MAPPING GEO-INFORMATION EDUCATION IN EUROPE

Frans I. Rip, Wageningen University, the Netherlands - June 2, 2010
What? Why?

Mapping Geo-Information Education = “EduMapping”

- **What is it?**
  - Approach to get an overview of GI teaching content in courses and/or curricula

- **Why do it?**
  - GI discipline is fragmented
  - Use of GI is expanding
  - Co-operation between employers, edu-org’s and manufacturers requires a shared concept of GI
Development of European Higher Education Area:

- ECTS (since 1989)
  cross border credit recognition (2009: 95% implemented)

- The Bologna Process (since 1999)
  - Introduction BaMa structure (2009: 90% implemented)
  - Staff / Student mobility objective
  - Life Long Learning objective
2006:

- Publication by UCGIS + AAG of GI S&T Body of Knowledge (GI-BoK)
  - hierarchical structure
  - 10 Knowledge Areas
    * 72 Units
    ** 329 Topics
    *** >1600 formal educational objectives

Objectives of GI-BoK: go to
http://www.ucgis.org/priorities/education/modelcurriculaproject.asp
2008: Recommendation by the European Parliament to establish a European Qualifications Framework (EQF) for Life Long Learning

2 objectives:

- Connect Edu-systems in countries via intermediate set of EQF-Levels
- Connect labour market to education
Conclusions

- BoK is a useful, but imperfect, general framework for teaching
- A clearer picture of the GI education landscape is needed for co-operation, marketing & mobility

the EduMapping initiative
- Explorative
- Educational Content oriented
The **EduMapping** Initiative

GI education and training in Europe

the GI Galaxy

the GI Content Map

EQF

BoK
Problem

GI Galaxy image:
- light spots: symbolize descriptions of GI courses or curricula of all sorts.
- positions and colours: a symbol for differences in educational content.

In the image you can’t see if a star is near or far. Likewise: descriptions in study and course guides might give a wrong impression, because
- no common format. They differ in:
  - Description: Language, Learning Outcomes / Competences, Study Load units, ...
  - Nature: Professional, Academic, Vendor software training, ...
  - Course set-up: Fulltime / parttime, Electives, Internships, ...

- usually not related to a overarching domain concept like GI BoK
Format differences in descriptions
- Descriptions not related to domain concept

→ obstacle for comparability → obstacle for co-operation & mobility

EduMapping would help. How?
- By using GI BoK as a common reference for description
- By using a standard format
EduMapping: 2 parts

1. Conversion of local course content description into a BoK-based label

2. Visualization of educational content in a map
first results /1

<table>
<thead>
<tr>
<th>GI curriculum, overall size: 120 ECTS</th>
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<tbody>
<tr>
<td>GI subjects in Body of Knowledge</td>
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<tr>
<td>Knowledge Areas:</td>
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<td>Analytical Methods</td>
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<tr>
<td>Conceptual Foundations</td>
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<td>Cartography and Visualization</td>
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<td>Design Aspects</td>
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Reference: UCGIS GI S&T Body of Knowledge, DiBiase et al. 2006

Content Summary

Content Area & Centroid
first results /2

Centroids in EduMap
Steps

1. Quantification
   Assessment of GI Edu-content using an external reference (BoK)

2. Visualization
   a. Rearranging BoK Knowledge Area scores into 4 groups, producing Content Area polygon (CAp)
   b. Calculation of CAp-centroid, “Course Coordinates”
   c. Combining centroids in a map
Step 1: Assessment

- materials:
  - description of course or curriculum (pref.: website in English)
  - GI S&T BoK’s hierarchy of subjects:
    (10 Knowledge Area’s, 73 Units)
  - Assessment Form (Excel worksheet)
    - 4 Content Area categories:
      GI in-BoK, GI not-in-BoK, Generic GI, non-GI
    - calculation of time % per BoK Knowledge Area and CA categories

- action
  - relate description to Content Area categories, based on the GI-BoK subject descriptions
  - assess the proportion of time spent to BoK subjects
Step 1: Assessment /2

Result: the GI Content Label

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Step 1: Assessment /3

Comments

- Too many categories, criteria too vague (RS specialist)
- Easy (GIS specialist)
- Curious to know the coverage of other curricula
- Assigning content to BoK for my own courses was difficult, and impossible for my colleague’s courses
- Very subjective, BoK follows a completely other logic.
- Mapping between 2 fuzzy sets
- Using BoK this way is useful as a packing list, and for harmonization
Step 2: Rearranging & Visualization

- **materials:**
  - the values on the label

- **actions:**
  - Focus on the in-BoK category
  - 10 Knowledge Area scores into 4 groups, add scores
  - Create Content Area polygon
  - Calculate Centroid position
Step 2: Visualization / Map centroids

- **materials**
  - the bi-axial domain
  - the course coordinates
  - the course size
  - the course name

- **actions**
  - put them in the map
Shown: prototype of “EduMap”
   a BoK-based
GI Education Content Map

- No role for EQF-levels, it’s BoK in all directions
- Distance unit: time in % of in-BoK size
- BoK’s Knowledge Areas in meaningful order
- Clear place for sub-domains
How to deploy?

**Content Label:**
- To accompany GI course descriptions, for better comparability
- Use as management tool to steer course+curr. content
- Support accreditation and certification processes

**EduMap:**
- Use as management tool to find niche for programme or course
- Use to advise students about Master programs

**Perspective**
- Connect to domain org.s (ISPRS, FIG, Herodot, ...)
- Collect more assessments and test deployment expectations
- Co-operate with UCGIS for BoK2 (feedback of GI-not-in-BoK)
- Improve presentation (10-d comparability?)
- Connect to EQF
COMMENTS ?
QUESTIONS ?

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Masik’s Survey on BoK-use in Europe (2010):
- 22% of GI-curr.’s is using, growth to 25% expected

Ralf Bill’s map of ‘study cities’ only shows geographic location and curriculum name

http://www.geoinformatik.uni-rostock.de/ausbildung_map