Do we know what they need to know?

EU Project GI-N2K, Wp1: Demand for and Supply of Geospatial Education and Training

06 Sept 2014, Frans Rip
Demand and Supply

...what they need to know...

- **They** =
  - GI-professionals: specialists, users, managers. Objective: *do* their jobs. => **Demand side**
  - GI-students: participants in GI teaching at EQF levels 4-8 (voc. - prof. - acad. - PhD). To *get* a job.

Are their learning needs met by the GI teaching on offer?

- **GI Teaching**: sequence of lessons + exercises, designed to develop GI competences. Offered by organisations and companies: **Supply side**
EU objective (Europe 2020 strategy): improving skills and access to education and training, focusing on market needs

Teaching is about acquiring competences

- GI-Problem: finding people with the right ones
GI-N2K project (2013-2016)  
Geographic Information: Need to Know

- **Wp1**: Demand & Supply survey and analysis  
  - State of awareness and use of GI-BoK?  
  - Is there a teaching gap?  
  - What is missing in GI-BoK

- **Wp2**: contents of GI-BoK next version (started)

- **Wp3**: construction of next version (started)

- **Wp4**: Test among partners (not yet started)

- Partners from 25 European countries; Lead: KU Leuven

http://www.gi-n2k.eu/
GI-N2K Wp1 results

**Demand Survey** (University Salzburg, Austria)
- Awareness and use of GI-BoK
- Relevance of GI-BoK / Need for obtaining competences
- Missing subjects in GI-BoK

**Supply Survey** (Wageningen University, Netherlands)
- Awareness and use of GI-BoK
- Existing and Intended courses
- Missing subjects in GI-BoK

**Analysis of Demand vs Supply**
Conclusion:
Awareness and use of GI-BoK is limited. It does not (yet) function as a common reference for GI-teachers and GI-employers.

Demand vs. Supply
GI-BoK Awareness and use

- Awareness and use of GI-BoK at the Supply side (N=233)
- Awareness and use of GI-BoK among interview partners at the Demand side (N=21)
Demand vs. Supply: teaching gap?

Respondents rating

<table>
<thead>
<tr>
<th>Scale of 1-6</th>
<th>AM</th>
<th>CF</th>
<th>CV</th>
<th>DA</th>
<th>DM</th>
<th>DN</th>
<th>GC</th>
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Wished-for competences

Knowledge Areas
EQF levels 4-8
Existing + Intended
N=297+109

Teaching on offer

KA-relevance + Competence Needs
Demand vs. Supply: teaching gap?

No conclusive evidence for a teaching gap.

Possible causes of the difference:
- The questions asked
- The lacking awareness of GI-BoK as a shared frame of reference

So, the situation might be better than it seems

-> No conclusive evidence for a teaching gap.

But... If organisational aspects (scheduling, fees, language, location) were also taken into consideration, the situation might be worse, especially on a multi-country scale.
### Demand vs. Supply
Missing in GI-BoK

**SUPPLY side**

<table>
<thead>
<tr>
<th>Prog. Dev.</th>
<th>Data acquisition</th>
<th>Other ‘hot topics’</th>
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<tbody>
<tr>
<td>Data archive</td>
<td>OSM</td>
<td>Geomarketing</td>
</tr>
<tr>
<td>Frontend</td>
<td>UAV, drone</td>
<td>2D</td>
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<td>API</td>
<td>GNSS</td>
<td>Semantics</td>
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<td>(Glob.Nav.SatSys)</td>
<td>OBIA (object based im. anal.)</td>
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<tr>
<td>Python</td>
<td>Mass data</td>
<td>4D</td>
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<tr>
<td>Plugin</td>
<td>Open data</td>
<td>BIM (building inf. model)</td>
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<td>Augmented reality</td>
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<td></td>
<td>Radar RS, SAR</td>
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**WebGIS**
- Web application
- Geoprocessing
- HTML5
- Smartp
- GPRS
- RESTful
- Semantic web

**SDI**
- Inspire
- Harmonization

**Web Services**
- Web platforms,
- System architecture

**Data acquisition technology**
- UAV
- LiDAR

**DEMAND side**

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<th>Point cloud analysis</th>
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**Conclusion:**
Dozens of possible subjects on various conceptual levels not present in GI-BoK. GI-BoK is truly incomplete.
GI-N2K Survey responses

Demand side:
• Valid responses: 435 out of >1000
• From 28 countries

Supply side:
• Valid responses: 234 out of 264
• From 28 countries
Demand Survey results

Awareness and use of GI-BoK

Interviews

- 6 out of 21 interview partners are aware of GI-BoK
- Only 3 used it (all academics)

Comments about GI-BoK:

- *if* ‘it was more practical oriented’...
- ‘strongly academic’
- ‘way too theoretical’
- private companies ‘rather need an easy-to-use and more straightforward tool’.
- use the BoK for student self-assessment.
- use the updated BoK as a foundation for the new competence-oriented salary system in the German public administration.
Demand survey results

Need for competences

Free text response analysis

Word clouds of the 2% - 7% range
**Demand Survey results**

**Missing in GI-BoK**

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<td>Semantic web</td>
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Demand side summary

- **Awareness**
  Little awareness of GI-BoK, almost no use

- **Demand**
  Keywords indicate need for both GI competences (e.g. ‘mapping’) and non-GI competences (e.g. ‘web’)

- **Missing**
  Large number of possible subjects, missing in first version of GI-BoK
Supply Survey results

GI-BoK Awareness and Use

Aware, but no use: why? – 44 answers
- No need, no wish (13/44)
- Organisational obstacles (11/44)
- BoK content not OK (8/44)
- No time (5/44)
- Usability aspects (2/44)
Existing teaching

Number of courses (N=427)

Existing, per size class and EQF level

Size class in ECTS

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Existing teaching, 0-10 ECTS
Teaching content landscape

Intended
N=109

CV4 Graph.Repr.Techn.
DM5 Mod.3D etc.
GC7 Sim.Mod.
DA2 Proj.Def.
GS3 Use GI in Public Sector

MD2 Dbms
GD7 Land Surv.+GPS
GD5 Map Proj.
GD11 Rem.Sens.
GD12 Stand., Infra

CV3 Princ. of Map Design
DA6 Appl. Design

Existing
N=334

AM Analysis Methods
CF Conceptual Found.
CV Cartography+ Vis.
DA Design Aspects
DM Data Modeling
DN Data Manipulation
GC Geocomputation
GD Geospatial Data
GS GI S+T & Society
OI Org.+Inst.aspects
Teaching content profile

KA coverage per EQF level in # of courses

EQF levels 4-8

N=299

Per EQF level

N=299

Netherlands

N = 24

Course total: 31
ECTS total: 152

Courses per Knowledge Area

Response/Target: 14/16
### Supply Survey results

**Missing in GI-BoK**

Subjects mentioned in the free text descriptions of existing and intended teaching:

<table>
<thead>
<tr>
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<th>Data acquisition technology</th>
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<tbody>
<tr>
<td>• Web platforms,</td>
<td>• UAV</td>
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<tr>
<td>• System architecture,</td>
<td>• LiDAR</td>
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<td>• OGC services,</td>
<td>• Mobile GIS</td>
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<tr>
<td>• Web processing services</td>
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<td>• SDI service components</td>
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Supply side summary

- Less than 50% awareness of GI-BoK, less than 25% use;
  Half of the respondents aware of GI-BoK are not using it.

- Supply of teaching content: emphasis is on a) Analysis Methods, b) Cartography & Visualisation and c) Geospatial Data. Only small changes intended.

- number of possible subjects, missing in first version of GI-BoK
Do we know what they need to know?

- It is difficult to compare Demand for and Supply of competences because GI-BoK is not a common language
  - Not sure about a teaching gap
  - Also, GI-BoK is incomplete
  - Yes, there is a content gap
Outlook

GI-N2K will improve GI-BoK:
• Interesting tools
• More up-to-date

If it becomes a common language is in the hands of the users at Demand and Supply side

http://www.gi-n2k.eu/

Suggestion for teachers:
• Add a GI-BoK diagram to the courses you offer to characterize their content
• Use the EduMapping kit:
Competences

- Competences: abilities to apply knowledge in a context
  - Domain-specific competences
  - Description: Learning Outcomes. GI: GI-BoK
  - More general competences
  - Description for GI is in American Geospatial Technology Competence Model
GI domain competences

**GI-BoK** Knowledge Areas

- Cognitive levels
  - Understand – Describe, Explain
  - Knowledge - Remember

Learning Objectives in “Action-verb” format

e.g.: After this course, student is able to evaluate tools for conversions between data formats (from: TU-Delft Geomatics).
The questions asked

**Demand side:**
What competences would you like to obtain?

**Supply side:**
The GI teaching in your organisation can be a single course, or a number of courses, organised in a programme.

Please specify up to 3 courses that best reflect the focus, or the core, of GI teaching in your organisation.

Specify ECTS-size, EQF-level, nearest GI-BoK Unit