

# Geomedia - Multimedia Manual for the Study of Physical Geography

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**Abstract.** *The paper describes one of the first attempts to create a multimedia manual in Romania. It talks about the creation process and shows the advantages of such an approach as opposed to regular printed material. Illustrations of the application are given and discussed.*

**Keywords.** Multimedia manual, e-learning.

## 1. Introduction

The computer has become in recent years a very versatile, powerful tool that is getting easier and easier to use. Even in less developed countries computer and internet access have become standard. Hence, the possibility of creating information-rich content that can be

available to anybody, anytime, in a structured and comprehensive form.

In the very early days of educational software development in Romania, a team working on a Temphus-PHARE program run by staff from the Faculty of Geography and Geology at University of Bucharest began building a multimedia Physical Geography manual for high school, particularly ninth grade, students in Romania.

Physical Geography was chosen for its distinctive property that it is much easier understood if its teaching implies moving graphics, animation and real-world video. Cumulated with the ability to contain a vast array of graphics, charts and multimedia content, in general, made Physical Geography the obvious choice.



Figure 1. Overview of the application

## 2. The academic effort

Academics from the Faculty of Geography and Geology at the University of Bucharest were involved in preparing this multimedia manual. The printed manual used for reference was the Ministry of Education approved material of Gabriela Apostol et. al. Reshaping the contents and creating a structure more suited to a multimedia application was the task for the researchers and academics from the Center for the Training of Science Teachers in Preuniversity Education, also part of the Faculty of Geography.

The main focus of the specialists was to include rich visual content, especially video and animation, making application more than just a computer-based version of the printed manual. Modern passive learning techniques were used concentrating on ease of use and comprehensiveness of the abundant information.

An intuitive layout was created, mimicing the overall organization of the information in current gymnasium and high-school manuals in Romania. However, efforts were made to improve every aspect of the presentation in order to transmit the information (text, comparison charts, images, video) in the most appropriate and natural way. For example, large images that contain small essential details are displayed differently than most other images.

Another aspect to be noted is that CDs can store a lot of data which would be expensive to print or unsuitable for paper. Steps were taken to including in the near future of additional media on the CD for students who want to learn more about the discussed topics than the curriculum states.

Figure 1 presents the general interface of the application.

## 3. The technology

One of the main requirements of the project was that the product should be, from a technological point of view, as revolutionary as possible with respect to its paper counterpart.

This meant a lot of effort went into finding and including interesting and exclusive media. The main focus has been the visual part of the application, especially movies and animated computer graphics, since this is the most obvious and significant aspect that, by their nature printed manuals lack.

In order to create a useful and modern tool, the latest findings and information, both figures and graphics were included.

The user interface received special attention. The target was to develop an application rich in content that could run on low resources, provided that computers in high schools are rarely up to date on the large scale.

Initially, Borland Delphi was chosen as the development medium because of its ability to produce high-quality application that work on computers several generations old. The differences in graphics performance, screen size a.s.o. were taken into account from the start and treated as to ensure the compatibility with virtually any computer that runs Windows 95 or newer.



**Figure 2. The control bar is the main element of the user interface**

The interface should also be very intuitive and easy to use, allowing for the maximum screen space to be usable for the presentation. A control bar in the upper right corner of the screen was chosen as the main interface element. It contains a drop-down menu for selecting the chapter of the book and buttons for registering and for quitting the application. A picture of the control bar is given in Figure 2.

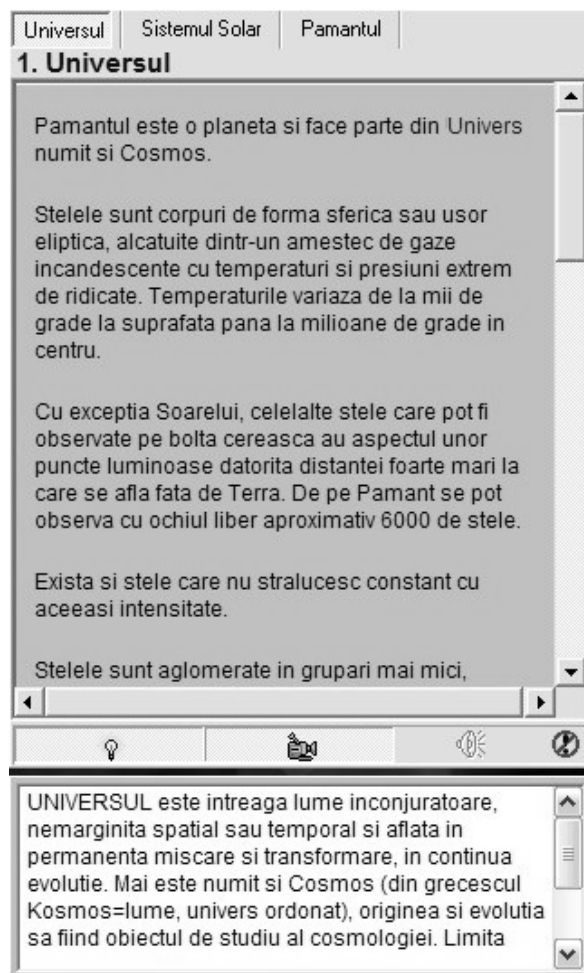
Once a chapter is selected the text panel becomes visible. It allows the user to read the lesson just as a standard book would do. Lessons can be selected from the upper bar. An illustration of the text panel is in Figure 3.

The first thing one notices is the use of standard Windows controls that allows fast scrolling and display even on very slow computers and in the meantime are very easy to use since the same control has the same behavior in all Windows applications.

Another thing common to Windows applications is the presence of hyperlinks. Links in the text work the same way as links on a webpage. A brief explanation of the meaning, a definition or detailed information about the item can be made available at the click of a button, in the definition panel. This particular panel is still visible when the student clicks, scrolls or interacts in any way with the application making it more useful than a popup box or a "tool-tip" sort of hint bubble.

On the bottom of the text panel there are, from left to right three show/hide buttons used to activate the additional and multimedia content of the lesson, and a “close text panel” button.

The functionality of the three show/hide buttons is linked with the respective type of content. The rightmost button is used to set whether the definition panel below the text panel is visible or not.



**Figure 3. The text panel along with the definition panel, located in the right part of the screen contain information structured only as text**

Pressing the second button shows or hides the “visuals” panel. The third button is the “enable sound” button, also called the “read text” button. On pressing the button, an audio version of the text in the text panel of the lesson begins to play. This is useful if the student has a mainly auditive memory and learns easier and faster by hearing the material. This feature is currently unavailable, since not all the chapters have the text in the final form.

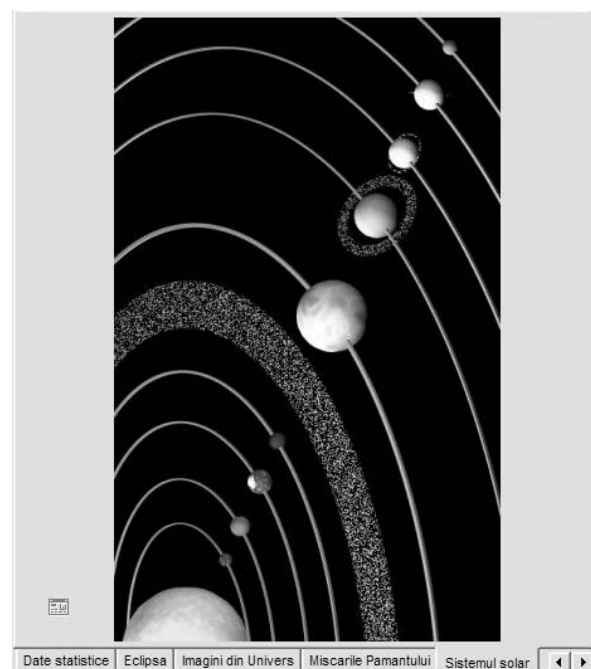
Closing the text panel from the rightmost button also closes all other open panels. This effectively brings the application in a “reset” state, the interface looking just like when you open the application.

The visuals panel is the main asset of the application and, in fact, what distinguishes it the most from the regular printed manuals. It has multiple layers, selectable through tabs or buttons situated in the lower part of the screen. Each tab corresponds to a different page. Pages are used to group information in categories or to structure the visual data according to the layout of the lesson text.

Visuals include charts and graphs, maps, illustrations, pictures, computer graphics (where a real photo is difficult to obtain or e.g. cross sections are needed), movies and computer animations. These animations depict phenomena, much like a simulation would do, or allow the student to take a closer look at tools, objects and entities discussed in the lesson.

Some pictures are interactive, meaning that clicking hot-spots brings detailed explanations in the definition panel or jumps to the lesson that discusses the respective graphical representation.

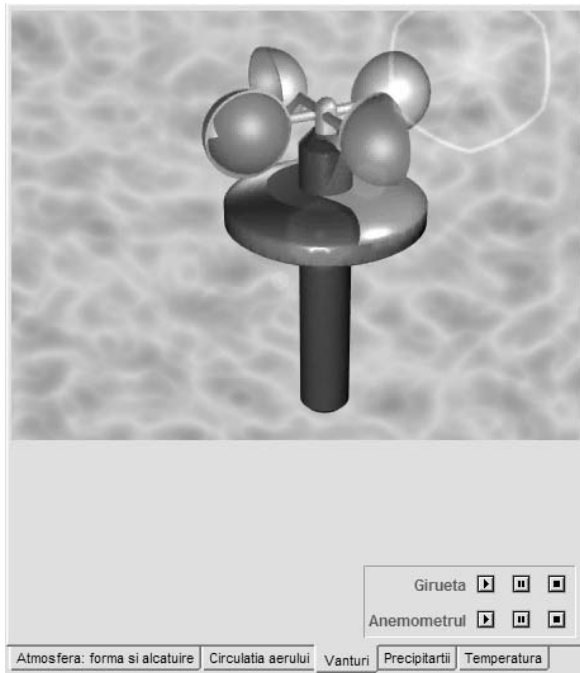
In Figure 1, a real-life meteorological satellite sequence of picture is shown as a movie illustrating the movement of the atmosphere.



**Figure 4. Original graphics of the solar system in the visuals panel; the interactive image reacts to mouse clicks showing relevant details**

Figure 4 depicts one of the tabs in a lesson about the solar system. Clicking any of the planets opens its description and statistics in the definition panel.

Access to the way tools used in the field look and work is given through animations such as the one in Figure 5. High-definition original artwork was created and included in the visuals panel. Here, an apparatus for measuring wind speed is illustrated.



**Figure 5. Objects used in the field can be studied in detail through realistic computer animations, also available in the visuals panel**

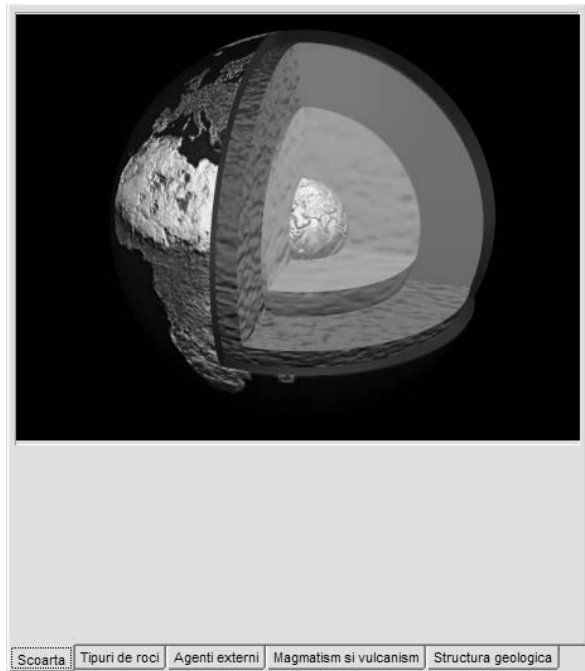
Another graphical element created especially for this application is shown in Figure 6.

Graphics development of both the interface and the media content was done using commercial software from Corel and Caligari operating on standard PC systems.

#### 4. The next step

Work on this project has begun when the computer processing power required for the creation of such an application was a problem for a small group of developers. In the past two years, computer speed at affordable prices has increased dramatically, making it possible to create even more complex graphics, both still and in motion. Furthermore, the complexity and versatility of the software used has also increased

adding to the overall productivity and the quality of the finished product.



**Figure 6. The different layers of the Earth are easily shown through a cross section, made with a powerful consumer 3D modeling software**

This application is still work in progress, and the authors expect it to become better with each revision. Some of the graphics presented in this paper have been created using 1997 software technologies on roughly the same level of power machines. The leap in the computing power in recent years opens new possibilities of creating intuitive, easy to use and eye-catching content.

#### 5. Acknowledgements

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#### 6. References

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