Designing a new Cultural Electronic Atlas of Greece

Nikolaos Karanikolas, Pery Lafazani, Myron Myridis, Dimitrios Ramnalis

PhD Candidate, Department of Cartography, A.U.Th, karanik@topo.auth.gr
Lecturer Department of Cartography, A.U.Th, lafazani@topo.auth.gr
Professor Department of Cartography, A.U.Th, myridis@topo.auth.gr
PhD Candidate, Department of Cartography, A.U.Th, ramnalis@topo.auth.gr

ABSTRACT

Although culture and history of Greece are of the greatest ones in the European world, the cartographic and geographic analysis of this fortune can be characterized as considerably poor. No real atlas has been developed during the last years in Greece, containing such data and maps. This new cultural electronic atlas of Greece comes to supply the new socio-economic atlas of Greece (Beijing 2001), with the cultural image of the country. The reference elements for the whole mapping are the Prefecture and every municipality across the country, according to the administrative structure in Greece. In Greece, all citizens are entitled to free education in public schools. According to the National Statistic Service, the educational system of the country is divided into 3 parts: primary education, secondary education, third higher education. For the representation of data the Educational system is separated as follows: primary school, secondary school, tertiary education-University. For the cultural data, apart from the National Statistic Service for the year 1997, the Ministry of Culture has provided precious information about the archaeological sites and museums throughout the country. More than 250 museums, 180 archaeological sites, 350 monuments have enriched this Greek Atlas with this kind of information. Each part is related to a cartographic section including tables, diagrams and texts. Special attention to the visualization issues both for the electronic variant and the hard-copy counterpart of this new Atlas and some innovative tests concerning the visual treatment and some new design of symbols, pictograms and other means of thematic symbolic representation would be helpful. Moreover, the user could observe the coupling of the electronic and the hard-copy versions of the Atlas which is made due to scale selection in order to fit the Atlas format in DIN A2.

1. INTRODUCTION

The aim of this project is the design of a cultural electronic atlas of Greece. This project is being developed, among other research projects, at the Department of Cartography in the Aristotle University of Thessaloniki, Greece.

Cultural Atlases are always used as communication means for geographers, thought of as the final image of the cultural identity of a geographic region on a map. In this sense, an atlas is a collection of relative objects, which are used to portray information on this subject on a map (B. White, 1998). An electronic atlas is a digital collection of maps with illustrations, information, tables and texts. It can combine statistical indicators, tables, texts, maps, graphs, pictures, videos, audio and animation in an effective, powerful and entertaining presentation.

The development of digital technologies, G.I.S., multimedia, Internet technology has made the completion of the first electronic atlases possible. Today electronic atlases exist in a large number of web sites and on many digital video disks (DVD’s). Many institutions use atlases as information systems of their position to users, but atlases can be also used to design their policies.

It is obvious that with the use of electronic atlases someone can make better decisions with increased accuracy, speed and shared access to more data for a better public and private service planning, geographic allocation and resource allocation.

In conclusion, we could say that an electronic atlas is an information data system, which exists and operates within the interaction of digital geographic databases and maps (B. White, 1998).

1 Aristotle University of Thessaloniki,
Department of Cartography, P.O. Box 439, 54124 Thessaloniki GREECE Tel. +302310 996133, fax +302310 996415
2, 3 Ben White, 1998, Electronic Atlases: In theory and in practice
The Netherlands Cartographic Society offers a comprehensive definition of an electronic atlas: ‘an information system set up for the interactive consultation of digital geographic databases concerning a certain area or theme and containing data which is comparable in terms of the level of generalization and the resolution at which data was collected’.

On the other hand, culture is a multidimensional means for today’s communities. In this Atlas, the Greek culture is represented through time, from the ancient era to nowadays. The Greek monuments are classified in the Atlas through their thematic cultural identity. The Greek government is making a great effort to preserve national cultural heritage. All museums and institutions are also mapped representing their cultural offer today. Education is a basic indicator of national culture. The Greek education follows the European standards of education in E.U.

2. THE NEED FOR A CULTURE ATLAS IN GREECE

Although the Greek culture is one of the oldest and widest ever, there is a dramatic lack of organization and mapping culture, monuments and museums and therefore education in Greece.

The importance of this Atlas follows two basic steps.

- Use of the Atlas by educational and cultural institutions.
- Use of the Atlas by users and tourists.

The Ministry of education and other parallel educational institutes can design a successful geographical policy by using this kind of Atlases. Determining the situation in the Greek education is the final image of this culture Atlas. Quantities of educational institutions, schools, universities, quality of education, proportion of teachers per students, studies schedules, and also human geographic indicators such as an indicator of illiteracy or the percentage of bachelor holders are only a few of the themes of this Atlas.

The Ministry of culture, other culture foundations or museums can use this Atlas as a planning tool for the location of museums or as a decision tool for the preservation and spread of the cultural identity of the country.

The Atlas users have the opportunity to locate areas of cultural interest and draft information such as schedule and charge of visits to archaeological places and museums or even information and characteristics of all the Greek monuments.

To cover these basic needs, the atlas was designed as an analysis tool for national organizations, offering data and information of geographic and social interest. Moreover, the user is able to approach through the culture atlas much information about the situation and condition of Greek monuments with national and global interest. Therefore, the use of the Atlas is considered to be a multidimensional tool.

3. MONUMENTS IN GREECE, FROM NATIONAL TRADITION TO WORLD HERITAGE.

The Greek monuments have a cosmopolitan heritage globally. Three hundred (300) monuments, almost four hundred (400) archaeological sites and about two hundred and fifty (250) thematic museums are spread all over the country to remind people of the past of Greek civilization. Sixteen (16) monuments are recognized by UNESCO as monuments of world heritage, (14) monuments are listed as cultural monuments and (2) are listed as natural monuments.

From the ancient Greek civilization offering monuments such as the Acropolis, Delphi, Epidaurus, Olympia, Delos, to the Macedonian era in Northern Greece, the Roman and Byzantine civilization with great monasteries all over the country, the Greek civilization follows these basic steps:

- Prehistoric and classical Greek civilization.
- The Byzantine and post-Byzantine period.
- Contemporary history.
According to this generalized classification the ministry of culture is organized as follows:

**Archaeological Activity**

![Managerial diagram of ministry of culture.](image)

From these steps the most famous Greek monuments according to UNESCO are listed as follows:

<table>
<thead>
<tr>
<th>Monuments</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acropolis, Athens</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>2. Archaeological Site of Delphi</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>3. Archaeological Site of Epidaurus</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>4. Archaeological Site of Olympia</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>5. Archaeological Site of Vergina</td>
<td>C (i) (iii)</td>
</tr>
<tr>
<td>6. Archaeological Sites of Mycenae and Tiryns</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>7. Delos</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>8. Historic centre (Chora) with the monastery of Saint John -the theologian- and the cave of the apocalypse on the island of Patmos</td>
<td>C (i) (ii) (iii) (iv) (vi)</td>
</tr>
<tr>
<td>9. Medieval City of Rhodes</td>
<td>C (i) (iv) (v)</td>
</tr>
<tr>
<td>10. Meteora</td>
<td>N (iii) C (i) (ii) (iv) (v)</td>
</tr>
<tr>
<td>11. Monasteries of Daphni, Hossios Luckas and nea moni of Chios</td>
<td>C (i) (iv)</td>
</tr>
<tr>
<td>12. Mount Athos</td>
<td>N (iii) C (i) (ii) (iv) (v) (vi)</td>
</tr>
<tr>
<td>13. Mystras</td>
<td>C (i) (ii) (iii)</td>
</tr>
<tr>
<td>14. Paleochristian and Byzantine Monuments of Thessaloniki</td>
<td>C (i) (ii) (iv)</td>
</tr>
<tr>
<td>15. Pythagoreion and Heraion of Samos</td>
<td>C (i) (ii) (iii)</td>
</tr>
<tr>
<td>16. Temple of Apollo Epicurius at Bassae</td>
<td>C (i) (ii) (iii)</td>
</tr>
</tbody>
</table>

Table 1: Monuments of Greece according to UNESCO.
Figure 2: Museums in Greece according to Greek Ministry of Culture.

Figure 3: Monuments and archaeological places of interest in Greece.
4. EDUCATION IN GREECE

4.1. The structure of the education system

The Greek Educational System consists of three successive levels: Primary, Secondary and Tertiary education. Primary education level can be divided into Pre-school Education which is offered by kindergartens and Compulsory Primary Education which is offered by Primary schools. The attendance of Primary Education (Dimotiko) lasts six years, and children are admitted at the age of 6. Along with regular kindergartens (Nipiagogeia) and Primary Schools (Dimotika), all-day primary schools are in operation, with an extended timetable and an enriched schedule.

Secondary education level is available in two cycles: Compulsory Lower Level Secondary Education is offered at Gymnasiums and Post-compulsory, Upper Secondary Education which is offered by the Unified Lyceums and Technical Vocational Educational Institutes. The duration of studies in Eniaia Lykeia (EL) is three years and two years (a’ level) or three years (b’ level) in the Technical Vocational Educational Schools (TEE). Mutual student transfer from a type of school to the other is possible. Along with the mainstream schools of Primary and Secondary Education, Special Nipagogeia (kindergartens), Dimotika, Gymnasia, Lykeia and upper secondary classes are in operation, which admit students with special educational needs. Musical, Ecclesiastical and Physical Education Gymnasia and Lykeia are also in operation. Post-compulsory Secondary Education also includes the Vocational Training Institutes (IEK), which provide unclassified level of education.

Tertiary education is divided into University education -available from Universities- and non-university education, which is offered by Higher Technological Educational Institutes and Higher Education Institutes. Postgraduate courses are also available at Tertiary Higher education level. Students are admitted to these Institutes according to their performance at the national entrance examinations taking place at the end of the third grade of Lykeio. In addition, students are admitted to the Hellenic Open University after the completion of the 22nd year of their age by drawing lots.

In 1997 an effort was made by UNESCO to internationally classify educational systems based on seven levels of education which were described in the International Standard Classification of Education - ISCED 1997. These levels of education are:

- Isced level 0 - Pre-school education
- Isced level 1 - Primary education
- Isced level 2 - Lower secondary education
- Isced level 3 - Higher secondary education
- Isced level 4 - Post-secondary, non-university education
- Isced level 5 - University education
- Isced level 6 - Postgraduate studies

The diagram which follows shows the structure of the Greek educational system and its relation with the system of initial and continuing vocational training, in an effort to follow the International Standard Classification of Education - ISCED prepared by UNESCO.

It should be emphasized that the graph offers a general overview of the educational system with its main aspects being supervised by the Ministry of Education and forming the major part of it. However, a deeper analysis shows that the total of the education services provided in Greece form a much more complex, multilevel and differentiated infrastructure. Moreover, many other educational services, classified or unclassified, are provided in the official education system, either in co-operation with it or completely independently.

A detailed description of the Greek Educational System is offered in EURYBASE , the EURYDICE database of the European Educational Systems.
4.2. Privilege of education in Greece.

All citizens in Greece are entitled to free primary and secondary levels in public schools and universities from bachelor to PhD degrees.

According to the National Statistic Service of Greece, the educational system of the country is divided into 3 parts: primary education, secondary education, third level of education. For the representation of data, the Educational system is separated as follows: primary school, secondary school, tertiary education - University.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Percentage</th>
<th>Number of Municipalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of master holders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;2%</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>1% - 2%</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>0.5% - 1%</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>0.1% - 0.5%</td>
<td>457</td>
<td></td>
</tr>
<tr>
<td>&lt;0.1%</td>
<td>502</td>
<td></td>
</tr>
<tr>
<td>% of bachelor holders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;20%</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>10% - 20%</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>5% - 10%</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>1% - 5%</td>
<td>806</td>
<td></td>
</tr>
<tr>
<td>&lt;1%</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>% of illiterate people</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;30%</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>20% - 30%</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>10% - 20%</td>
<td>378</td>
<td></td>
</tr>
<tr>
<td>5% - 10%</td>
<td>421</td>
<td></td>
</tr>
<tr>
<td>&lt;5%</td>
<td>183</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Classification of Greek municipalities according to National statistical census of 1991.
Figure 5: Percentage of illiteracy in Greece.

Figure 6: Percentage of master and PhD’s graduates in Greece.
5. DESIGN OF THE ATLAS

5.1. Design of the environment

There are three basic steps for the design of an electronic atlas outline:

a) The use of a common GIS system provides the possibility to work with a database and create the first images of the atlas. A database providing all the statistical analysis of the atlas must be constructed.
b) The use of a graphic application prepares the files for entering a multimedia system.
c) The final process of data in a multimedia system and images representation.

Particular choices must be made regarding the format of the files, so that we can have the atlas over the web or in a compact disk. In the conclusion of the last task – the one of the completion of the atlas in a multimedia environment - all the new technologies of these systems must be used in order to achieve the best format of the Atlas.

![GIS Database ➔ Graphics Application ➔ Multimedia System](image)

**Figure 7: Designing the electronic Atlas**

![Electronic Atlas](image)

**Figure 8: The multifunctional electronic atlas and the digital identity of Archaeological site of Vergina.**

5.2. Designing the Culture Atlas

It is not possible to appraise Greek Culture as a whole through a digital atlas. Nevertheless, being aware of the power and the potentialities of digital cartography, a considerable effort was made to cover the millennia of artistry, the outstanding art in centuries, the achievements of the human spirit, the routes in which the Greek civilization strode in order to reach its current form. Besides, in order to cover the culture of the Greek nation, education is parameterized following cartographic norms and being analysed through human geographic indicators.

![Culture ATLAS](image)

Every atlas is a different project; therefore the cartographer must consider different aspects. Greece is a unique country because of the Greek history. Almost ten thousand years of history relics cover the body of the country. Half of the total surface of the national territory is seawater, and islands like Crete and Rhodes can be considered as cultural and historical sacs. The administrative borders of the Greek municipalities changed after 1997 with the “Kapodistrias” project. This project re-divided the country and created new relationships among communities. The new administration map of Greece is the new layer (layout?) of the atlas. Moreover, the education data of the country have considerably changed during the last decade. After joining the European Union and
the Economic and Monetary Union, the educational profile in Greece has dramatically changed. These changes create a new form of the Greek community and different economic and social data. The remains of history and the ‘explosion’ of education in the country, form a new atlas, ‘the new culture electronic atlas of Greece’. For the reasons mentioned above, the demand for a combination of the two atlas design techniques has been judged necessary. Having the advantages of the two techniques, we can achieve the best communication with the atlas.

5.3. The cartographic support

The choice of the proper cartographic background for any cartographic procedure always constitutes an important step for the whole apprehension and structure of the cartographic product.

Apparently, important differences between different research results exist in a way that the cartographic background can vary in significance - from very important to less important, to schematic. In the case of the new electronic cultural atlas of Greece, even though the demands of construction are not so high, the choice of the cartographic background is of great importance for the developers of the atlas, because of the need for a printed final product.

The cartographic background, which was finally chosen, has all the characteristics to serve parallel purposes which are supplementary to the atlas.

These characteristics are as follows:

- Projection
- Datum
- Scale
- Readability
- Chromatic relations
- Legend
- Generalization
- Accuracy

5.3.1. Issues of Scale

According to the rationale of designing such atlases, the issue of scale is not one of the first basic choices. The exact specification of the prime and allocated scales is necessary in our case, as a tool for the efficient correlation of data and the basic map.
5.3.2. The choice of thematic symbols

*(Issues of graphic communication for Cultural Atlases)*

In an atlas or even in electronic atlases, where a volume of geometric and thematic information is represented, the problem of the choice of designing templates is especially important.

The Department of Cartography of Aristotle University of Thessaloniki has developed a great activity on research projects and application projects as well, in the issues of designing and graphic communication.

The basic graphic choices for the new electronic atlas lie in classification of representation ways of thematic information. We have spotty, linear and surface-volumetric thematic representations. The factors which influence the choices of the design templates are scale, users, and the need for the Atlas to operate in an electronic and conventional form.

Spot symbols usually represent geographic positions and place-names; all the choices are simple and conventional. Linear symbols refer to limits, borders and transfer networks. In this case choices are also simple and conventional. Surface-volumetric symbols represent singularities and sufficient choice margins. Problems on choropleth and pycnometric maps are well known. The basic problem on this atlas was mainly the presentation of the singularity of allocated geographic units for the easiest comparison and ability of correlations between them.

5.4. Structure of cultural Atlas

*The structure of the information system, which supports the atlas, truly corresponds to what we could call ‘the thematic content of the atlas.’* We consider it a special information system, which includes observations and measurements of space, objects and activities of the country, and also includes all the relative procedures for collection, registration, recapture, procession and allocation of the elements.

The types of thematic information which register in this kind of system are basically two:

- Natural and geometric elements of space.
- Characteristics of the human space.

The N.E.S.E.A.G. features three geographical area levels: The country - 53 Prefectures and 1100 municipalities. The Greek Census Service covers more than 100 demographic and socio-economic indicators collected for all persons during the 2001 Census.

The topics covered are: land, population, education, economic activity, migration, households and housing conditions, urban-rural distribution, settlement network.

The thematic indicators of the Atlas are:

![Thematic indicators of the culture Atlas.](image)

Figure 11: Thematic indicators of the culture Atlas.
6. CONCLUSIONS

The designing and completion of an atlas has always been one of the great thoughts that cartographers deal with. The main aim has always been the survey of the true image of a subject on a land. Because of the historical value in data and the dynamics of Greece, the design of the new cultural atlas was of critical importance. The completion of the atlas is a work that never ends and continues due to the changes of data. The new cultural electronic atlas of Greece is an atlas, which uses all the modern techniques of cartography and is also a Greek atlas in which the culture of the Greek cartography is imprinted. The principal characteristics of modern electronic atlases versus the conventional ones are as follows:

- From large to small mapping systems.
- From static to dynamic maps.
- From passive to interactive mapping.

The atlas is a reminder of the way in which prosperity and vitality depend on the variety of place and region and also on the tension between different patterns of spatial organization. For the time being, increasing awareness and understanding those different patterns whether in teaching or in research, can only be a benefit.

7. BIBLIOGRAPHY


Spiess Ernst (1995), “Some problems with the use of Electronic Atlases”.


CV of the presenter

Karanikolas Nikolaos

- Rural & Surveyor Engineer, School of Engineering, Aristotle University of Thessaloniki, (1997).
- PhD Candidate in Department of Cartography, A.U.Th. (1999).
- Member of Hellenic Cartographic Society (2002).