.

All these skills could be achieved, using the atlas and blank outline maps in Geography for school year 7.

**NEW ATLASES FOR BULGARIAN SCHOOLS**

A short presentation of some atlases, published by DataMap Ltd., will be done. The view of the covers can be seen in Figure 1. This is a poster used in Bulgarian book market, as well as in many of geographic cabinets and expert’s offices.
Atlas 'The Person and the Society'  
(40 pages, sizes 31x24 cm) - school years 3-4

The atlas is a useful first introduction to the world of maps. It starts by showing how the scales, distances and symbols work and offers a selection of geographical and historical maps. It is a “handbook” which is both fun to use and easy to understand. The blank outline maps help students to understand the geographical features as well as teachers test their knowledge. The historical maps follow the logic and historic succession of learned themes in 3rd and 4th grade of Bulgarian schools. They are connected with the reach history of Bulgaria. The represented themes Solar System, Plants and animals, Preserved objects are in help of school object “The person and the nature”. The design of the Atlas combines children’s drawings, photos, and artists’ illustrations.

Atlas on Geography - school year 6  
(40 pages, sizes 31x24 cm)

The maps which form the main body of this atlas, have been prepared in accordance with the highest standards of international cartography to provide an accurate representation of the Earth, using electronic maps and databases up-dated to 2002. The school atlas includes thematic maps on nature, climate, hydrography and soils, plants and animals, population and races of all continents excluding Europe. There is an informative table giving data about the continents on the last page. Realistic pictures represent people, plants and animals (see Figure 2).

Atlas on Geography for school year 7  
(40 pages, sizes 31x24 cm)

Seventeen maps of Europe, 7 of the Balkan Peninsula and 11 of Bulgaria present the school curriculum in geography in both depth and breadth. Nature and Economy are presented using the most recent data and detailed electronic map bases.

The needs of the Atlas for 7th grade of education in Bulgarian schools are grown up during the recent years.

The first reason is the forthcoming acceptance of Bulgaria in European Union. The Atlas represents the continent Europe from different sides – nature, countries, settlements, transport, industry and agriculture, etc. The students will have opportunities to acquaint with the newest achievements of European countries. For example, the export commerce
can be seen on page 19 – Transport and Trade in Europe.

The second reason is the examinations in Geography, which are held after 7th grade of student’s education. The examination synopsis includes themes about Europe, Balkan Peninsula and Bulgaria and they are represented in the Atlas in the most detailed way.

The third reason is the complicated school curriculum approved by Ministry of Education (see [4]). The rich information and maps will help students’ understanding and geographically orientation of studied topics. This is unique atlas, which represents all learn topics for 7th grade in a single issue.

The atlas gives the possibilities for easy orientation and information extraction for everyone of presented theme. This was the aim of the author and atlas compiling was made after some researches of the students understanding and needs about maps and atlases.

"Landscapes" from Europe are presented professionally by relief shading (automatically generated) and realistic drawings of plants, animals and famous buildings (see Figure 3). The atlas is a rich source of information and helps students appreciate the beauty of maps.

Figure 3: One of the Landscapes “Atlantic” representing in the Atlas Geography 7

Blank Outline Maps - school year 6
(24 pages, sizes 31x24 cm)
Blank outline maps on Geography are intended for homework and the student activities are included.
Four types of map - Nature, Climate, Countries and Photos show Africa, South America, North America Asia and Australia.

The tasks are clearly indicated with easy instructions. The scale and geographical grid are in the contents of maps. There is a special place for a map legend (see Figure 4).

Blank Outline Maps - school year 7
(16 pages, sizes 31x24 cm)
These blank outline maps of Europe, Balkan Peninsula and Bulgaria have been developed in a convenient way for homework. By following clear instructions students will understand the topics fully and accurately. They will learn what they need to know. Also they will develop good study habits and have the satisfaction of using quality maps.

Figure 4: Fulfilling of the blank outline maps
The tasks are clearly indicated with easy instructions. The scale and geographical grid are in the contents of the maps. There is a special place for a map legend.

The blank outline maps are used very successfully for assimilation of knowledge, home and class tasks and works. The clear tasks and place for map elements as a legend are enough tools for students’ homework.

**Atlas on Geography for school year 8**

(48 pages, sizes 24x15.5 cm)

The Atlas represents the information that is included in the different themes of curriculum for Geography. They are studied in the subject “Natural geography”. The Atlas is compiled on the base of the newest available digital data, using Geographic Information Systems. The maps are accompanied with schemes, graphics, profiles, satellite images, photos and text.

The themes in the atlas are:

- Cartography,
- Earth and Solar system,
- Atmosphere,
- Hydrosphere,
- Lithosphere and soils,
- Geosystems and humans.

They are clearly differentiated in the Atlas by the colors of the titles and page numbers.

Abreast of the innovation, the atlas ensures fast, interesting and successful studying by a small format, modern design and high quality (see Figure 5 and Figure 6).

**WALL MAPS OF THE CONTINENTS**

The students in the 6th year of their education are learning all of continents in the world excluding Europe (it’s learned more detailed in next year of education – 7th). For every continent they learn for the locality, coastline, nature, mountains, lowlands, rivers and lakes, minerals, soils, plans and animals, countries and capitals, etc. All of these elements are included in few maps for a continent. The following ones per a continent are designed:

1. Nature map (includes minerals);
2. Climate. Hydrograph. Plants and animals (includes climate-charts and hydro-charts)
3. Countries. People (see Figure 7);

All of them are prepared and designed used Geographic Information System (GIS), CorelDraw, PhotoShop and publishing software products. The paper sizes are 100 x 140 cm.

Ministry of Education has approved the maps as school appliances after reviews of contents, responding to curriculum and art designing by the professionals. The usefulness of maps is very high in the school works also in preparing of homework.
The major relief shapes are presented by colors and texts. Traditional symbols for Bulgarian maps are used for presentation of minerals and topographic objects on the maps.

The point, line and area symbols are presented in the legend. Hypsometric scale presents depression, contour lines with highs – 200, 400, 600, 1000, 2000, 3000m, … and depths – 200, 2000, 4000, 6000m, … The hydrography is represented in 100% cyan color for lines and texts and different percents for area presentations.

Countries with their capitals can be seen on the background. They are represented by magenta color texts.

Three nature components – climate, hydrography and plants and animals are combined in a single map. The map can be used for comparative analyses and researches.

The hydrography system, presented on the Nature map is used for this second kind of maps but it is enriched with some rivers. Climate zones, ocean currents, winds (by names and directions), meteorological stations present climate of the world. The climate diagrams for every zone and the hydro-diagram for the biggest river are presented in the south part of the map. Climate diagrams content average temperatures in ºCelsius for every month, average annual temperature, temperature amplitude, average monthly rainfall and average annual rainfall in millimeters. Realistic pictures present animals and plants. They are chosen as cartographic signs. These signs with a small type text under them make the map more beautiful and attractive.

Hydrography, country boundaries, capitals, large cities and towns are represented on the map. All this content is learned in the school and children have to know, tell, explain, and make conclusions after thinking in front of the map. The colors and font text are chosen after experiments in classrooms for easily understanding and information extraction from the map (Figure 7).

DataMap-Europe, as one of leading GIS Bulgarian company, provides rich cartographic information and vector data and aims to cover all years of education in geography and history with appropriate atlases, outline maps and wall maps, as well as to produce similar products for foreign students. Published Bulgarian cartographic products with continents’ and world’ content could be adapted to foreign schools with similar curriculum. They could be compiled also as national atlases for foreign schools with teachers’, professors’ and specialists’ advice from the corresponding country. The cartographic products could be adapted for ordinary use or for special users in any language.

PUBLISHER

Figure 7: A part of Wall Map of the Asia - Countries. People
The methodology of Atlases and Maps creation is shown. The steps of it started from:
- Idea;
- School curriculum and its analyses;
- Atlas and maps’ contents;
- Currently statistical and text data and GIS cartographic vector data base;
- Draft representation of the contents;
- Test analyses on the base of student reaction and information extraction;
- Atlas and contour maps compiling;
- Modern design
and finish with the Pre-publishing and Publishing processes.

The quality execution of all these steps could be seen in the presented issues. The atlases are the entire cartographic products and additional to it the outline maps should be treated. The all publication could be used for reading maps and information extraction and knowledge testing and assimilation. The methodology is a new for Bulgaria and the market’s results show its fairway.

The wall maps provide the very best learning support for Bulgarian students. Students could learn more from them and develop greater interest in geography.

The contents of the wall maps have been developed according the school curriculum and have been approved by the Ministry of Education. They are the best quality cartographic products in Bulgaria and the materials used for their production allows using them some years in schools.

Presented information cover all basic themes learned in 6th and 7th years of geographical education. The maps are designed and produced after atlases making for these years of education. This is very comfortably when the students use atlases, produced by DataMap and see the wall maps in front of them. The information is presented in similar way. The decisions about contents, design and cartographic presentation of information could be used for production of school maps in country with similar curriculum.

References:
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BIOGRAPHY

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1987 – 1990: Senior programmer at the Technical University, Sofia, Bulgaria

Own developed products of Datamap-Europe Ltd.
Publishing of:
- road and administrative maps and atlases
- custom-made maps and atlases
- school maps and atlases

GPS and AVL systems
GIS and Geographical Data Base
MaxInfo - CD atlas of Bulgaria
Design and processing of vector and raster maps.