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Incorporating Geographic Information Systems into an MBA Program

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Abstract

This paper discusses the introduction of a Geographic Information Systems module into a Master of Business Administration (MBA) program. The module promotes spatial thinking, which is the analysis and management of issues in terms of their location component. An overview of GIS technology in the context of business is presented. An approach for incorporating GIS and spatial thinking into the MBA program is discussed. A study showcasing the increased benefits of the proposed approach is presented. MBA program faculty are encouraged to adopt GIS for their teaching, producing MBA graduates that can promote GIS within their organizations and incorporate spatial thinking into the management of their organizations.

Introduction

Overview of GIS Technology

GIS is an integrated computer system capable of capturing, storing, retrieving, analyzing and explaining spatial information. It provides the user with knowledge of the location information in the context of time, about the world, a business, a project, or an objective (Spiegel, 2004).

Geographic Information Systems consist of a number of key components. These include computer hardware, software, data, procedures and people (Sommer, 2006). GIS data consists of spatial or mapping objects as well as non-spatial attribute data. Spatial data includes points, lines, polygons, other graphical representations, as well as text that represent buildings, customers, roads and other real-world entities (Bolstad, 2002). Figure 1 showcases a sample GIS map.

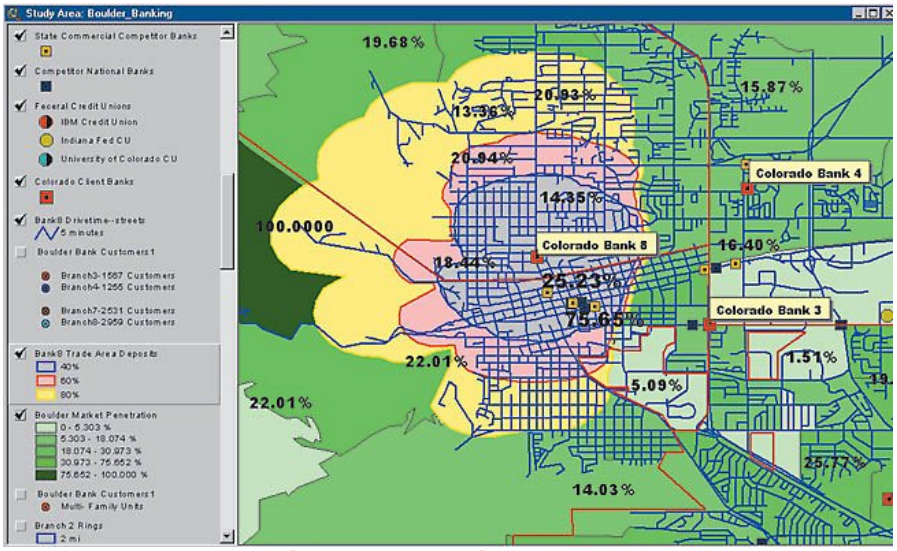

Figure 1 – Sample GIS Map.

GIS can help answer different types of questions. It can help you determine what is at a particular location, where something specific is located, what has changed, which is the best way to get somewhere, what the pattern is, and "what-if" certain conditions arise (Wayne, 2002).

GIS is also a decision making tool that helps produce useful information in a cost-effective manner (Longley et. al., 2003). The ability of GIS to analyze spatial data is frequently seen as a key element in its definition, and has often been used as a characteristic which distinguishes GIS from other systems (Tomlinson, 2003). GIS facilitates spatial analysis which is a set of analytical methods. It requires access to both attributes of objects under study, and to their location information and allows referencing traditional data sets to maps (Maguire et. al., 2005).

GIS and Spatial Thinking in MBA Studies

Introducing GIS technology to facilitate spatial thinking in an MBA program can increase the competitiveness of the program and that of its students once they enter the workforce. The program encourages MBA students and faculty to think about location issues relating to their academic and professional careers.

We begin with an overview of GIS. We identify benefits that GIS provides to business management, and focus on graduate business education. A detailed discussion of the approach ensues. It consists of an awareness campaign where MBA faculty and students are made aware of the benefits of thinking about business, and about business education in terms of location. It also consists of a new course module covering GIS and spatial thinking.

California State University Los Angeles (CSULA) is reaching out to introduce spatial thinking in business education to build more academic-business bridges in the world. The school of business at CSULA, an AACSB accredited institute, is working to promote the use of GIS technology in graduate business education, as well as in the multi-cultural business community that it services.

A study conducted at CSULA examines the impact of GIS and spatial thinking on MBA students. The study shows increased awareness, interest and use of GIS.

Benefits of GIS Technology for Business Management

Business knowledge is power and it can be increased by looking at the business data in terms of location and time. GIS enables viewing business information graphically, sharing information with others as well as making appropriate business decisions. GIS can be used for managing information about a business, a business sector, business activity in a region, country or world-wide (Grmishaw, 1999).

GIS can be used by businesses at a number of levels. GIS can be incorporated into individual projects, it can be used at the departmental level, at the enterprise level responding to overall organizational needs, or it can be used as a means for collaboration among multiple organizations. GIS allows organizations to better understand large quantities of information that are prevalent in today's business environment.

In the last few years private business organizations began realizing the benefits that GIS provides to the public sector and began adopting GIS technology for their own business needs. Table 1 lists several business sectors that can benefit from GIS technology and illustrates the extent of these contributions (Harder, 1997; Boyles, 2002). This serves to demonstrate the wide range application of GIS technology for business management.

Business Sector	GIS Contribution
Banking	Measuring market potential
Dental supply	Realigning sales territories of sales people
Food (Supermarkets)	Efficient delivery methods for food purchased via the web or by phone order to homes.
Health (Gyms)	Evaluating suitability of sites for new gyms.
Healthcare	Evaluating healthcare resources, analysis of demand for specific treatments by location to better serve the public (Koch, 2005; Lang, 2000).
Insurance	Establish the value of real estate property to be insured.
Publishing (Newspapers)	Increase newspaper readership by targeting new subscribers; Mapping courier routes
Real Estate	Determining where to locate commercial real estate – new shopping centers, new stores, by analysis of demographics and competition (Longley, Clarke, 2006).
Retailing	Mapping customers, and providing custom advertising

Table 1 – GIS Technology Benefits to Business Sectors

The GIS adoption process has proven to be lengthy and complex as there are few qualified people who understand and appreciate spatial thinking and its benefits to business organizations (Tomlinson, 2003). As more and more businesses realize the benefits of implementing GIS technology and their inability to understand and implement it, it becomes apparent that there exists a gap between business and education. This provides MBA programs with an opportunity to fill an important educational gap and business need. MBA programs should begin to enhance their efforts of incorporating spatial thinking in their business education curriculum.

GIS and spatial thinking in organizations can increase organizational efficiencies as well as competitiveness.

Benefits of GIS for the MBA Program, Students and Faculty

MBA programs are able to address business needs by educating future business leaders to think in terms of location and time. MBA programs that will be early adopters of spatial thinking and GIS technology will have a competitive edge over other higher education institutions in satisfying the needs of business, and promoting closer ties with these organizations. MBA programs will also be able to attract those students who are interested in having an additional competitive edge once they enter the job market. Business schools can also create new collaborations with industry, hosting workshops and extension classes for managers and executives.

MBA students benefit from being exposed to a new way of thinking about business problems. This gives students a competitive edge over those who have not been exposed to such spatial business thinking. MBA students also benefit from exposure to GIS technology and having gained such hands-on experience will be better able to manage real-world situations once they start their careers.

MBA faculty benefit from spatial thinking complemented by the use of GIS technology in their teachings and research. Faculty will be better equipped to analyze real-world business problems by incorporating spatial thinking. Faculty can use GIS technology in the classroom to illustrate business concepts in terms of location by utilizing the visualization power of GIS technology to map business data. Faculty is also able to use spatial thinking and GIS technology for their research objectives. GIS technology should help faculty explore new ideas and discover new business patterns.

Businesses will have the opportunity to hire MBA graduates that think spatially and have base knowledge of GIS technology. These graduates can look at the existing business processes and suggest new ways in which an organization can leverage on their spatial thinking (Wayne, 2002; Tomlinson, 2003). Many MBA students at CSULA work full time while at school, and can therefore incorporate spatial thinking and GIS technology in their workplace.

Awareness Campaign

The author of this paper has been working since 2002 to include GIS technology in CSULA's program. The proposed approach begins with an awareness campaign. The campaign's goal is to present the benefits of the use of GIS technology to MBA faculty and students. This can be accomplished through a series of short presentations about GIS in various MBA courses. Presentations about benefits of Incorporating GIS in the areas of Management, Marketing, Finance, and Information Systems can be provided to students attending courses in these areas. The author has had an ongoing collaboration with a number of faculty members from various departments, and presents an overview of Business GIS as part of their courses.

Incorporating GIS into the Curriculum

The author proposes an approach for incorporating GIS into the MBA program. The four components of the approach include course lecture, team-based study, individual study and student presentations followed by classroom discussion components.

Course Lecture Component

The author incorporated the use of GIS into one of the core courses (Year 1) of the MBA program (see Table 2). The BUS 514a – Managing Business Processes I was chosen to be the course that includes the GIS component.

Two Year Plan Beginning Fall Term			
Year 1			
Term	Course	Title	Units
Fall	BUS 511 BUS 512A	Managerial Skills and Business Ethics Financial Reporting, Control, Management and Markets I	4 4
Winter	BUS 512B BUS 513	Financial Reporting, Control, Management and Markets II Marketing Management in Global Environment	4 4
Spring	BUS 514A BUS 515	Managing Business Processes I Business, Government Policies, and the Global Economy	4 4
Summer	BUS 514B BUS 516	Managing Business Process II Integrated Business Strategy	4 4
Year 2			
Fall	Option	Elective 1 Elective 2	4 4
Winter	Option	Elective 3 Elective 4	4 4

Table 2 - CSULA's MBA Program Courses

The material is covered in a 3-hour module that covers GIS technology and spatial business thinking (see Table 3). It is also accomplished by relating GIS technology to other course material through classroom discussions throughout the term.

Topic ID	Description
1	What is GIS?
2	Review of GIS capabilities and functionality (theoretical and use of GIS software)
3	Location Based Services (LBS)
4	A survey of the GIS and LBS industry
5	Foundations of GIS and LBS: Data, Hardware, Software, Workflows, Science, People
6	Spatial Business Data: Collection, Build, and Maintenance
7	Spatial Business Data: Additional Sources of GIS data
8	Analysis of spatial business data: Buffer Analysis, Network Analysis.
9	Management case studies: Telecommunications, Utilities, Banking and Finance, Retail / Wholesale, Government Sectors
10	Managing your business with GIS and LBS

Table 3 – Business GIS Course: Topic Outline

Team-Based Study Component

The course project, which is team based, requires each team (composed of 6-7 students) to evaluate a business case facing an organization and suggest a strategy for growth. The strategy developed by the team includes a component involving spatial thinking and the utilization of GIS technology to enhance the organization and its business processes. Each team is required to:

- Identify if the organization is using Spatial Thinking, and in which business processes.
- Identify if the organization is using GIS.
- Determine the effectiveness of the current GIS solution.
- Determine if use of GIS can be enhanced.
- Propose strategy for enhancement of GIS utilization in the organization.

Individual Study Component

Course work is complemented with individual student projects. Each MBA student selects a business sector of interest, and pursues a theoretical application of the ideas discussed in the course to the topic. Special attention is paid to utilization of GIS and spatial thinking. The result is a paper discussing the existing state of GIS technology in the student's business area of interest. Some students choose to evaluate the organizations in which they are currently employed. Other students choose to evaluate a company or business sector which they wish to work in following graduation. This individual project provides each student with specific, practical knowledge which may benefit them.

Student Presentations - Classroom Discussion Component

Each student shares their findings from the individual study component with the class during the last two weeks of the course. The presentation provides students with an opportunity to see how different business sectors are or could incorporate GIS and spatial thinking. It also provides students with the ability to dream up new and more effective ways of incorporating spatial thinking in their area of interest.

The Study

This study examines the impact that the GIS component in the MBA program has on MBA students. In particular, the author believes that GIS and spatial thinking provides a competitive advantage for students entering the workforce. The author believes that once students are exposed to spatial thinking, they will use this knowledge to create new business processes and enhance existing business processes in organizations they are involved with.

Participants

The study was conducted over a two year period (2006-07) at CSULA. 95 MBA students taking business 514a – Managing Business Processes I at the College of Business and Economics participated in the study.

Instruments

Participants were asked a series of questions at the start of the course, and a follow-up series of questions at its conclusion.

Pre-GIS Module Survey Questions are listed in Table 4 below.

Question
Have you heard about GIS previously?
What is GIS?
What business sectors can GIS be used for?
Have you used GIS in the past?
Are you currently using GIS outside of your study program?
Do you plan to use GIS during the next 3 years?
What is Spatial Thinking?
Were you taught to think spatially prior to taking this course?

Table 4 – Pre-GIS Module Questionnaire

Post-GIS Module Survey Questions are listed in Table 5 below.

Question
What is GIS?
What business sectors can GIS be used for?
Are you currently using GIS outside of your study program?
Do you plan to use GIS during the next 3 years?
Should GIS be taught as part of an MBA program?
What is Spatial Thinking?
Should a discussion about spatial thinking be part of the MBA program?
Do you think spatial thinking will benefit your career?

Table 5 – Post-GIS Module Questionnaire

Procedure

Participants were provided the anonymous Pre-GIS Module Questionnaire during the first lecture of the course. They were provided the anonymous Post-GIS Module Questionnaire during the last lecture of the course.

Results

The summary results of both surveys are listed in Table 6.

Question	Pre-Course Results	Post-Course Results
Have you heard about GIS previously?	23% of participants heard about GIS before taking the course.	Not applicable
What is GIS?	8% of respondents provided correct responses.	92% of respondents provided correct responses.
What business sectors can	Emergency Services,	Over 30 different business

GIS be used for?	Automobile Navigation	sectors
Have you used GIS in the past?	2% of respondents stated that they used GIS before taking the course.	Not Applicable
Are you currently using GIS outside of your study program?	1% of respondents stated that they are currently using GIS outside of their study program.	5% of respondents stated that they are currently using GIS outside of their study program.
Do you plan to use GIS during the next 3 years?	2% of respondents stated that they plan to use GIS during the next 3 years	18% of respondents stated that they plan to use GIS during the next 3 years
Should GIS be taught as part of an MBA program?	Not Applicable	90% of respondents indicated that GIS should be taught as part of the MBA program.
What is Spatial Thinking?	13% of respondents provided correct responses	95% of respondents provided correct responses
Were you taught to think spatially prior to taking this course?	None of the respondents indicated they were taught to think spatially prior to taking the course.	Not applicable
Should a discussion about spatial thinking be part of the MBA program?	Not applicable	98% of the respondents indicated that spatial thinking should be taught as part of the MBA program.
Do you think spatial thinking will benefit your career?	Not applicable	78% of respondents indicated that spatial thinking will benefit them in their career.

Table 6 – Survey Questions and Results

Discussion

The results of the initial survey show that a majority of MBA students were not aware of GIS or what it is, and they were also not aware of spatial thinking. Only 23% of participants heard about GIS before taking the course. Only 13% of participants knew what spatial thinking is.

Only 8% of respondents provided correct responses when asked to define what GIS is. Respondents that were aware of GIS, when asked what business sectors can GIS be applied to, indicated that GIS can be applied for Emergency Services, as well as to Automobile Navigation. No other business areas were listed as part of their responses.

Only 2% of respondents used GIS in the past, and only 1% were using GIS at the time of the initial survey.

The follow-up survey shows that incorporating GIS and spatial thinking made a significant impact on the students. A majority are aware of GIS, how it can benefit organizations in different business sectors, and are able to think spatially. 98% believe spatial thinking should be part of the MBA program, and 90% believe GIS should be part of an MBA program. 78% of participants believe GIS will benefit their careers. 18% of the students indicated that they plan to use GIS outside of their study program over the next 3 years, and 5% are already doing so.

Conclusion

The proposed approach increased awareness of spatial thinking and use of GIS technology to the benefit of MBA program faculty and students. The benefits are expected to further propagate to different business sectors and the community.

In the case of CUSLA's MBA program, the results are positive and promising. Students have stated that this approach provides them with a new way of seeing the business world. Some students are working on research activities which incorporate GIS and spatial thinking. Spatial thinking has been positively received by faculty in the school of business. The author recommends the proposed approach for other MBA programs.

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