UNDERSTANDING THE IMPORTANCE OF GIS AMONG STUDENTS OF TOURISM MANAGEMENT

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ABSTRACT:
Tourism, as extremely complex phenomenon, is closely tied to geographical space. The implication of the use of GIS in tourism can be significant. The main applications of GIS are mapping, measurement, monitoring, modeling and management. In these main areas there are lot of influences of heterogeneous tourist activities. So far, the applications of GIS in tourism have been limited. The problem largely lies in the lack of GIS education among tourism managers, since tourism oriented curriculums, in most cases, do not include GIS course. This paper aims to examine the knowledge and understanding the importance of GIS concept among students of tourism management. In order to point out the necessity of GIS being part of tourism curriculums, the authors have determinate a prior knowledge and understanding of GIS among students that did not attend GIS course. An online questionnaire was used as an instrument for the study. The main part of the questionnaire was designed to give answers in student's familiarization with GIS software and brands, main areas and types of the use of GIS and the students' opinions on the necessity of GIS within their curriculum. The study came to conclusion that students understand the importance of GIS in tourism, even without high level to knowledge of GIS. The majority of students believe that GIS should be part of their tourism management curriculum.

Key-words: *GIS, tourism, management, curriculum.*

1. INTRODUCTION

Tourism industry is closely tied to geographical space. The geographical grounds of tourism activities consist of residence of tourists, travel destinations and the space that connects these two areas. Tourism is mostly viewed as a phenomenon that is predominantly shaped by economic transactions. Even in this case, most economic factors are influenced by the geographical space. *Kukrika (2000)* states that 80% of all daily information in a business has common denominator - geography.

Every geographical space is characterized by numerous factors that can be divided into natural and anthropogenic forms (relief, climate, hydrology, biogeography, history of the place, population, economy, etc). Tourism is extremely complex phenomenon. Because of the complexity and mutual impacts, while studying tourism it is necessary to use automated methods for collecting, processing, analysis and presentation of data. The basis and practical application of that concept can provide geographic information systems (GIS).

GIS stores geographic data, retrieves and combines this data to create new representations of geographic space, provides tools for spatial analysis, and performs simulations to help experts users organize their work in many areas, including public administration, transportation networks, military applications, and environmental information system *(Rigaux et al, 2002).* The implication of the use of GIS in tourism can

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be significant. Still, tourism managers do not use GIS sufficiently. One of the main reasons for that is the low level of understanding of GIS software, hardware and concept of GIS in general. The problem largely lies in the lack of GIS education among tourism managers *(Stankov, 2010).* Many current and future decision-makers in the tourism industry received and are receiving their formal education by majoring in tourism or hospitality programs *(Guyette, 2003).* Many tourism-oriented curriculums do not include GIS, as a separate course or a part of a study course. This paper aims to examine the knowledge and understanding of GIS concept among students of tourism management. The sampling frame included students of University in Novi Sad, Faculty of Sciences, Department of Geography, Tourism and Hotel Management. Geographic information systems are the part of the Tourism Management curriculum modules, as a separate or part of other course. In order to point out the necessity of GIS being part of tourism curriculums, the authors aimed to determinate prior knowledge and understanding of GIS among students that did not attend GIS course.

2. TOURISM EDUCATION AND GIS

Geographic information system is now recognized widely as a valuable tool for managing, analyzing, and displaying large volumes of different data pertinent to many local and regional planning activities *(Straś, 2006).* The main applications of GIS are: mapping, measurement, monitoring, modeling and management. In these main areas of GIS applications there are lot of influences of heterogeneous tourist activities. GIS is just beginning to become known as a analytical tool by tourism/hospitality firms and as a tourism economic development tool by communities *(Guyette, 2003, Avdimiotis et al, 2006).*

Still, there is a lack of the use of GIS technology to improve operations in tourism industry. In comprehensive review of GIS in tourism industry, *Maguire (1991)* mentioned the study of *Buffied and Coppock (1975),* which describes the creation of a simple GIS (Tourism and Recreation Information Package - TRIP) for the three Scottish government institutions. The purpose of this GIS was to assist in planning travel policy. From that study there is a gap of 20 years when it comes scientific papers linking GIS and tourism. During the 90s the situation began to change.

The recent advances on geographic information technologies, continuous demand for professionals in these areas and use of new ICTs in teaching and learning processes, are all factors that concur for a better systematization of GIS in education curricula *(Painho et al, 2007).* GIS can play a significant role in tourism education, but tourism programs have failed to adopt GIS within their curriculums.

Many current and future decision-makers in the tourism industry received and are receiving their formal education by majoring in tourism or hospitality programs. These programs are typically found in colleges and schools of business, human ecology, or education as programs within departments, stand-alone departments, or stand-alone colleges or schools *(Guyette, 2003).*

It is apparent that GIS has huge potential for application in tourism *(Hall, Page, 2006, Stankov, Dragićević, Drakulić, 2007, Marković, Stankov, 2010, Oppermann, 1997),* form sustainable tourism planning *(Bahaire, Elliott-White, 2010, Davidovic et al., 2010)* to tourism education *(Stankov, 2010).* However, due to the general lack of tourism databases and inconsistencies in data, its applications are limited.

For example, there is very little site-specific information about sources of visitors origin and destination, travel motivation, spatial patterns of recreation and tourism use, visitor expenditure patterns, levels of use and impacts, and suitability of sites for recreation/tourism development - all of which are suitable application areas of GIS.

So far, applications of GIS in tourism has been limited to recreational facility inventory, tourism-based land management, visitor impact assessment, recreation-wildlife conflicts, mapping wilderness perceptions, tourism information management system, and decision support systems *(Straś, 2006).*

Tourism education must aim to enhance the ability of managers to use a wide range of tools to increase their efficiency and responsiveness *(Daniele, Mistilis, 1999).* Among other information technology, GIS should be regarded as one of important skill for competent manager. Competitiveness and profitability of tourism industry will increasingly be associated with though ability of tourism professionals and managers to utilize emerging information technology in order to maintain a competitive advantage *(Buhalis, 1998).*

3. METHODOLOGY

Students of Tourism Management of the University in Novi Sad, Faculty of Sciences, Department of Geography, Tourism and Hotel Management were used as the sampling frame for this study.

An online questionnaire was used as an instrument for the study. The authors created the online questionnaire and using Department's social network on Facebook, students were invited to participate in the online questionnaire. The sampling frame only included students that did not attended the GIS course. The sampling frame included 71 students.

The study instrument was developed after a literature review on the topics related to the use of GIS in tourism management. The statistical evaluations of the data include some general information on the number of students, the sex of students and the year of their studies. The main part of the questionnaire was designed to give answers in the students' familiarization with GIS software and brands, main areas and types of the use of GIS and the student’s opinions on the necessity of GIS within their curriculum.

4. STUDY RESULTS

The study results reported focus on the following areas: students' profile, familiarization with software for working with spatial (geographic) data, basic understanding of the nature of GIS concept, awareness of main GIS software brands, level of benefits in different areas of the use of GIS, types of use of GIS in tourism management curriculum and opinions on the importance of GIS in tourism management curriculum.

The majority of respondents are female (81%) towards male (19%). In terms of their year of study, more than one-half of the respondents are students of the fourth year (62%), following with students of second year (20%) and students of third year (18%). Since, GIS is the course at the fourth year, it was expected that students of fourth year are most interested to participate in this survey.

4.1. Familiarization with software for spatial (geographic) data

As an introduction to the questionnaire, the respondents were asked to evaluate the level of familiarization with software for spatial (geographical) data. Almost half of the respondents (49%) know to use some of those programs superficially. About third of the

respondents have heard for some of that kind of software but they did not have chance to use it. The smallest number of the respondents is in the group of those who know to use some kind of software for working with special data (6%). On the other hand, 15% of the respondents did not hear about that kind of software.

4.2. Basic understanding of the nature of GIS concept

Since there is lot of software that can work with spatial data, and knowing the fact that GIS is much more than just a software, the respondents are asked to define GIS by choosing between three answers: a) GIS is computer program, b) GIS is a group of computer hardware and c) GIS is an operational system of software, hardware, spatial data and organization. The majority of students (51%) think that GIS is a just a computer program. The correct understanding of GIS has 46% of the respondents. Only 1% of the students think about GIS as a group of computer hardware.

4.3. Awareness of the main GIS software brands

The students were asked to check GIS software brands they heard about. In addition, they had a possibility to add a GIS software brands that are not on the list.

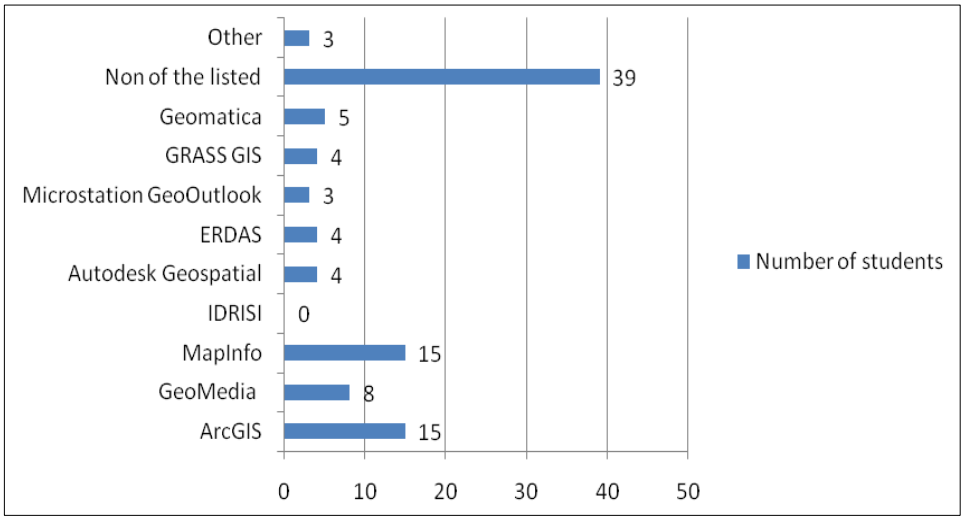

Fig. 1 Awareness of GIS software brands among students.

Most of the respondents have heard of ArcGIS and MapInfo. ArcGIS is the main licensed software package that will be available for students to work within GIS course. After ArcGIS and MapInfo the students are most aware of Geomedia, Geomatica, GRASS GIS, ERDAS, Autodesk Geospatial, and Microstation Geospatial. However, the most of students did not hear about any of these programs.

4.4. Perception level of benefits of the use of GIS in different fields

The respondents were asked to evaluate the level of benefits of the use of GIS in different fields using a 5-point scale, with "1" indicating the lowest level of benefits and "5" indicating the highest level of benefits. The weighted arithmetic mean of the evaluation items are reported in **Table. 1**.

Table 1. ***Perception level of benefit of the use of GIS in different fields.***

Areas of the use	Level of the benefit					Weighted arithmetic mean
	1	2	3	4	5	
Navigation	2	2	4	13	50	4.5
Land-use planning	2	1	3	18	47	4.5
Tourism industry	2	2	4	13	50	4.5
Roads and railways	2	2	7	13	47	4.4
Military	6	4	6	26	29	4.0
Environment management	3	5	13	29	21	3.8
Education	3	3	20	26	19	3.8
Forestry	4	5	22	23	17	3.6
Social science	4	8	15	28	16	3.6
Archeology	5	8	16	24	18	3.6
Trade and economy	3	5	26	22	15	3.6
Emergency services	7	17	18	12	17	3.2
Real estate	8	15	22	16	10	3.1
Agronomy	10	16	19	17	9	3.0
Epidemiology	11	15	23	11	11	2.9

As can be seen from **Table 1**, the highest score is reported for Navigation, Spatial planning and Tourism industry. The weighted arithmetic mean more than 4, also has Roads and Railways and Military. Other fields are scored lower than 4.

4.5. Perception of possible use of GIS in tourism management curriculum

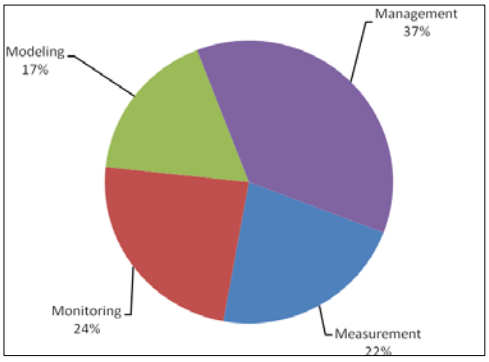

Fig. 2 Main types of use of GIS within tourism management curriculum according to students' perception.

The respondents are asked to choose the main types of use of GIS that can have significant application in the scope of tourism management curriculum. The answers indicated four general types of use of GIS: measurement, monitoring, modeling and management, based on the five Ms of GIS application *(Longley et al., 2005).* The authors excluded mapping, as the main GIS application in order to gain more precise structure of use of four other applications in tourism management curriculum.

As can be seen in **Fig. 2**, the responded marked management (37%) as the main type of the use of GIS within tourism management curriculum. Management is followed by monitoring, measurement and modeling.

4.6. The opinions on the importance of GIS in tourism management curriculum

At the end of the questionnaire, the students were asked to decide should GIS be part of their curriculum regarding its importance in tourism industry. The great majority of students (60%) consider that GIS should be part of their tourism management curriculum, while every forth student cannot answer that question based on prior knowledge of GIS. Only 14% of the respondents clearly stated that GIS should not be part of tourism management curriculum.

5. CONCLUSION

Tourism is one of the many sectors that can benefit using GIS. Still, the level of use of GIS in tourism is low. The problem mostly lies in the lack of GIS education among tourism managers. Many tourism-oriented curriculums do not include GIS, as a separate course or a part of a study course.

In this paper, the authors examined the prior knowledge of the students of tourism management in order to point out the necessity of GIS being part of tourism curriculums. The study came to conclusion that students understand the importance of GIS in tourism, even without high level to knowledge of GIS. Neglecting the suggestiveness of the survey, understanding the importance of GIS in tourism curriculum is very high among students.

Although, only 6% of students know to use some kind of software for working with special data, almost half of the students know superficially to use some of those programs. Software for working with special data does not have to be "real" GIS, but can have some of GIS function that will facilitate the future use of GIS. In this context, most of students believe that the GIS is essentially just a software. It is primarily a consequence of the complexity of GIS concept and the lack of uniform definitions of GIS. Although, students believe GIS is primary just a computer program, they have very low awareness of GIS software brands.

Navigation, land-use planning and tourism industry are perceived as fields that can have the highest level of benefits of the use of GIS. Although, the use of GIS in tourism is not essential, like in the case of navigation and land-use planning, it is important that students perceive highly the importance of using GIS. GIS can be significant tool for tourism managers, particularly in spatially decision-making process. The majority of students understand that possible use of GIS. They also believe GIS should be part of their tourism management curriculum.

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