

THE INTERACTIVE GUIDE, A NEW MODEL OF DIDACTIC GUIDE

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Abstract

The work we are presenting grew out of a project that we call "Interactive Guide" which was subsidized in 2007 by the University of Girona to aid cooperative projects of investigation and development in the humanities and the social sciences. The group responsible for the project consists of researchers from the Research Group on Information and Communication Technologies in Education (GreTICE) and the Geology and Environmental Cartography group and of staff from the Geographical Information Systems and Remote Sensing Service (SIGTE) of the UdG.

The project was initiated with the aim of conducting research that would analyze the didactic possibilities of what could become an innovative resource for the dissemination of information: the creation of guides with content interaction according to user geolocation (communication via satellite).

Based on a GIS and on-site experience that allow mobile devices (especially PDAs), different contents are prepared and can be provided as users complete different routes or activities in natural or urban spaces, and didactic proposals are developed to use this information. It is an application based on the interaction of the following components: GIS, GPS, pedagogical resources and instructional activities in different formats (map, video, audio, etc.), PDA/mobile and Internet.

An "Interactive Guide" with these characteristics is conceived like an educational tool with different potentials:

- Informational support for the routes
- Interactive tool for the development of exercises or activities
- Creative tool

Besides increasing the amount and the quality of the information that can be made available to users, recent technological deployments grant users greater protagonism, allowing them to take part in the creation of the contents offered by the guide. In this way, the information can be expanded and updated from contributions made by users during completion of the routes (photographs, texts, sounds, etc.), and the possibility exists to evaluate the contents sent by other users.

Finally, in the long term, virtual communities of "interactive guide" users could be created to share the material developed by the users themselves.

To follow this course, within the project it is hoped to prepare a website, using a mash-up (a hybrid web application that creates new contents from already existing contents), which shows on a map the georeferenced elements that different users of the "interactive guide" want to share, and allows them to consult information organized by type of route, type of documentation, geographic zone, etc.

Lastly, the final objective of the work being developed is to implement an "interactive guide" model which is accessible through a mobile device, that can be applied to different contexts and with different purposes, doing some pilot testing to assess validity and to detect weak points. Specifically, the required material is being developed to test the device on a route through the city of Girona, focused on knowledge of the stones characteristic of this city, nummulites, and monuments and other buildings where it can be seen.

In the full version of the paper we hope to present the materials involved, the first results of the

experimentation and future projects of the research group.

1. INTRODUCTION

One of the characteristics of contemporary society is the use of large quantities of technological resources at the professional, personal, cultural, social and even educational levels. Most outstanding is the great proliferation of the use of mobile devices in all countries. New features offered by tools like PDAs, iPods, BlackBerrys, iPhones, or GPS increase their potential to a great extent, converting them into very versatile products that are now available to people of all ages.

The new generations, especially those that Pedró [7] refers to as new millennium learners (NML, people born after 1980 who have grown up surrounded by digital technologies), prioritize moving images and music over text, are comfortable multitasking and process information in a discontinuous (nonlinear) way to obtain knowledge.

If we add the results obtained by countless studies conducted in the field of learning, which have concluded that much more is learned from doing activities close to real life (Dale [2]), we can assume that any action that entails visiting, observing and interacting with one's surroundings is a good way to better learn or assimilate knowledge about them.

The use of mobile devices in fieldwork means that students can leave the classroom to know *in situ* landscapes and cities or observe animals and plants in their natural habitat with a series of resources to gather various kinds of information (including photographs, videos and comments recorded as audio files) or receive complementary information about what they are observing.

Experiments that take advantage of some of these devices are currently being carried out to improve communication between students, increase access to information about topics that might interest them or facilitate data collection. Details of some of the experiences highlighted by the Duke University CIT (*Center for Instructional Technology*) [6] are provided below:

Visualizing an animal's movement in real time

<http://cit.duke.edu/ideas/projects/2007/05/04/visualizing-movement/>

Students of the Duke University Lemur Center, in the course "Methods Primate Field Ecology", use GPS devices incorporated in collars to monitor lemurs for a particular time. Then, to show the movement of these animals, the data obtained is downloaded to Google Earth.

Visualizing historical Durham using Google mapping tools

<http://cit.duke.edu/ideas/projects/2007/05/04/visualizing-durham/>

Students prepare various historical maps integrated in Google Earth, adding audio files (collected by iPods) and photographs taken with cameras that geolocate images.

Data collection using PDAs

<http://cit.duke.edu/ideas/projects/2005/08/24/pda-data-collection/>

In the Social Psychology Research Methods course the students design questionnaires to conduct research on emotions in response to certain experiences and, in their fieldwork, they use PDAs to collect data.

Mobile devices for the creation of multimedia archives and their subsequent publication

<http://cit.duke.edu/tools/mobile/index.html>

Gabcast is a podcasting and audioblogging platform that provides users with an easy way to create and distribute content in audio or multimedia formats. A mobile phone can be used to make at-the-moment recordings and access is then provided to a service with VoIP (voice over Internet protocol). For example, a group of students who travel to a city and make video and audio recordings to know the language of the people of that city could subsequently post their video on *YouTube*.

On another note, HP Labs have developed Mediascape, software that uses PDAs and GPS together. Specifically, it makes geographic information (maps, itineraries, geolocation of photographs) available in real time through PDAs. An example of the use of this technology is **GPSMission** [3] a latest

generation GPS game that lets us discover and explore our closest surroundings. Educational missions or itineraries, treasure hunts and guided visits can be created for students to play or experiment out of doors and enjoy learning. Users improve their knowledge of the surrounding areas by receiving relevant multimedia information.

Using Mediascape in education offers benefits that warrant consideration. The possibility for students to create their own itineraries leads to activities in which they have to collaborate with their colleagues to generate relevant information, requiring them to analyze, debate, make choices and reach agreement. In turn, they take different actions (e.g. take photographs, search for maps, decide on a route) and organize contents in a structured and comprehensible way. As such, in addition to acquiring knowledge of a variety of contents, they increase their digital literacy.

Thanks to the Internet and the Web 2.0, there is another recent Web phenomenon: **social networks**. There are countless portals offering services to share photographs, bookmarks, documents, opinions and more with friends, companions and/or family members.

Researchers from the University of Minnesota have discovered the educational advantages of social networks such as Facebook or MySpace [3]. This study reports that 94% of the students observed use the Internet, 82% have an Internet connection at home and 77% have a profile on a social network. When asked what they learn on the network, they say they learn about technology first of all, but they also talk about creativity and new forms of communication. One of the conclusions of the research is that social networks offer more than the possibility of establishing new relationships or introducing new forms of communication; the educational implications should also be taken advantage of in schools.

In 2007 a group of researchers from the University of Girona, who were familiar with all these advances and experiences and were motivated to adapt new technologies from an educational perspective, designed the "Interactive Guide" project. It was subsidized by the University through the 2007 round of funding for cooperative research and development projects in the humanities and the social sciences. The team responsible for the project is made up of researchers from the "GreTICE" (Research Group on Information and Communication Technologies in Education) and the "Geology and Environmental Cartography" groups and by personnel of "SIGTE" (Geographical Information Systems and Remote Sensing Service) of the UdG.

2. THE "INTERACTIVE GUIDE" PROJECT

The project was initiated to conduct research that would explore the didactic possibilities of what could be an innovative resource to disseminate information: the creation of guides with interactive contents based on user geolocation (communication by satellite) and using mobile devices.

2.1. System characteristics

Based on a geographic information system and the *in situ* experiences offered by mobile devices (especially PDAs), prepared contents can be provided to users as they follow routes or engage in activities in natural areas or urban settings, and didactic proposals using this information can be designed. The application is based on the interaction of the following components: geographic information system, GPS, didactic resources and activities in various formats (maps, video, audio, etc.), PDA/mobile and Internet.

Using this type of resource for didactic purposes can lead to numerous applications in which users receive information associated with a certain place. It is possible to receive information about various objects of knowledge while being in physical contact with them, turning these resources into valuable didactic tools.

2.2. The "Interactive Guide" as a didactic resource

An "Interactive Guide" with these features is a didactic tool that can be assigned several functions:

- ♦ Informational support for itineraries

- ◆ Interactive tool based on the development of exercises or activities
- ◆ Creative tool

From this perspective, the “Interactive Guide” as a didactic tool can be:

A. Field activity support, providing information that lets users:

- ◆ Listen to or visualize complementary information (audio guide – video guide)
- ◆ Observe and/or listen to animals that for seasonal or circumstantial reasons cannot be seen or observed live
- ◆ Visualize historical landscapes (past scenes)
- ◆ See graphs (temperature, demographic, chronologic, etc.), representative figures (water treatment plant operation, watershed composition, etc.) and maps (contextualization support, thematic maps) that complement the knowledge that can be acquired *in situ*
- ◆ Receive other types of data related to the place or places being visited.

B. An interactive resource, based on the development of exercises or activities, or a model for the development of a guided summary exercise. In particular, users or students can receive more or less detailed information about the type of practical session to be completed, taking into account their previous knowledge and the evolution and level of their learning.

C. A creative resource, in which users complete the information contained in the guide based on the data compiled during the routes completed by users during the fieldwork: photographs, drawings, written descriptions, sounds, etc. The database associated with each point of the routes can be continually updated.

2.3. Implementation of an “Interactive Guide” prototype:

A prototype that receives information about the city of Girona has been developed to provide an example of how the “Interactive Guide” works and present its features. As people move around the city from place to place, the device locates them and provides information associated with the places they are passing by. Mediascape (shareware developed by HP Labs) presents multimedia information associated with specific geographic places and has been used to visualize itineraries or routes on mobile devices.

The application developed in our project is based on the integration of the following components:

- ◆ Geographic Information System
- ◆ GPS
- ◆ Educational resources and activities in different formats: maps, video, audio, etc.
- ◆ PDA/mobile
- ◆ Internet

The “Guide” can be downloaded from the GreTICE or SIGTE web pages for free if the specific conditions of use (standard conditions for free software, primarily with respect to non-commercial use), are accepted.

2.4. Web about the project

To publicize the project, present the work being developed and disseminate the characteristics of the “Interactive Guide” prototype, a web site has been created: <<http://gretice.udg.edu/gdi>> (fig. 1).

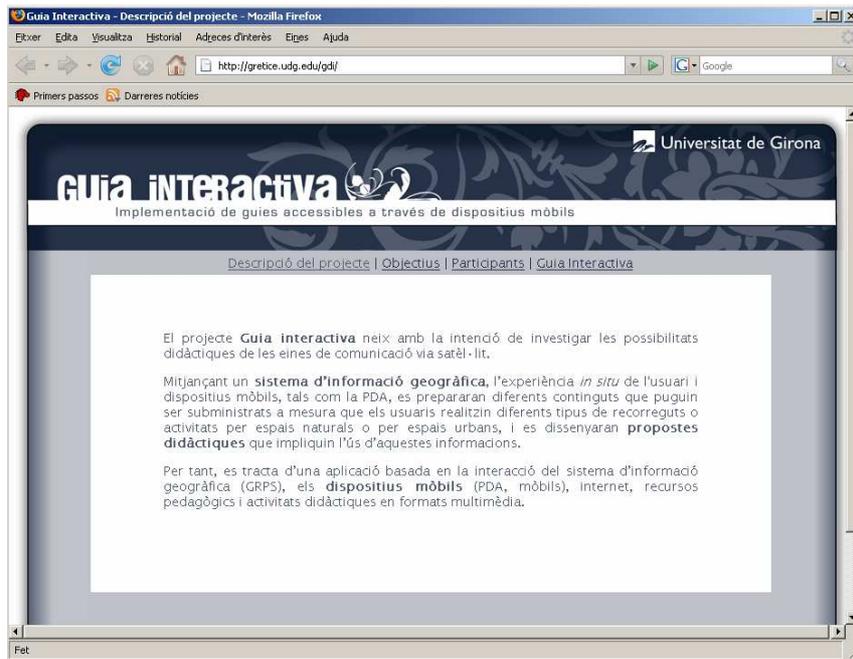


Fig.1: Web site of the “Interactive Guide” project.

This web site introduces the characteristics of the “interactive guide” and explains how it works using an actual itinerary located in the city of Girona (fig. 2). The prototype includes information based on an itinerary that includes the characteristic stones of the city (*La Pedra de Girona*). It was published by the City of Girona, from whom permission has been requested to use the contents.



Fig.2 Detail of the “La Pedra de Girona” prototype.

2.5. Other efforts

Prior to the developments mentioned and within the context of the same project, similar experiences were compiled to compare the technological systems developed in each case. We conducted a study based on parameters including type of commercial licence, compatibilities and capacity for interaction with other devices and with cartographic support. As a result, we decided to base our application on Mediascape.

Finally, we have contacted institutions that might be interested in giving us the job of introducing the contents that can be accessed using the "Interactive Guide".

2.6. Prospects for project continuity

As the "Interactive Guide" can adapt resources and activities to different levels of learning, it has been devised for students at the primary, secondary or higher education levels, as well as for adult students with a variety of interests.

Although intended for formal educational contexts, the prototype can also be used as a tourism resource for people of all ages in natural or urban areas.

After the pilot testing, the results will be disseminated and new application contexts created by agreements between the UdG and other institutions will be developed. Likewise, we hope to present our experiences and share and compare the results obtained in international meetings.

In the future, in addition to increasing the quantity and quality of the information offered, we want to introduce the new possibilities that technology offers. Recent advances have given users a larger role and we hope to incorporate these interaction possibilities in our prototype. We also hope to develop applications that will raise user interaction levels, allowing them to use their own contributions compiled on the routes (photographs, texts, sounds, etc.) to improve the contents of the Guide. The information collected will thereby be extended and updated. In turn, we have also considered the possibility of evaluating the contents sent by other users.

Finally, the creation of virtual communities of "Interactive Guide" users would allow them to share and comment on the material contributed by each other.

For that, we hope to prepare a web space, based on a mash-up (hybrid web application that, using already existing contents, creates other new ones), to show a map with the georeferenced elements that users of the "Interactive Guide" want to share and to allow them to request information about routes, types of documentation, geographic areas, etc.

When the paper is presented the materials involved and the initial results of their use will be shown.

3. WEB SITES OF INTEREST

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