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# AN OPEN EDUCATIONAL RESOURCES FOR INCREASING THE GEOGRAPHIC INFORMATION AWARENESS OF BUSINESS LEADERS

*Research in Progress*

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## **Abstract**

*This paper describes all aspects of designing, developing and incorporating an Open Educational Resources (OER) to increase the awareness of business leaders on geographical information. The paper includes the proposed methodology for the design and development of the OER. The final proposed OER modules will be offered in various forms including synchronous E-learning modules like distance learning sessions through shared white board, virtual classrooms, scheduled online examination and asynchronous e-learning modules like the coursework through the web, email, message board or online forums and online GI System (GIS) tools. During the pilot implementation of the OER, the selected business leaders who will be primarily the OER learners aiming to build their GI awareness starting by learning the basics of the GI, addressing the business operations' issues, identifying the GI role in solving the business operations' issues and finally practicing the GIS & applying it in their daily business operations. In a later stage, an OER assessment should follow in order to check the progress in the business leaders' GI awareness.*

*Keywords: Open Educational Resources, Geographic Information, Geographic Information System, E-learning*

## **1 Introduction**

Business leaders, including those who are in the public are facing many problems in their daily operations. Alter (1976) stated that effective managers rely on Information System in order to make sound decisions. Since then, most of the business faculties and schools have introduced several IS educational modules in their curriculum and teaching programs, either Coursework or Lab, where the main target was to improve the problem solving skills of the future managers when dealing with their daily operations' issues by introducing the necessary supportive IS tools. Arthur (2009) indicated that the evolution of the business and human needs is one of the main reasons of the IS evolution. One of those evolutions in the IS field was the GIS which transformed the Geographic Information from a concept and science to a supportive tool available to the people and business leaders to help leading themselves and improve their decision making (Greene 2000).

Audet & Ludwig (2000) indicates that the GI creates an education environment where learners can visually discover, investigate, and make decisions about issues through GIS in an interactive and challenging manner. This means that GIS may be employed as an essential decision making tool to

address the “Where” dimension in business cases where location is an important factor for optimal decision making. Exploring the relevant issues of the “Where” dimension and its potential benefits for business leaders, including but not limited to the chief of operations or investments or business development or corporate strategy or technology and many others whom with higher or lower positions, requires a focused and structured design and development along with problem-based approach to maintain high engagement of learners depending on the level of impact of the “Where” factor in increasing his performance and decision making. To do so, there is a need to go beyond the traditional way of teaching and training the potential GIS users that are usually offered as either academic GI courses (at undergraduate or postgraduate level) or professional GIS software certification focused modules.

Accordingly, the incorporation of an Open Educational Resources (OERs) is becoming an urgent need supporting the GI institutions and educators in their effort to design and develop a practical GI educational program aligned with the general GI learning objectives and GI learning tools & methods, as well as the business leaders’ needs & desired learning objectives.

Educational, technological and economic aspects will be taken into consideration in the design, development and implementation of the GI for business leaders’ e-learning program to simplify the teaching and learning process. Regarding the GI for business leaders’ courses, we have identified some issues like the availability of the GI resources mainly in the English language which limits the potential e-courses’ candidates to the English educated, the number of the potential candidates interested in or capable to follow those courses and the need to develop a scalable methodology.

This paper presents the aspects of the design, development and implementation of a primary prototype of a GI e-learning program for business leaders, which has to be developed as highlighted previously for English speaking educators and learners.

In this paper, we will provide an outline of the methodology used to identify GI educational needs of the business leaders as well as the design of the GI e-learning program framework. For the GI e-learning program, the team should include one expert in e-learning programs from the pedagogy and the technology perspectives with advanced information system skills, one GI expert and one developer. The team will be responsible of designing the GI e-learning program interface and integrating the corresponding teaching material and tools.

This paper is organised as following: Section 2 will include a short literature review about relevant academic approaches, GI learning approaches for business leaders as well as the proposed methodology to be used in order to define the GI educational needs of the targeted business leaders. Section 3 will describe the GI e-learning program design with the supportive examples. Section 4 will conclude this paper.

## **2 Literature Review and Identified GI Educational Needs for Business Leaders**

In this research, we will follow the social-constructivist theory (Vygotsky 1978) which emphasizes on the learner’s knowledge construction through social interaction and sharing of experience especially for acquiring preliminary concepts about ideas. In addition, we have identified some essential theories that will be support in the design of the GI e-courses as following:

- The theory of the “Zone of proximal development” (Vygotsky 1978), which highlighted the importance of learners’ engagement in social behavior and collaboration with peers in order to achieve more fulfilled learning experiences rather than relying only on individual experiences.
- The “Experiential learning theory” (Kolb 1984), which emphasized on the role of intertwining learning with everyday real life incidents in order to achieve higher learning experiences.

- The “Lave learning theory” (Lave 1990), which identified an evolution path for the active learner that starts from the “newcomer” level and ends with “old timer” level within a learning community.

The design of the targeted GI e-learning program will be fully aligned with the above identified learning theories, in addition to the GI learning approaches for business leaders.

Shepherd (2009) stated that the GI learning or Geographical thinking is included in many of the traditional business subjects: accounting, business and management, finance, economics, human resource management, law, marketing, and statistics. In addition, he highlighted that GI has a wide impact over the business environment in the PESTEL framework (Aguilar 1967) for understanding influences operating on the organization as well as the human resource management. Moreover, Miller (2006), Lynch (2005), Hess et al. (2004), and other researchers highlighted the strong influence of the GI over the marketing, including the marketing management, strategic marketing and consumer marketing where the GI has an essential role over one of the four ‘Ps’ (Place) in the original marketing mix (McCarthy 1960, Gronroos 1997). Accordingly, the business leaders’ GI learning needs will cover many of the business disciplines mainly business and management, economics, human resource management, statistics and marketing.

The e-learning OER should be designed taking into consideration the need to have an active learning e-courses with a focus on the learner-centered philosophy. It should cover also certain essential GI learning activities in order to increase the GI knowledge of the learners. The learning activities vary from simple to complex in an ascending sequence. Every GI e-course in the program should include (i) many learning tools and materials like self-assessment tests, audio or video lectures, practices, access to online forums, etc..., (ii) the learning environment which includes the online platform, the GI tools to be used and the ICT needed skills, (iii) the e-course metadata (like prepared by whom, when, type of learners) and (iv) the e-course prerequisites, profile of the learner and the required technical infrastructure. The e-course design will include some interactive tools that facilitate the communication between the educator and the learner in addition to the self-expressing tool. The learning activities will be fully described with (i) an overview about the sequencing and the teaching sessions’ time of the GI online sessions, (ii) a detail about the size and characteristics of the GI audio and video materials, (iii) a list of the GI material and course contents’ sources, (iv) a list of the GI tools necessary to implement for practicing and finally (v) a variety of self-assessment tools.

A secondary research will be necessary in order to define the profile of the GI learners (business leaders) and as described previously, the GI e-learning program courses will be developed as an open educational resource with a mix of synchronous and asynchronous learning modules to maximize the potential impact on the targeted learners using the Moodle (Open Source) server.

In the following section, we will describe the GI e-course learning activities, tools & methodologies, relevant audios & videos, animations and self-assessment exercises.

### **3 OER Design, Development and Implementation**

The strategy to be followed for the OER development will focus in separating the design, the implementation and the course execution stages from each other with a clear definition of the expertise required in each stage.

At the design stage, we will need expertise at the e-learning level, technology level as well as the GI knowledge level to design (i) the GI courses’ content and curriculum according to the business leaders’ profile and requirements, (ii) the general interface of the OER framework, (iii) the interface of each tool to be used such as GIS or Business Intelligence tools that may differ from course to another, and finally (iv) the distribution of the course content and components between the synchronous and asynchronous learning methods based on the best international practices or learners needs.

At the implementation level, there is an extensive need for the GI expert with minor support from the e-learning and technology experts. The GI expert will be responsible of monitoring and testing the deployed OER system and checking whether there is a need to do some modifications to cover some missing GI e-learning requirements if existing or some bugs in the OER system.

Applying a fully phased development approach with separated levels will ensure the future scalability and transferability of the OER platform. The OER development for a GI e-program will be costly in terms of direct investment but will guarantee a continuous delivery and execution of GI e-courses to the business community worldwide mainly the existing or potential business leaders as well as the GI academic community having good English language speaking and understanding thus crossing the geography boundary to reach the globalism. For the non-English speakers, the GI e-program does not require any change in the design of the GI course or general interface or even tools interface but requires a full language translation of the course content and relevant materials to the preferred language, and perhaps a language translation of the tools or activities' content if possible which might not be so easy especially with the GI software that requires support and direct involvement from the software vendor.

The proposed OER, developed according to the above methodological approach, will offer the learners the following e-learning activities:

- Participation in synchronous e-learning sessions that require tutorial discussions on GI concepts. Those sessions will be coordinated and led by a GI remote instructor. The proposed technology to be used for such distance learning course will be WebEx®.
- Usage of various asynchronous GI e-learning courses that could cover many tutorials and documentations about some specialized or advanced GI tools. The proposed technology to be used for such asynchronous distance learning courses and materials will be the Moodle system with various Web and Web 2.0 tools.
- Possibility to design and develop their GI learning material using appropriate method and tools (asynchronous distance learning).
- Communication, cooperation and knowledge sharing with peer students, GI distance learning students, through an online OER internal forum or access to other external GI forums in order to gain new GI knowledge that is more relevant to the learners' specific business needs, to be applied and practiced directly using the offered tools and learning activities.
- Opportunity to perform some self-assessment tests, practices and exercises on the GI offered tools that allow learners improve follow their GI learning skills.

Based on the aforementioned, we will propose a curriculum of the GI e-course for business leaders as illustrated in table 1. It includes the name of the GI e-course module, the outline, the online teaching method, the tools to be used and the duration. The proposed GI e-course will support the potential learners in understanding the essentials of GI for business, acquiring hands-on skills that support the integration of GI in the business decision making and mapping, visualizing & analyzing the business data spatially in addition to some advanced GI technical skills that could be of interest for the business leaders like publishing of geographic data. The proposed curriculum is advised by the topics is offered in university-level course with modifications mainly in the pedagogical methodology followed and the employment of GI tools that are suitable for such an implementation. The initial contents of the OER are presented in Table 1 and will be amended progressively during the OER development, implementation and execution phases to cover more E-modules and tools based on the continuous researcher's knowledge development & understanding of the different business leaders' needs of using the "Where" factor to improve their operations and increase the accuracy of their decisions.

E-module Name	Outline	Teaching Method	Tools	Offering
Geographic	Introducing the GI for business,	Asynchronous e-	Moodle System and	Core

Information for Business	the concept of “Everything happens somewhere”, the strategic role of GI in the decision making, the National Spatial Data Infrastructure (NSDI) and the Geographic data and tools including process and procedures	learning	Web (Web based tutorials)	
Introducing GIS in business applications	Introducing the GIS, the Spatial Data sources for business, the GIS capabilities the GIS applications in business sectors, the Quantum GIS (QGIS) in addition to the design of a GIS project	Synchronous – Virtual classroom	WebEx®	Core
Spatial data collection techniques for business applications	Describing the spatial business data collection techniques including the Global Positioning System (GPS) and Mobile Phones in addition to the integration of data collected from different formats into GIS and the selection of the appropriate layers and data to be displayed and visualized	Synchronous – Virtual classroom  Asynchronous e-learning	WebEx® and Esri ArcGIS  Moodle System, Web (Web based tutorials and ArcGIS practical videos) and Esri ArcGIS tool	Core
Designing maps for a business studies	Learning how to design maps for business studies including the assembly of base maps for emergency preparedness, the reduction of GIS data from large coverage to an area of interest, the cut of points of interest, the extraction of subsets of GIS data for mapping, the built of numeric scales for mapping attributes, the preparation of a digital map from paper map/scanned map, thematic map, professional map' layouts for presentations and reports, market share map for retail distributors, suppliers map, customers map through geocoding in addition to the coding of Building with specific variables	Synchronous – Virtual classroom  Asynchronous e-learning	WebEx®, Esri ArcGIS  Moodle System, Web (Web based tutorials and ArcGIS practical videos) and Esri ArcGIS tool	Core
GIS analysis and mapping techniques	Describing the Comparative Business Site-Location the Feasibility Analysis, Cost/Benefit analysis in GIS, The Proximity analysis, the neighborhood analysis, the Multi criteria analysis in business site selection, Cluster /hot spot analysis in addition to the spatial patterns and trends	Synchronous – Virtual classroom  Asynchronous e-learning	WebEx®, Esri ArcGIS  Moodle System, Web (Web based tutorials and ArcGIS practical videos) and Esri ArcGIS tool	Core

Exploring open data, voluntary Geographic Information, and crowd Sourcing	Presenting the Voluntary Geographic Information and crowd sourced projects, the social media data, the OpenStreetMap data, in addition to the Online publishing of interactive and dynamic map as well as the creation of Custom Web maps without programming using Google earth	Asynchronous – e-learning	Moodle System, Web (Web based tutorials and ArcGIS practical videos) and Esri ArcGIS tool	Elective
Online Publishing of maps and GIS outputs	Learning how to work with Google maps & Fusion tables, publish into multiple web based platforms and introduce the Participatory GIS in Business	Asynchronous e-learning	Moodle System, Web (Web based tutorials and ArcGIS practical videos) and Esri ArcGIS tool	Elective

Table 1: GI e-course proposed Curriculum

Thus, the aim of the proposed GI e-course is to empower the business leaders with the GI skills in order to improve their decision making capabilities. The objectives are particularly to increase the GI awareness of the business leaders, offer them the possibility to develop their GI skills and competences according to their preferred learning design including the needed learning resources and relevant tools & methods, and iii) finally enable them to use the GI tools effectively in order to take the accurate decisions.

## 4 Conclusions

The paper main objective is to propose an OER system for GI learning for business leaders. It includes the initial design for the OER system along with the GI e-course curriculum. The design process has not finished yet and a repetitive design iteration cycle is applied in order to reach a mature design. The presented work can be considered as the preliminary design of the GI OER for business leaders. The future work will focus on assessing and validating the GI OER design through additional research and then start the development process.

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