

THE POSSIBILITIES OF GIS IN TOURISM EDUCATION

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Abstract. Even if there are progresses in the integration of GIS in various natural and social sciences, this technology can be considered in isolated one, as the computer science was about 10 years ago. In this paper we would like to present those possibilities that are or will be accessible in tourism education. The education segment is our main target even if we don't want to make abstraction of the fact, that a practical education should include many real world applications to prepare the student for real situations. In tourism education GIS can play an important role especially in the following directions: modeling, simulation, analysis. We consider that by revealing some of these possibilities, we can help to develop a more efficient and competitive tourism market.

Key words: GIS, tourism, education, possibilities

1. The importance of GIS

The GIS technology can represent a basic element in many fields of human activity. That's because more than 80% of data are representable in maps. Maps are the most expressive data carriers, but have an important lack: cannot represent large, thematically different datasets simultaneously.

The GIS technology can overran this lack, it can store, manage and analyze various data from the same geographic location, visually representing in any moment just those data/results what are important to the user.

2. GIS in education

Even if there are progresses in the integration of GIS in various natural and social sciences, this technology can be considered in isolated one, as the computer science was about 10 years ago. One of the important steps made in GIS popularization is the proposal of teaching this technology as 4 modules in ECDL/ICDL courses.

ECDL (European Computer Driving License)/ICDL (International Computer Driving License) certifies the basic



Fig. 1.- GisDay logo from www.gisday.com

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computer knowledge for anyone who takes it. The basic ECDL/ICDL is organized on 7 modules each one with a specific thematic (spreadsheets, communication etc.)

There are other specialized ECDL certificates such as ECDL CAD, ECDL Image processing. The ECDL-GIS will provide certifications of competences about the professional knowledge related to the basics of the computer science and its components used in the GI&GIS field.

The 4 proposed modules should be:

- Module 1: The basic knowledge of informatics and of GIS components.
- Module 2: Cartographic representation and GIS basics.
- Module 3: GIS basics
- Module 4: How to use a GIS?

If this proposal will be accepted in several years the GIS could be considered a widely known technology.

Another step is the annually organized and promoted Gis Day program where the GIS and its benefits are presented mainly for the young generation from the elementary to high school pupils.

Promoting GIS by this way may lead in future to that more and more geography teachers will adopt GIS technology in their classes.

3. GIS in tourism education

In this paper we would like to present those possibilities that are or will be accessible in tourism education. Our paper doesn't focus on GIS possibilities in tourism market. At least not this is our first goal. The education segment is our main target even if we don't want to make abstraction of the fact, that a practical education should include many real world applications to prepare the student for real situations.

In tourism education GIS can play an important role especially in the following directions:

- modeling
- simulation
- analysis

In every professional education there are two major guidelines:

- the presentation of basic principles and relationships
- the practice of situations closed to reality

Both of these guidelines can use the GIS technology either by using existing GIS/GIS based software or by developing GIS based software in some cases. Continuing will focus on presenting the present and future possibilities of GIS in tourism education, specifying the field areas and the software that can be used for every mentioned direction.

3.1. Teaching the basic principles and relationships with GIS (modelling and analyzing)

In tourism one of the basic knowledge that where the GIS technology can play an important role is the presentation of geographical space and phenomena. This can be done using surface models and phenomena modeling.

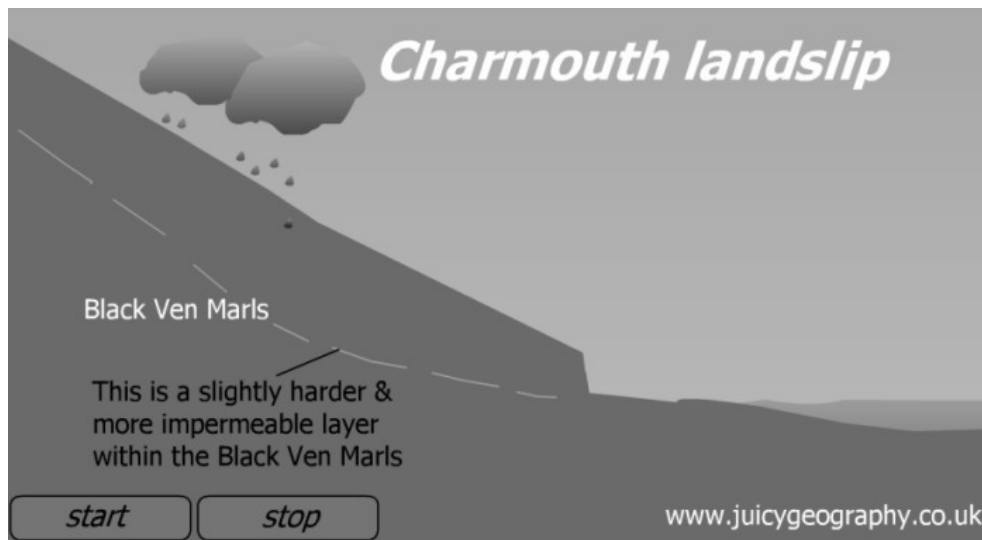


Fig. 2. - Presenting the landslip process without context

In present the most often used method to present a location with significant touristic attractions is made by traditional maps and different media. All of these methods hold several disadvantages: a traditional map can focus on one or two topic, it could not represent all the data related to the touristic market. The photo materials cannot contain the spatial aspect of the represented feature. The video materials, which can override the above aspect, do not provide a self exploring journey.

Most of the events simulating materials are presented as isolated processes. The process is presented in a short animation regardless on its apparition



Fig. 3. - Presenting the mudflow process based on Digital Elevation Model

context in the geographic space. So a student could have just a general aspect of the process but in many cases he could not observe the spatial limits of the phenomena. Using GIS technology these problems could be solved.

For illustrating basic knowledge we could use various GIS and remote sensing software. It worth to present in the class not only isolated cases, but to offer for the students the possibility of self exploring. For this goal GIS based software are the

best. It should be avoid the use of just CAD or different animation software. Putting all together (GIS, CAD, animation) could result an exciting and educating system.

Subjects that present the landscape, the relief are important segment in tourism education. A 3D landscape model eventually with drape images represents a real help in presenting relief forms.

The presentation has more impact if this can be made on a mobile PC in the field.

It's advisable to use software which can make profile based on various segments. In our days every serious GIS software can make this operation (ex. IDRISI, Global Mapper, etc.).

Due to the fact that in GIS systems the possibility of use several different thematic layers is a basic need, 3D landscape models combined with topographic or touristic maps can be useful in teaching the recognition of relief based on these maps.

In the tourist market field in general, but in field tourism in special it's important to have a good estimation on time and space. These two concepts are in a strong relationship, as we don't have illimitable time and we often have to be present in give location at and exact time. The time and space (distance) are related by the velocity, which depends on persons, but with a little exercise we can estimate it with an acceptable error.

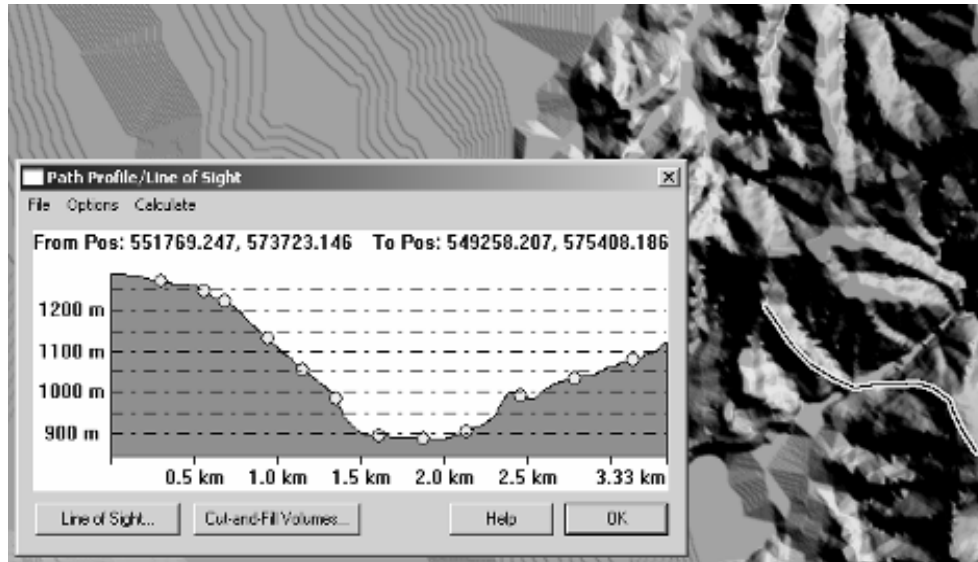


Fig. 4. - Illustrating relief forms by profiling using Global Mapper

The need of estimating the distance may appear in field but also in an office environment. A real tourist and a guide as well should take some analysis before making a field trip or excursion, making several decisions based on distance and usable time. While in the field we have limited tools for estimation (excluding for now the modern locating instruments), in an office environment the whole tools warehouse of modern technology are usable.

In distance measuring an important element is the recognizance of the relief forms, based on the contour lines. With GIS the understanding and practicing related exercises is much easier.

In GIS the horizontal distance measurement is a basic operation, so every GIS system has some modality to measure it. In general this tool is represented by an icon showing a ruler. The use of it is very simple and often we could change the measurement units too. But it's very important that the map composition should have a specified projection and a real coordinate system. This constrain is also useful to the student to realize the importance of map scale, and the proper relation between map and reality.

But the horizontal distance measuring is far from reality so taking account of slope is also important. Many of the future guides have impropriate appreciation about slope values, regardless of the used measurement units (degree or

percent). By taking a well know area and calculating the slope in GIS systems, the students can realize that a seemingly low slope value (ex. 10 degree) represent an important ascent, when a person have to climb it for 100m. The correspondence between degree and percent is also important and GIS systems have the ability to show the same image in both cases, but with different cell values.

The profiling is another element which can help to understand the real world. This operation is also common and often integrates real distance calculations, so it's usable in the majority of GIS systems. By profiling the visibility issues can also be explained in a proper manner.

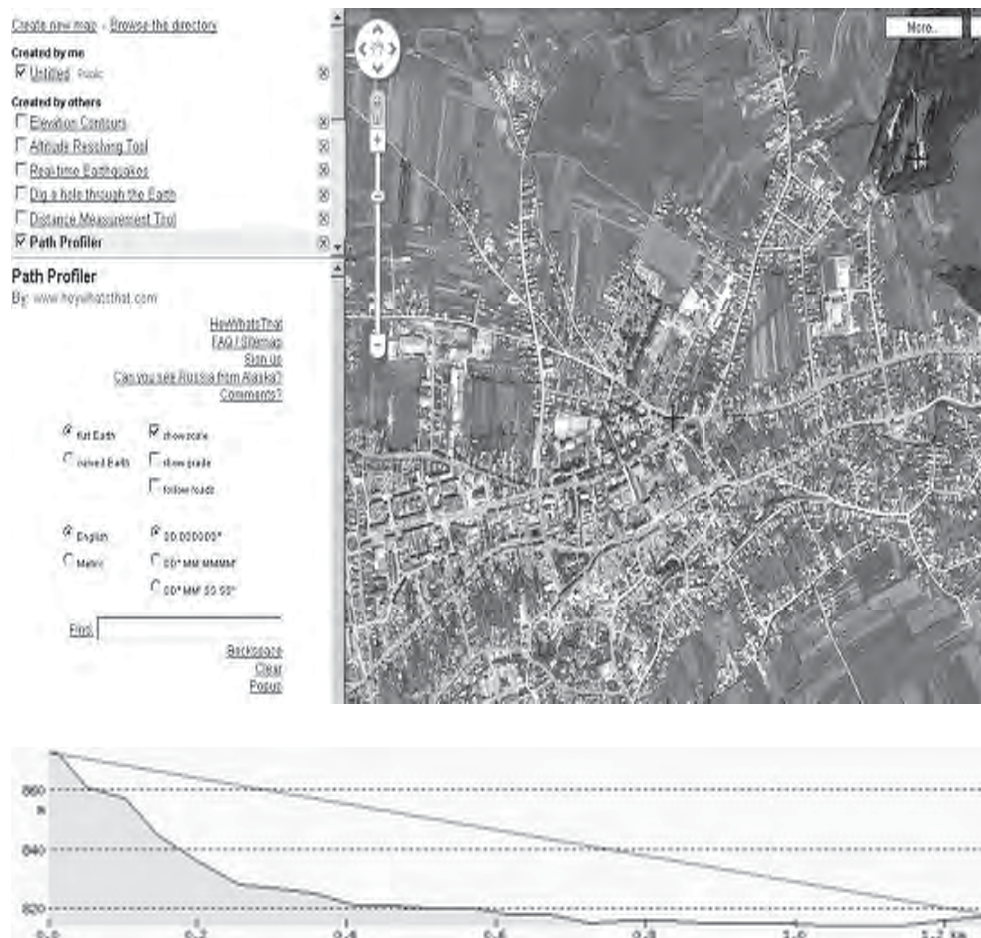


Fig. 5. – Path Profiler Tool in Google Maps

Google Maps (maps.google.com), have several utilities for this. One of the most suggestive is Path Profiler with the possibility to measure real distance between the selectable points, and representing the profile along the linking line. The generated profile although doesn't specify the vertical exaggeration factor, which is also important in field related representation. The importance of this factor could be showed out by using Google Earth where the 3D terrain representation is also available.

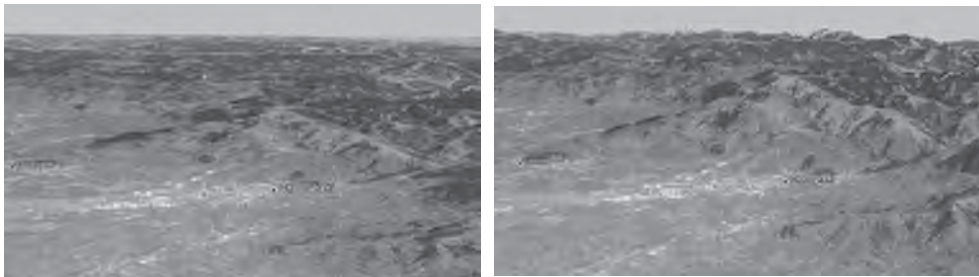


Fig. 6. – Changing the vertical exaggeration factor in Google Earth

It's also important to person who works in the tourism industry to have a good orientation ability. This can be taught for example in 3D urban models. Google Earth (earth.google.com) combined with Sketch Up (www.sketchup.com) (each one is a free software) can represent a valuable choice in this direction.



Fig. 7. - Walking in a 3D city. A Google Earth application.

Another alternative can be the SkyLine Software Systems (www.skylinesoft.com).

Now days GIS systems statistical module becomes more and more powerful. In tourism education presenting in macro, mezo and micro scale the evolution of several touristic and not only touristic indicators is also important. The distribution in time and space of these indicators can also be easily made using GIS system. This can be done statically but also dynamically using for example the Animator module in ArcGIS 9.

By using GIS and not traditional materials (thematic maps, charts, etc.) we also could lead the student to enter his own dataset and more important, to offer the chance to experiment the usefulness and expressiveness of different combined indicators, developing new skills for the student.

The most important and valuable segment of modern technology in learning environments is the encyclopedia developing. This plays an important role in tourism education but its effect could be enlarged if the encyclopedias will be more maps based. One of the valuable steps was made by Google Earth Pro, where everybody can develop and upload different vector based multimedia material. Google Earth also permit to develop information databases based on this map system.

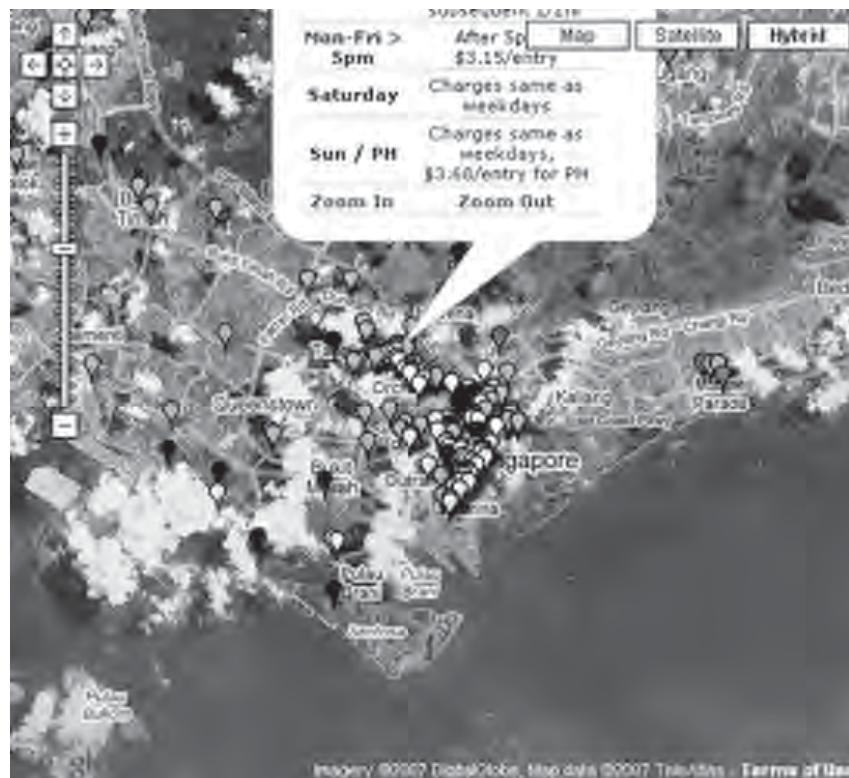


Fig. 8. - Google Earth application with thematic database. Parking opportunities and fees.

3.2. Simulating various touristic market activity

The practical education is very important in tourism education. We would like to present some of the possibilities in which GIS can play an important role offering the possibility for the students to exercise real life situations.

Making a voyage plan could be a practical issue where GIS based software could help the organizer, offering a route planner module. Some of these applications are stand alone ones and mostly with commercial license (Microsoft Autoroute 2007), while the others are free and can be accessed on-line (www.uk.map24.com). A few of them includes different types of establishments, which can be included as part of the route.

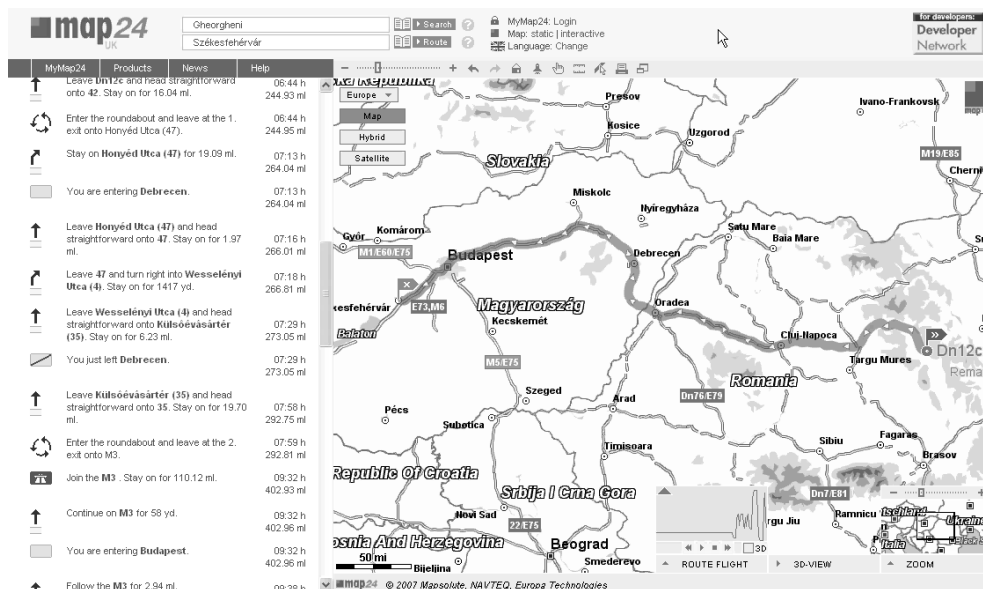


Fig. 9. - On-line route planner (Gheorgheni – Székesfehérvár)

These applications are in fact and extended versions of any common GPS route planner.

Even if it's not a proper simulation a business evaluation is another important segment in tourism market, and so one it's advisable for a student to have some knowledge about it. The Business Analyst extension of ArcGIS could be a good tool for teaching this part of tourism.

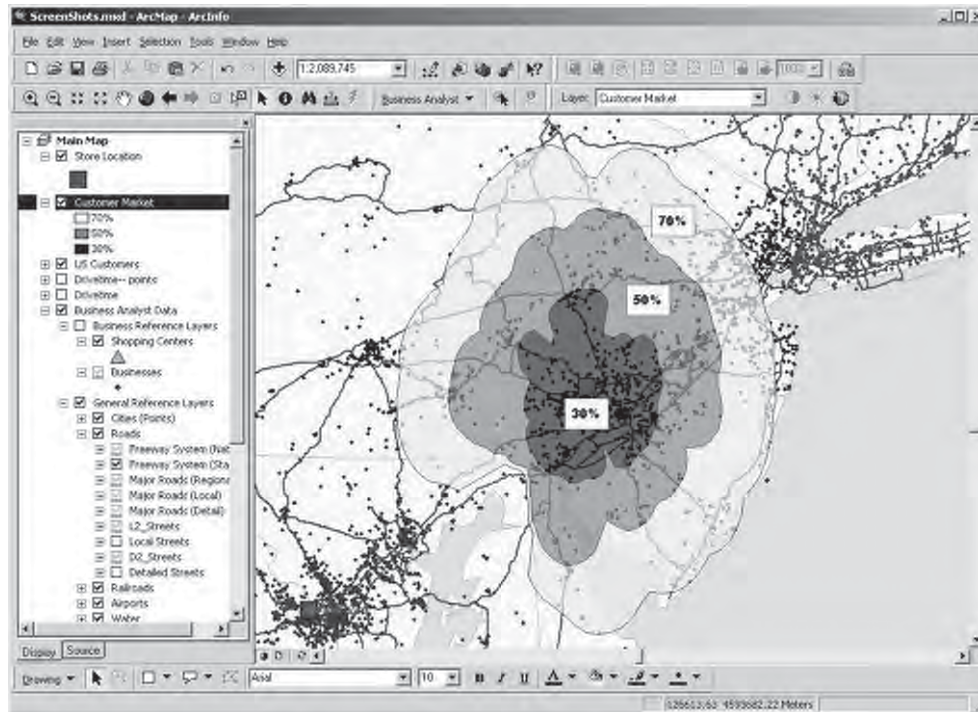


Fig. 10. - ArcGIS 9.2 Business Analyst Extension working

The intelligent games can also play an important role in education. The most sophisticated simulators can help in making strategical decisions leading different types of activity (Railroad Tycoon, Zoo Tycoon). In present we could not identify any touristic related game in this category but it's never too late.

In future may appear new games in this category which based on GIS databases can model a lifecycle of a specific touristic enterprise.

Conclusions

The above mentioned applications all could take a serious part in tourism education. But the applicability of these depends on the availability of the 4 major components off any GIS system, available in the host institution:

- hardware
- software
- data
- human resource

The above table wants to summarize the presented applications based on the strength of these components. Each component strength is ranked in a 1-5 scale.

Tab. 1. Component strengths for different application fields

	hardware	software	data	human resource
Relief recognition with DEM and profiling	2	3	3	2
3D urban models	5	4	5	4
GIS based statistical data analysis with animation	3	3	2	2
GIS based encyclopedias	2	2	5	3
Route planning	1	2	3	2
Business evaluation	3	3	2	2
Enterprise simulation	3	5	2	4

GIS should come out from its role of geo-touristic database in which it is in our days, and became a decision supporting tool. For this purpose the student's from different touristic related specializations (and not only them) should hold an analyzing capability based on map related data.

The hardware part of a GIS system doesn't present leaks at the present. The software part of these systems is generally good, but the business simulation aspect of GIS systems is weak. The existence of such applications could positively influence the decision making capability of students, including the GIS with its real value also for tourism. The data acquisition always present some problem especially when is related to economic activity or when the need of historical data is required. Speaking about the future human resource, the used terms, concepts and ideas are strongly related to the data storage models used in GIS, which are strange for many students and requires more study time.

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