



Geography and Geographic Competences

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Contents

 Our experience in geographic information (GI) training

– generic competences and training scenarios

 On modern geography

– ‘geographic’ spatial competences and future of geography

 Geographic methods – description and search system

– suggested model

Our experience in GI training

Universities

4 universities, one technical college

No consistent GI programme

ES co-funded project “Online Geographic Information Training for SDI Capacity Building in Lithuania

9 courses, 18 months, 259 persons, 1154 person/courses

Oriented to in-service training

Commercial courses

Formal GI education (universities
and colleges)

Lack of consistent approach

General (geography, ecology, history...)

- Thematic knowledge, insufficient technological skills

Technical (geodesy, civil engineering...)

- Good skills in a narrow context

IT (GIS data management and programming)

- Solely technological approach

Success in well-defined relatively narrow application areas (cartography, geology)

- Stimulate creativity?

Problems of formal education

Difficult to preserve balance between scope and complexity

Dissipated teachers' competences

- Poor quality of geographic information products
- Inefficient exploitation of geographic data
- Lack of organisational GI (GIS) culture: uneven skills and insufficient mutual understanding



In-service training for national SDI

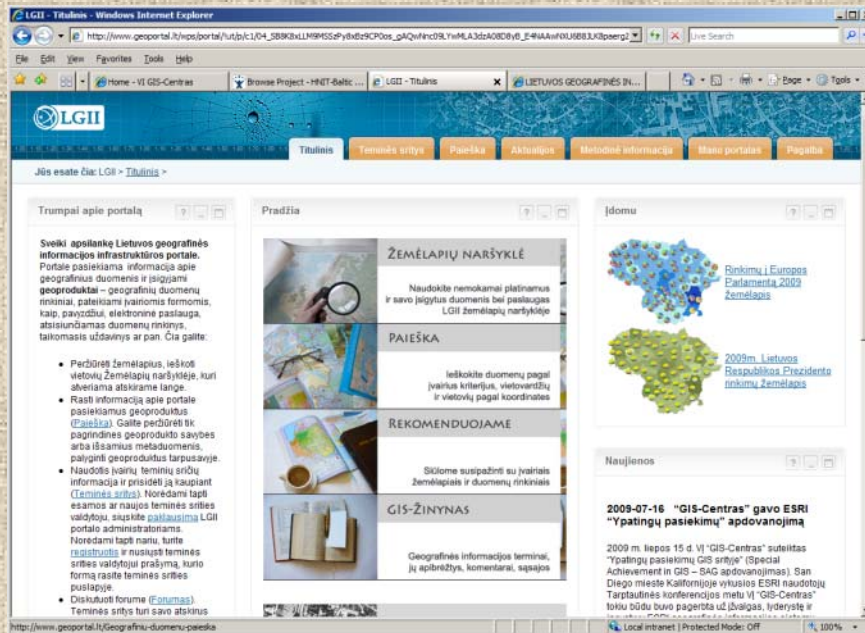
LGII: Lithuanian SDI

www.geoportal.lt

Core systems developed in 2005–2008

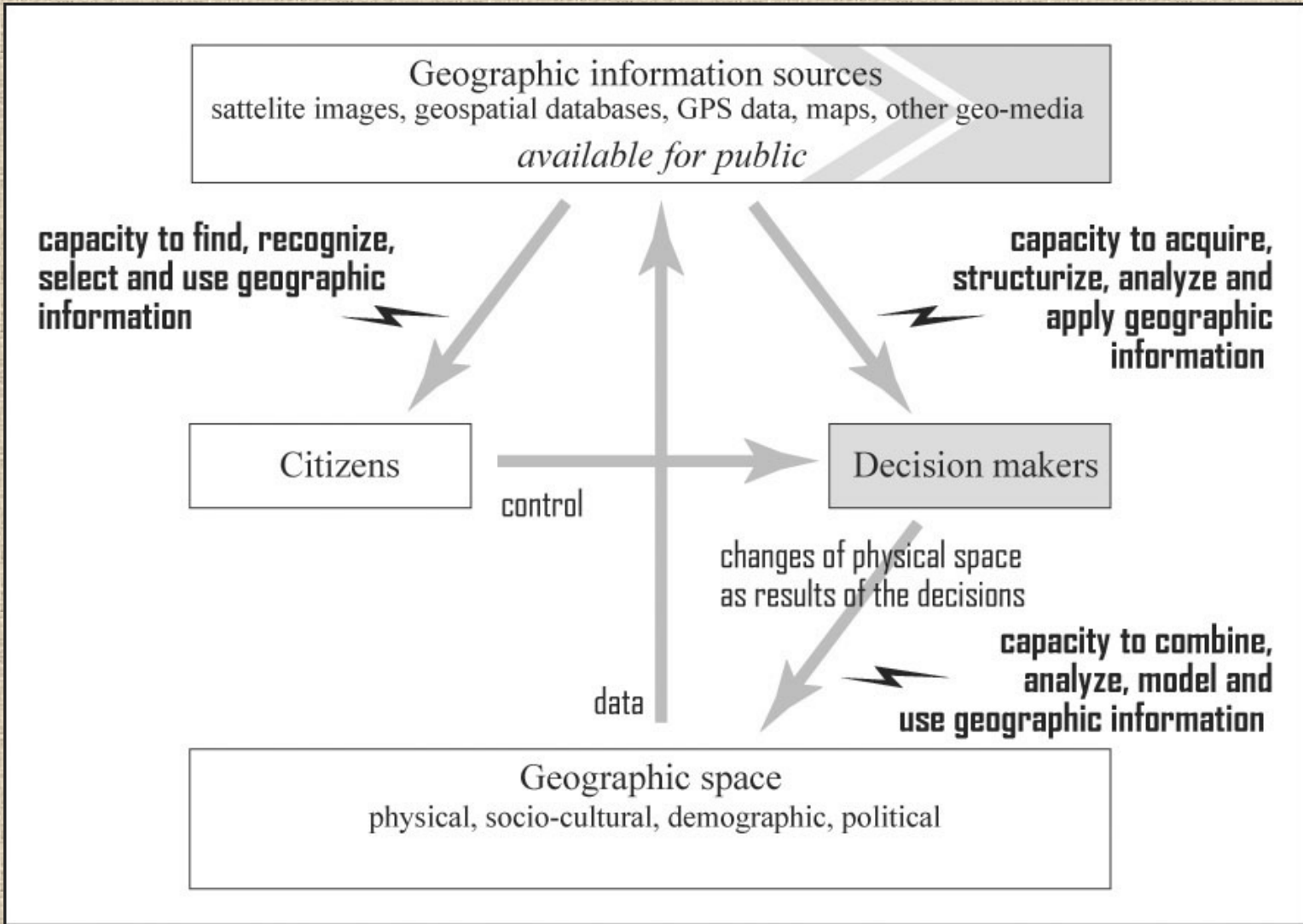
Launched in 2009

Efficient access to geographic data



More about the project www.gis-centras.lt/LGII

Competences needed



Students' expectations

- Newest materials
- Problem orientation + demonstrated value
- Integration with other disciplines

System of 9 online courses

GII-01 “Fundamentals of GIS”

GII-02 “GI organization and management”

GII-03 “GI standards, specifications and metadata”

GII-04 “GI and SDI application areas”

GII-05 “Geographic database management systems”

GII-06 “Geodesy and Cartography with GIS”

GII-07 “Spatial analysis and modeling”

GII-08 “Components of SDI”

GII-09 „Web programming for SDI”

Available online in Lithuanian and English at www.gismokymai.lt

Conclusion (*response to keynote*)

Future GI education

- Starting early (bachelor or secondary school level)
- Problem oriented
- Good balance of theory and practice
- Based on international co-operation and specialization
- Online
- Modular, providing diverse and consistent scenarios

Prerequisites for proper use of GI

- Knowledge/understanding
(what could be done geographically?)
- Information
(is it available? how to get to it?)
- Technology
(how to make it work?)

Keynote *forecast*

“The demand for geospatial education can be separated between the **user** of Geo-information in a specific domain (...) the **data manager** (collection and maintenance of the data) the **Geo-ICT technical expert**, and on the top the **coordinator**.”

Experience (*response to keynote*)

Basic GI competences

Literate user (vs. user)

Expert of thematic domain (vs. user)

Cartographer

Data manager / DBA

GIS programmer (vs technical expert)

Coordinator

Project stages

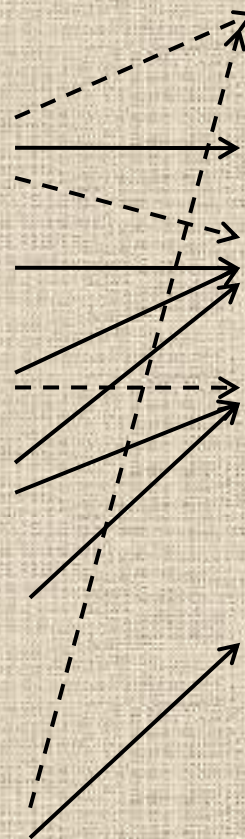
Strategy

Analysis

Design

Implementation & support

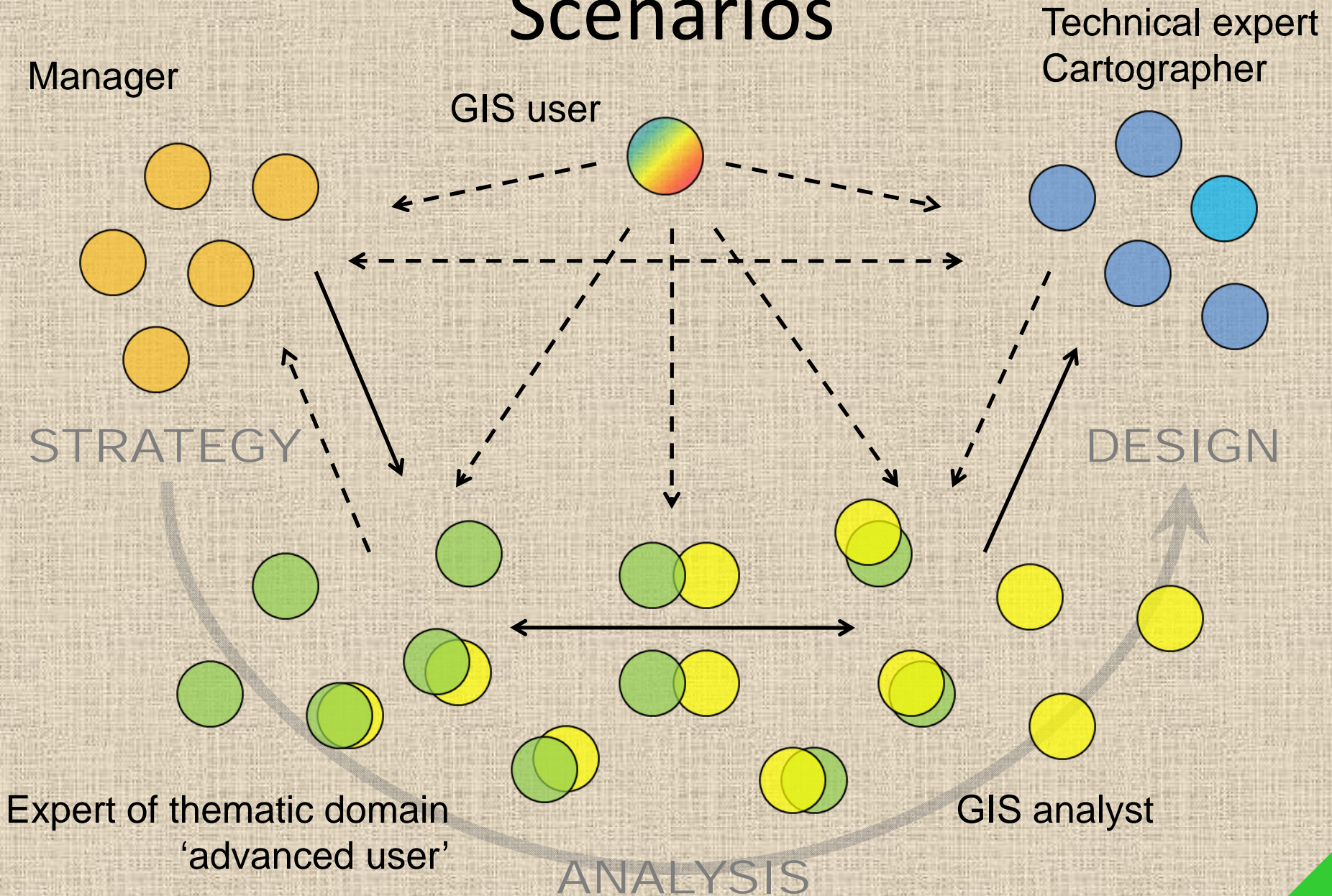
Management



Suggested module groups

- Basic principles
- Technological modules (standards, data acquisition, data management, visualisation, GIS programming, security...)
- Organisational modules (project management, innovation management, promotion)
- Modules for spatial analysis and modeling methods
- Modules for specific application areas

Scenarios



For discussion

What is better:

- Explaining every step in detail, being fair (**demotivates creativity**)

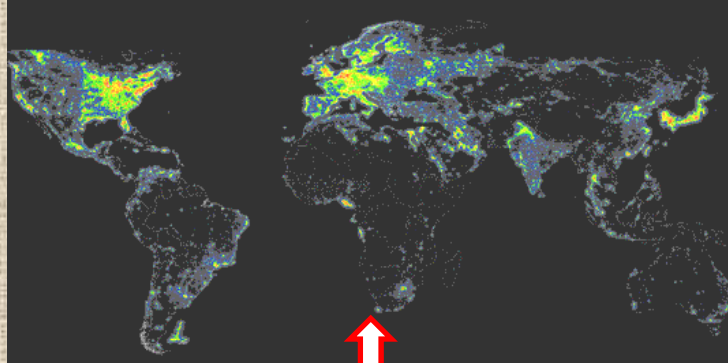
OR

- Making students work and find out things themselves, attempting to confuse (**hardly possible online...**)

In both cases: success of training largely depends on personal motivation

Bad example

No. of visits to degree
confluence points



World light pollution map
from NASA

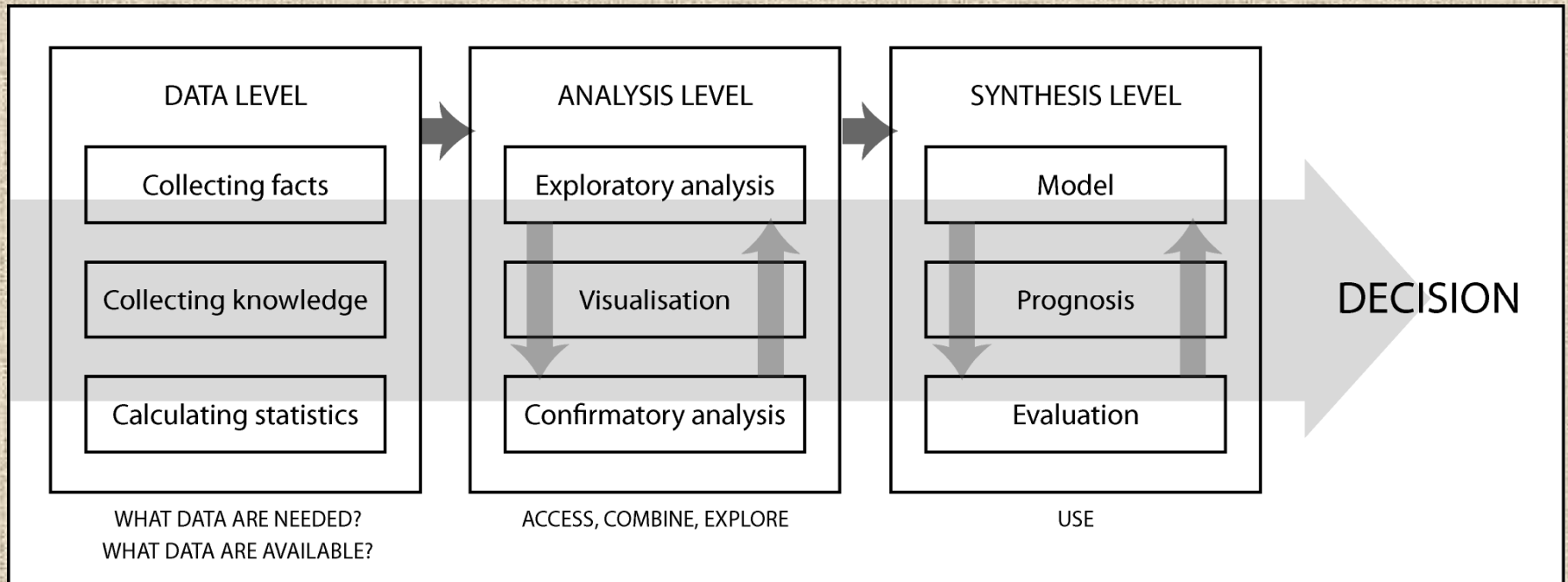


SPATIAL CORRELATION

Keynote *on 'co-ordinator'*

“Last and smallest group is the coordinator. In one way he or she should have an **overview of everything**, but more specific how to organize a department or organization with a strong GI component. To us it seems that **almost every organization needs this expertise.**”

'Coordinator's' competence

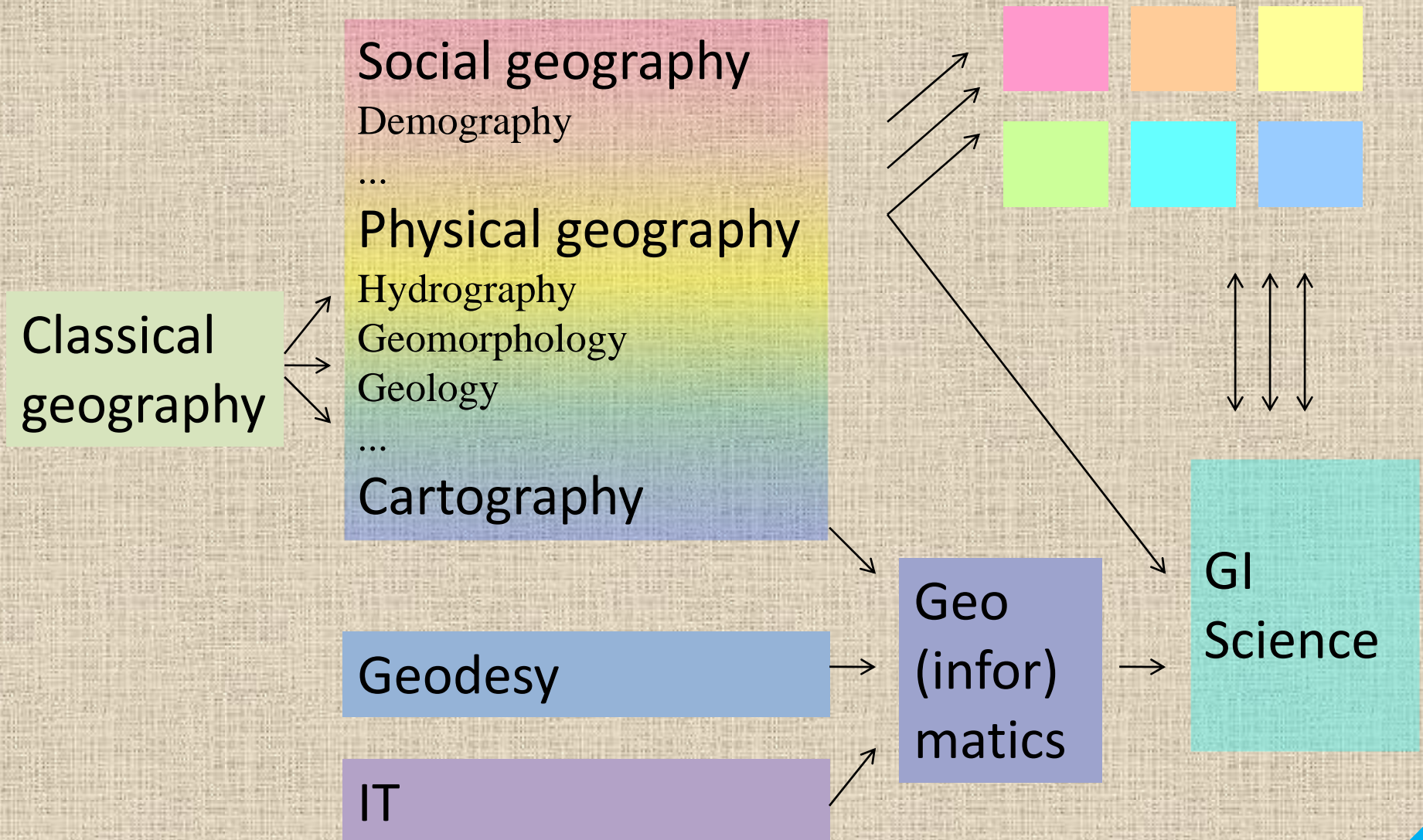


Analyst / programmer

Co-ordinator = 'Advanced user' ?

Geographer

Evolution of geography



Comparison

ASPECTS <i>~competences</i>	CLASSICAL GEOGRAPHY		GEOINFORMATICS		GI SCIENCE	
Exploration	Earth	Active	Earth and databases	Passive	Databases and Web	Active
Description	Texts and maps	Active	Inventory databases	Active	Databases and services	Active
Structurizing	Geospheres, geosystems	Active	Layers and classes	Active	Layers and classes	Active
Depicting	Cartography	Passive	Visualization	Passive	Visualization	Passive
Defining relationships	<i>Abstract</i>	Passive	Topology	Passive	Topology	Active
Understanding interaction	<i>Systematic approach</i>	Passive	Spatial analysis	Passive	Spatial analysis	Active
Priority	Informing	Passive	Provision	Passive	Enabling	Active
Prevailing approach	Synthesis	Passive	Analysis		Analysis	Active
Contributions	Spatial specifics	Passive	Digital data	Passive	Tools and methods	Active
Development trend	Diffusion	Passive	Separation	Passive	Consolidation	Active
Target domain	Science and planning	Passive	Engineering	Active	Everything	Active

Impact/role

Active	Active	Active	Active (influencing other disciplines): strong, moderate, weak
Passive	Passive	Passive	Passive (requested by other disciplines): strong, moderate, weak

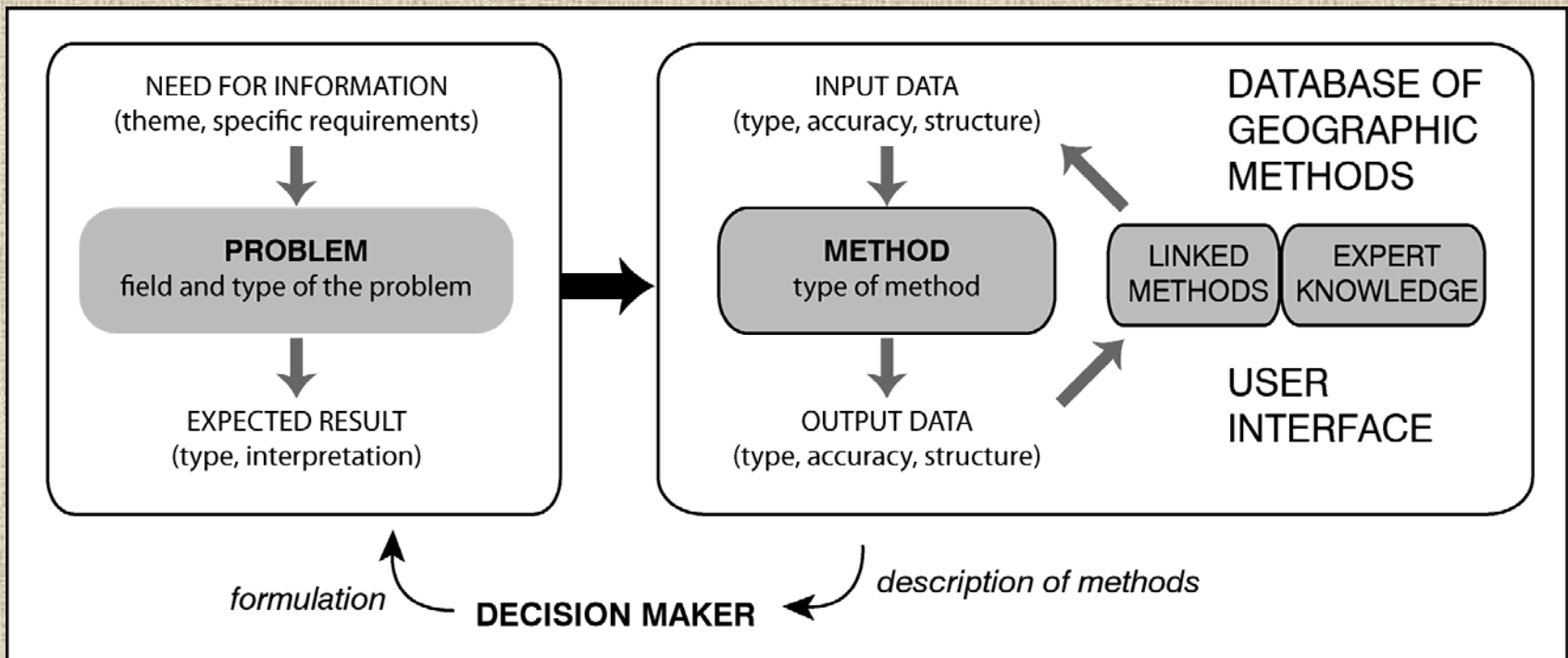
Keynote on GI competence

“...offering a **methodology qualification** to students with an already established domain expertise ‘who are having a problem and are looking for a solution’ ... is an effective way to work towards **GI as a transversal key competence** across a majority (?) of disciplines and professions.”

Solution to complexity

How to acquire the 'overview of everything'?

- Full training path
- Using search / expert system



Model of methods' description

Expectations

- Share experience between different user groups
 - Document how the geographic data were created
 - Find required methods in one place
- Continue to develop methods based on best practices

Model of methods' description

Problems

- How to build universal schema and principles of description?
- How to store all information together with capability to compare similar methods ?
- How to find intuitively required method and construct (develop) full analysis process?
- How to publish methods in easily readable manner for different expert groups?

Prerequisites (1)

Typologies of geographic tasks

Metadata catalogue – a set of descriptive parameters for each geographic method:

- a. input and final data structures, input parameters,
- b. space and time characteristics,
- c. algorithms and technological platforms
- d. references to relevant works

Prerequisites (2)

Descriptions of the relationships between different problems and their solution methods for:

- a) finding semantically and (or) structurally, judging by output data, similar geographic problems;
- b) intuitive construction of geographic analysis sequences based on input-output data.

Suggestions on which of the known methods could be efficiently applied for tackling a particular problem.

Implementation

Difficulties due to:

competing interests of the final users
different competences of the experts .

Different steps: building the geographic model of reality, synthesis of methods, data collection and extraction, construction of algorithms, technological solving (programming), cartographic representation, decision making.

It adds complexity to description of geographic problems: such descriptions are needed at different levels of detail.

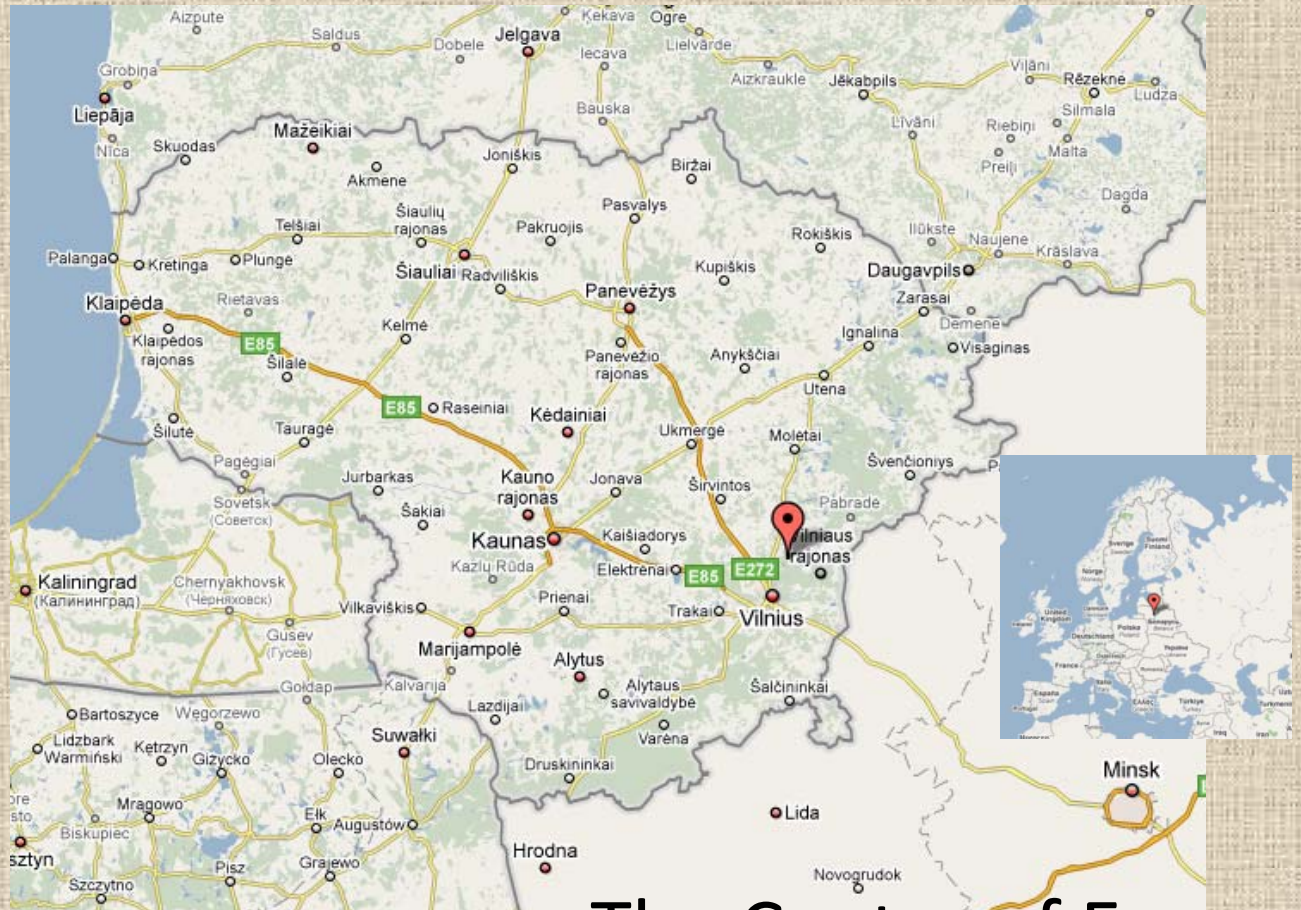
Thank you



<http://www.kc.gf.vu.it>

LITHUANIA

In 1989 the National Institute of Geography of France determined that the very centre of Europe is located at **54°54'N 25°19'E** in Lithuania, 26 kilometres north of Vilnius.



The Centre of Europe

VILNIUS UNIVERSITY



One of the oldest universities in Eastern and Central Europe (founded in 1579).

12 faculties, 8 institutes, 10 study and research centers, the oldest Library in Lithuania, 3 university hospitals, an Astronomical Observatory, a Botanical Garden, a Computer Center, and St. John's Church.

Statistics (2009-01-01)

Personnel **2941**

Students **22588**

<http://www.vu.lt>

