Towards an Interactive Educational Environment for Disaster Management Support

(IEEDM Project)

Dr. Algis Kucinskas, ENSAPLV, Paris, France
Dr. Brian Tomaszewski, CMS/RIT, Rochester, NY USA
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**IEEDM Project Team**

- **Algis Kucinskas**, Ph.D., ENSAPLV, Paris, France  
  Member UN-SPIDER KP Core Group & Expert Group on CB  
  Former Staff Scientist, JPL/NASA, Pasadena, CA USA  
  (Geosciences, Space & Geo-information Science & Technology and Applications, Education & Training, Capacity Building)

- **Brian Tomaszewski**, Ph.D., CMS/RIT, Rochester, NY USA  
  UN/OCHA Consultant/Researcher, UN-SPIDER KP Contributor  
  (Geographic Information Science & Technology (GIS & T), Geovisual Analytics, Disaster Management, Geospatial Technology Education)

**Advisors**

- **Bikash Chaudhuri**, Architecte DPLG, ENSAPLV, Paris, France  
  (Architecture, Urban Planning, Environmental Issues, Education)

- **Dogan Seber**, Ph.D., NRC, Rockville, Maryland, USA  
  Former Director, Geoinformatics Lab, SDSC, San Diego, CA USA  
  (Geophysics, Information Science & Technology, Education)
An Educational Programme

• In response to identified user communities needs & to address recommendations of UNISPACE III & the MDGs, we initiated an educational programme within the Geoinformatics Lab, SDSC (2006).

PROGRAMME GOALS:

• Design, develop, implement & evaluate distributed GIS solutions (digital learning resources & learning environments) for awareness raising, transfer of knowledge, & capacity building specific to the use of space, geo-information & other relevant technologies applications & concepts for addressing social, economic, and environmental impact issues.
Moving Towards an IEEDM: DM User Community Needs Assessment /Analysis

• In the period 2007-2008 A. Kucinskas participated in several UN-SPIDER-relevant Workshops and meetings (ongoing process).

• One important fact which emerged:

there is a gap between the required basic knowledge/understanding to efficiently use geographic information & the relevant formal training/capacities for some of the planners, managers, and decision-makers involved in DM/ER activities.

To contribute to reducing this gap & address DM user community needs we adapted our educational programme to support specific activities of UN-SPIDER: (1) systematic compilation of relevant information; (2) define & implement a KP; (3) awareness raising; (7) management & transfer of knowledge; (11) support to capacity building (Ref – UN document A/AC, 105/894).
IEEDM Project: Objectives

• Within our educational programme, the primary aim of this effort is to develop an interactive, web-enabled educational geoportal designed to support full natural disaster management cycle planning & decision making activities.

• The planned inquiry & case study-based, hands-on e-learning/training environment seeks to help end-users at all levels & from a wide variety of backgrounds:
  • acquire an understanding of hazard/disaster risk and impact on society & the environment (awareness raising).
  • Learn of the benefits of space, geo-information & other relevant technologies-based geospatial information/knowledge for DM/ER (awareness raising).
  • Learn how to efficiently use/apply such information & knowledge for improved planning & decision-making (capacity building).
IEEDM Project: Approach / Timeline

Towards our objectives, a stepwise approach:


• **Step 2 (2009- ):** Partnership with Dr. B. Tomaszewski (CMS/RIT): concept expansion, IEEDM proof-of-concept prototype (Ref – Tomaszewski RIT SIG Grant).

• **Step 3 (2010 ?):** Develop full scale IEEDM, user evaluation.
Step 1 - General Concepts / Educational Foundations

- IEEDM builds on & extends earlier work on a dynamic, web-enabled, interactive & user friendly Educational Information System called « Discover Our Earth (DOE) », built at Cornell & SDSC for geosciences education purposes.

- IEEDM draws upon proven pedagogical concepts developed from DOE, such as: an effective inquiry/discovery-based, hands-on approach to learning & the use of real world geospatial data.

- One key advantage: users feel empowered playing an active part while learning to make & interpret value-added hazards risk information & knowledge map products (Source: DOE student surveys).

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Step 1 - IEEDM Core Components

- **Geo-databases** for selected disaster-prone areas, including multihazard-relevant geospatial data from various sources.
- **GIS-based software components**, including an interactive mapping/analysis tool.
- **Online interactive study guides** on the topics addressed by the data sets.
- **Interactive applications** for effective inquiry-based, hands-on learning in the form of:
  - Study guides-relevant « virtual exercises » and discovery-based mapping activities
  - Personalized regional training case study sessions: study region selection & documentation; making a hazard info product; make inferences in terms of DM-related risk assessment & reduction, planning & decision-making for the at risk study region.
Step 1 – Planned Applications / Target End-Users

The IEEDM seeks to complement traditional class-based awareness raising & capacity building initiatives by targeting a wide audience with varying technical skill levels & diverse educational, cultural, and institutional backgrounds.

NOTEWORTHY PLANNED APPLICATIONS:

- **Quickly educating/guiding** those involved in DM/ER but with little or no formal training in geosciences, space science & technology & applications, as well as the handling & interpretation of geospatial data & derived geospatial information and knowledge.

- **Empower novice users** with the required skills/vocabulary to facilitate communication between & help create bridges to connect the various communities involved in DM/ER.

- **Empower local populations** for an increased participation in their own DM efforts, leading to improved 2-way communication, sharing of information & feedback between professionals with technical skills & the vulnerable population in the field.
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Step 2 - IEEDM System Architecture

Based on a classic 3-tier approach:
- Library
- Middleware of GIS-based software.
- User Interface (simple to use, interactive).

Uses advanced technology:
- Cloud computing
- Knowledge communities
Step 2: IEEDM Features in Practice
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**Step 2: IEEDM Features in Practice**

- Thematic image-map
- IEEDM prototype
- Annual Precepitation draped over eastern Sudan
- Rivers and populations centers
- Custom, value-added hazard risk information and knowledge product IEEDM users can create
- Personalized regional training case study session
- Interactive resources (map wizard)
- Produce, analyse and interpret knowledge products for disaster management-related planning and decision making
Idea - Concept Map — Geographic Map Integration

Concept Maps
Concept Map of Disasters
develops
Hurricane, Earthquake, Avian Flu, ...
depicts
provides location, distance, extent, etc.
provides attributes & procedures

Geographic Maps
Geo-map of Disasters
depicts
Hurricane, Earthquake, Avian Flu, ...
include
complement

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Idea - Learning Communities

Knowledge + Community
Multiple Web Platforms.

Function:
- Social Networking
  - Facebook
- Mapping
  - Google Maps
- Publishing
  - Blogger

Open Education?
Collaborative Learning?

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**Idea - Learning Communities**

- Real time/asynchronous collaboration to support education
- Non-core IEEDM content – user driven/created (web 2.0), open content

**Examples to demonstrate the idea**
Step3 - The Way Forward

• Potential inclusion of the prototype educational environment within UN-SPIDER’s KP.
• Usability evaluation of the prototype
• Development & evaluation of full scale IEEDM
• At term, consider uploading user’s data for training exercises.
• Ultimately, consider possibility integrating real or near real-time regional data, for interactive blended EIS/DSS functions.
Thank you for your attention

Algis Kucinskas
algis.kucinskas@noos.fr

Brian Tomaszewski
bmtski@rit.edu

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