

Interactive Web mapping for university education

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Keywords: interactive mapping, web mapping, education

Abstract:

In the last two decades, interactive maps have become increasingly popular. Due to its easy access in the age of technology, the transfer of information in the virtual environment is gaining popularity and people use more often this type of maps in their daily life. Interactive maps are mainly produced as web-based applications accessible through an Internet browser, as well as mobile applications accessible to smartphone users. Students, studying geo-sciences, increasingly use modern tools and technologies, and they are excited to create web maps with interactive applications. Therefore, interactive web mapping is more and more implemented into university education in cartography and GIS.

The creation of an interactive map can be conditionally divided into two parts. The first part is creating the map in several scales, and the second is adding the interactive elements and attaching them to the map base. There are products in which it is possible to make both parts without switching from one software to another but sometimes they do not meet the needs of the particular project. Students are encouraged to choose from a wide variety of possible tools and software, and to make their own workflow for creating web maps with an interactive application. They usually choose between two main options. The first option is to make their maps entirely in GIS software, and when adding the interactive functionalities, they continue with the same or additional GIS software tool. Such kind of software translates the main GIS project into an interactive web mapping project, including properties of the data frame itself (as well as the layers with their rendering types, symbols, and layer properties - map tips, hyperlinks, scale ranges for layer visibility, etc. (Sandinska and Bandrova, 2015)). Another option is to compile the map in GIS software, design with the means of a graphic software and develop the interactive part using additional software. For the interactive part itself, several approaches can be applied, for which different programming languages are used (Boulos et al., 2010, Degbelo et al., 2019). There are software applications already available that do not require web map authors to have a solid knowledge of computer programming. Before choosing such software, the functions of the final product should be clearly defined, then the capabilities of the individual software should be considered. Regardless of the option they choose, students develop their own technologic flow chart from the survey, through data collection and processing to the creation of the interactive part of the cartographic product.

The design of the levels of detail is essential. When creating the interactive functionalities, the maps for all levels of detail (two, three or more) are connected, creating a "zoom" effect. The interactive environment implies the creation of a dynamic features, specific navigation, depending on the preferences of the user: Button – an element of the interactive map that is used to refer to additional information about an object; Panning – allows movement on the map similar to dragging it in a desired direction without changing the scale; Drilldown – detailing, this function is similar to zoom in and zoom out, serves both to zoom in and to show and hide certain objects at different levels of the map; Points of interest - these are points of interest to the users. Students choose which map objects to be defined as buttons and enter the functions to act as references. In this way each button leads to the corresponding object's page. For each object, a photo, text, video or audio records are entered, which represent a brief description of the feature.

In the final products the user has the opportunity to self-select the map elements that are of interest to him/her and to obtain the related information. Relations are made on the principle of a hyperlink, activated by the user by pressing a specific button. Interactive web maps allow photo preview; visualization of textual information; video and audio playback; zoom in and out of maps; link to other web pages; reception of data from your server in real time; computer animations and others.

Interactive web mapping is attracting more and more students, challenging them to search for the best solution for a specific topic and show great ingenuity and creativity (Figure 1 and Figure 2). The maps they create intend to be easily accessible and combined with the diverse presentation of data, they can reach a large number of users. Through the attractive presentation of information and easy management, the interactive maps can arouse attentiveness in users of different age groups and people with different interests.

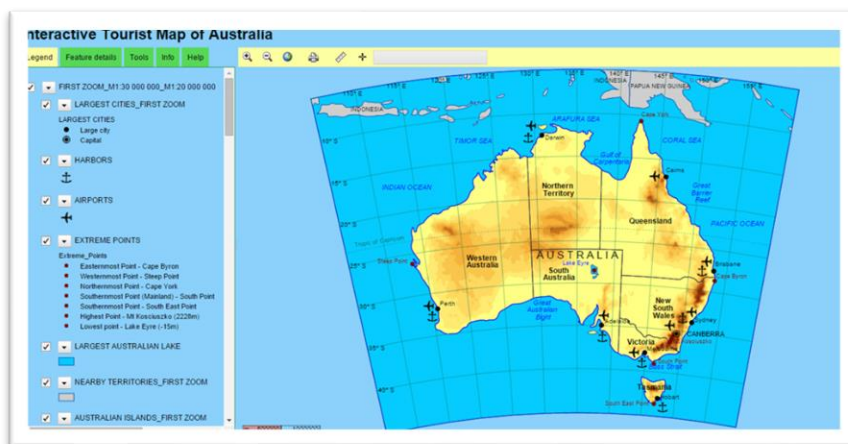


Figure 1. Interactive tourist map of Australia, author: Y. Sandinska, a student specialized in Cartography and GIS, UACEG



Figure 2. Tourist map of central Sofia with interactive audio application, author: R. Dimitrov, a student specialized in Cartography and GIS, UACEG

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