

The Potential Use Of Open Source GI Software in Education



Presented by Elisabeth Dresen, FIT 2006

Outline

- What is Free and Open Source Software?
- Why using OS in education?
 - Advantages
 - Disadvantages
- Architecture of the study
- Overview of FOSS4GIS
- Criteria Catalogue
- Data preparation (assignments for training courses) and questionnaire
- Results
 - Evaluation of open source GI software in Education
 - Preliminary evaluation of FOSS4GIS

„Open Source‘ Concept



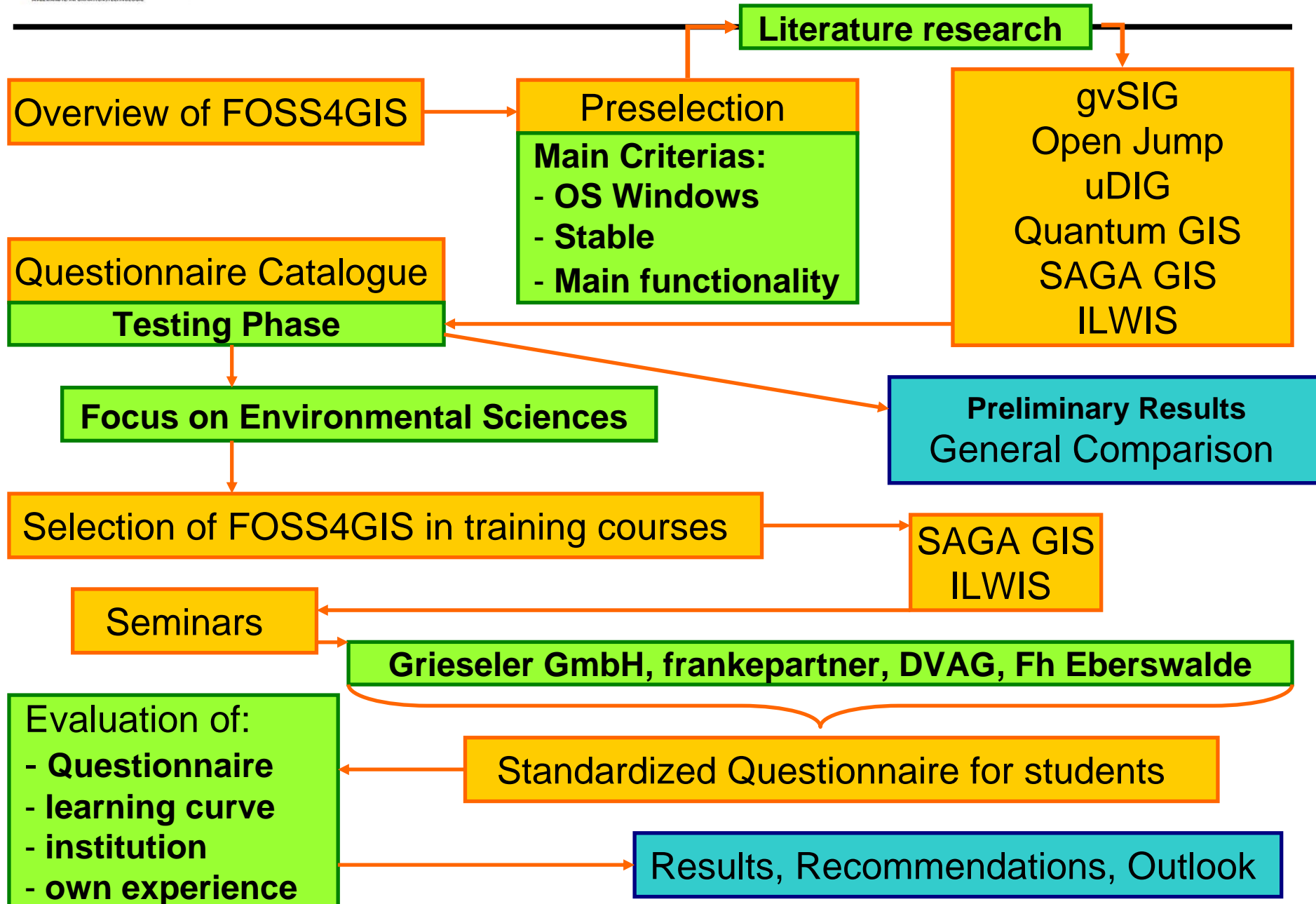
„Free Software‘ is a matter of liberty, not price!

PROS:

- Costs of Software = 0 €
- Application of different GI Software
-> diversified experience, flexibility,
focus on methods
- Source Code is ,open‘
->new possibilities for teaching
- transparency
- Distribution of software possible
- High Quality, scientific (adaptation
of knowledge very fast)
- Fast development cycle
- Direct communication between user
and developer

CONS:

- Finally Costs not = 0 €
- Mostly stepwise installation
- Needs of labor market
- Very quick development cycle
- Documentation lags behind
- GUI not always intuitive
- Regular update of material



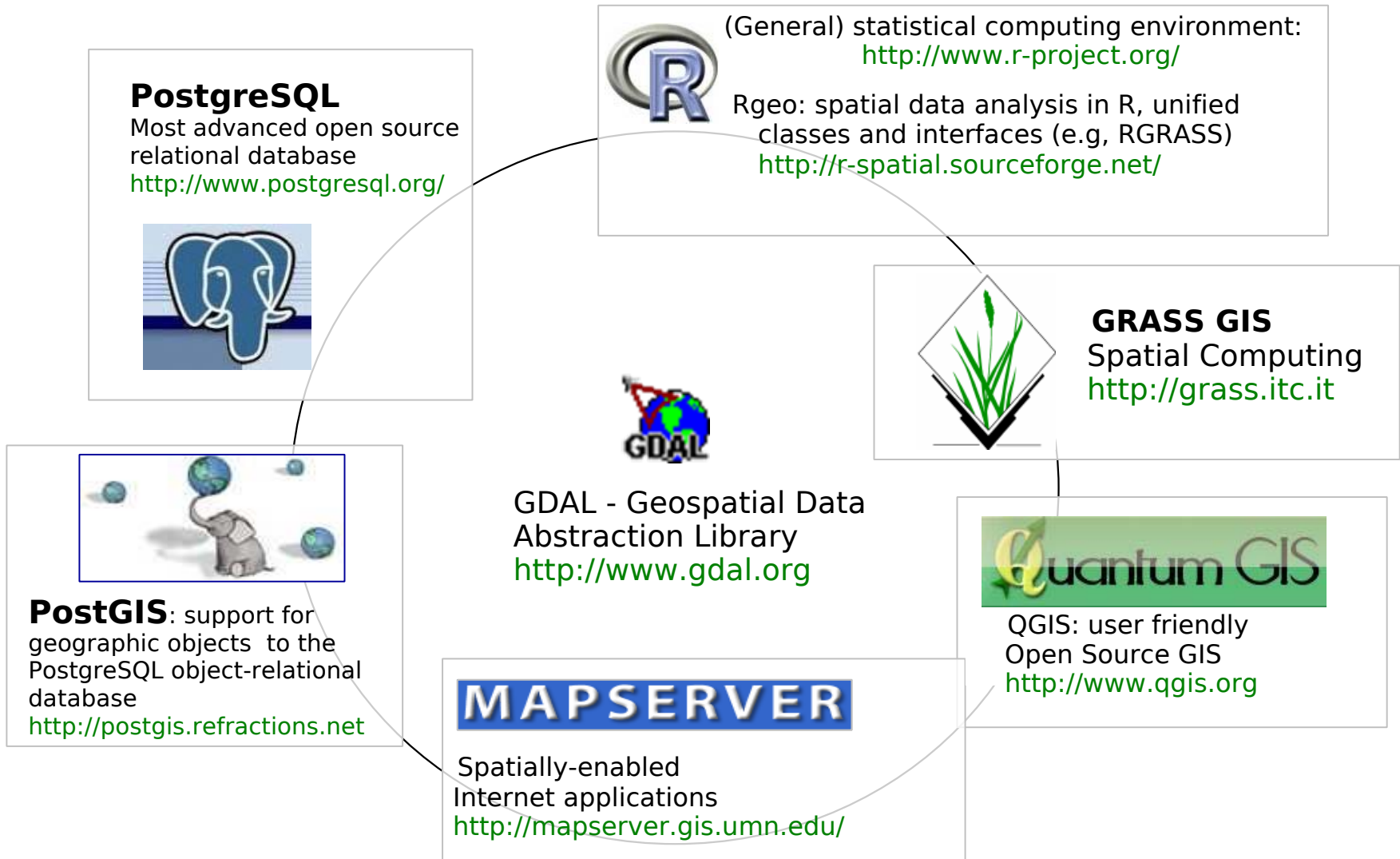
Library in C

- GDAL
 - Raster Format Reader / Writer
- OGR
 - Vector Format Reader / Writer
- PROJ4
 - Coordinate Reprojection
- GEOS
 - Geometry Objects and Functions

Library in Java

- JTS Topology Suite
 - OpenGIS Geometries and Methods
- GeoTools
 - Data Formats, Java GIS Toolkit
- WKB4J
 - Java Well-Known Binary Reader / Writer
- GML4J
 - Java GML Reader / Writer

Development



- **GRASS** – Geographic Resources Analysis Support System

- Long development (since 1982)
- Extensive documentation, good support via forum
- Widespread, sound GIS; functionality, flexibility, stability
License: GNU General Public License (GPL)
- Wingrass6.3 -> MSwindows
- Home: <http://grass.itc.it/>



- **gvSIG** – Generalitat Valencia Sistema de Información Geográfica

- Development since 2000
- Very good possibilities to extend → sextante
- Intuitive GUI, similarity to proprietary software (ArcView3.3)
GNU General Public License (GPL)
- PostgreSQL...
- Home: www.gv.sig.gva.es



SAGA GIS – System for Automated Geoscientific Analysis

Pros and Cons

- Development since 2001, Open Source since 2004
- Scientific Software
- Very good raster processing
- Good GPS – Import
- Low resource requirement → no extraordinary hardware requirements
- Stable
- Good support → Forum
- No installation
- Data history
- Inconvenient data visualization
- GUI/documentation/forum → English
- Documentation extendible; no help
- Poor print layout
- home: <http://www.saga-gis.uni-goettingen.de/html/>



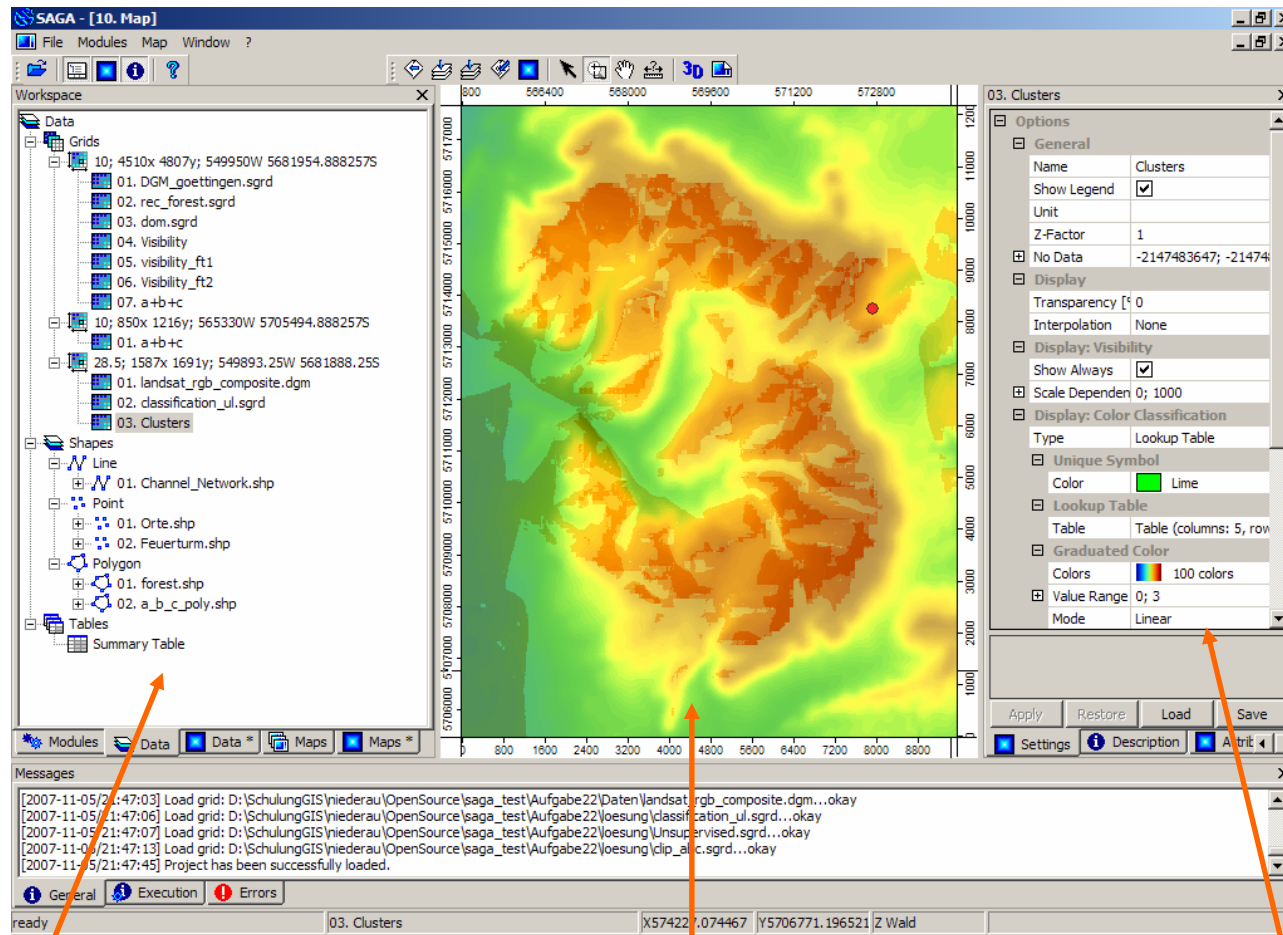
ILWIS – Integrated Land and Water Information System



- Pros and Cons
 - Development since 1985, since 2007 Open Source
 - Very good remote sensing application
 - User friendly -> Very good tutorial; very extensive help system
 - Statistics, Calculations
 - Good format support (import/export)
 - Good layout options
 - Full functionality via command line
 - Good Scripting
 - Data management based on Domains
 - Uncomfortable GPS – Import
 - Own formats (vector, raster)
 - So far, low forum activity
 - home: <http://www.itc.nl/ilwis/>



SAGA GIS – System for Automated Geoscientific Analysis

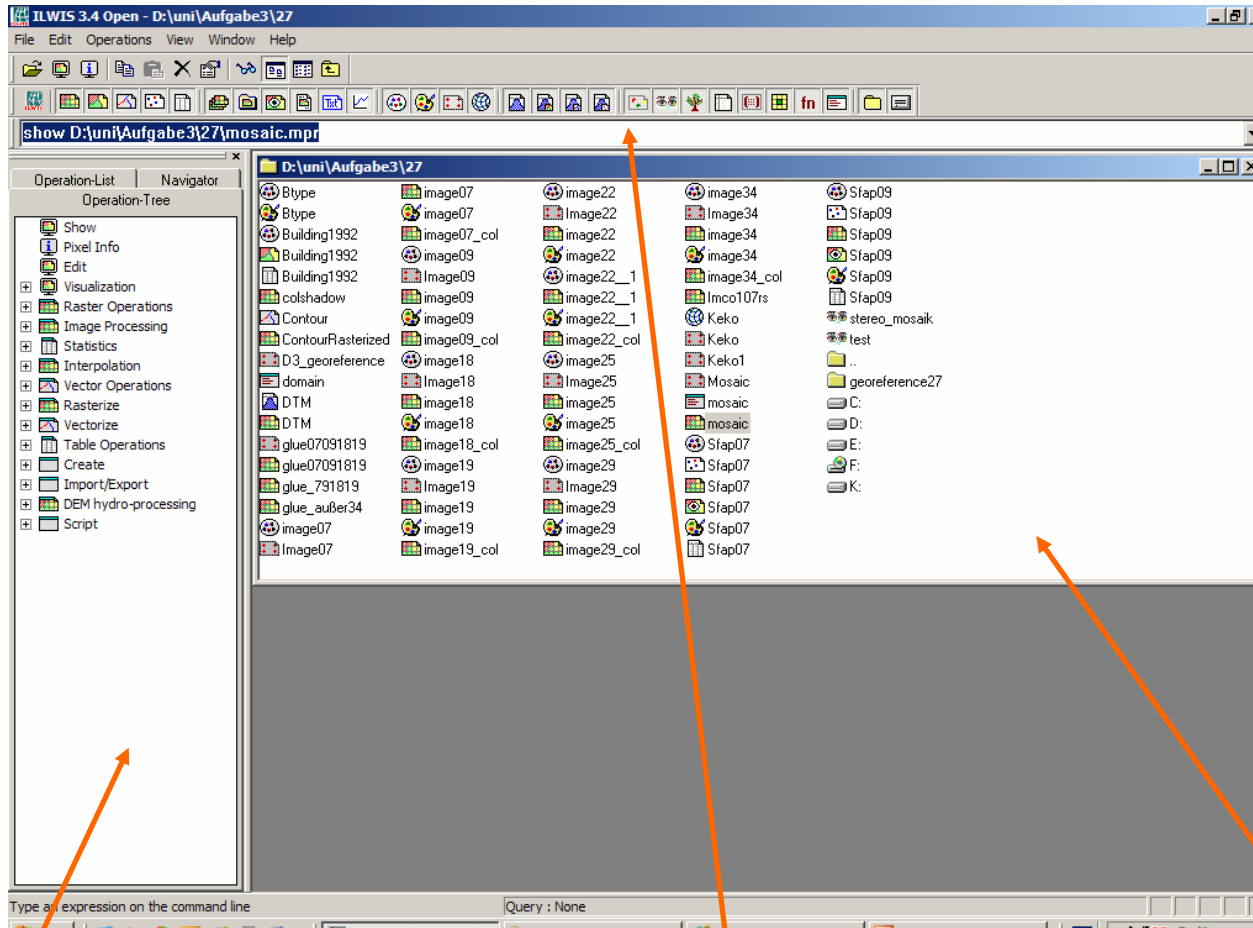


Working Environment

Data Visualization

Objekt Properties

ILWIS – Intergated Land and Water Information System



Functionalities

Command line

Object - Catalog

Screenshot from ILWIS

Criteria Catalogue (Extract)

- Collection of c.a. 160 criteria were tested
- Standard setting (ESRI)
- Provided geodata sets were evaluated

Main topics to be covered:

- Documentation / User Community
- Development Cycle
- Handling
- Data – Formats
- General Tools
- Georeferencing / Coordinates Systems
- Digitizing / Editing
- Geoprocessing
- Thematic View / Layout Options
- Raster functionalities
- Remote sensing abilities
- 3D View / Animations

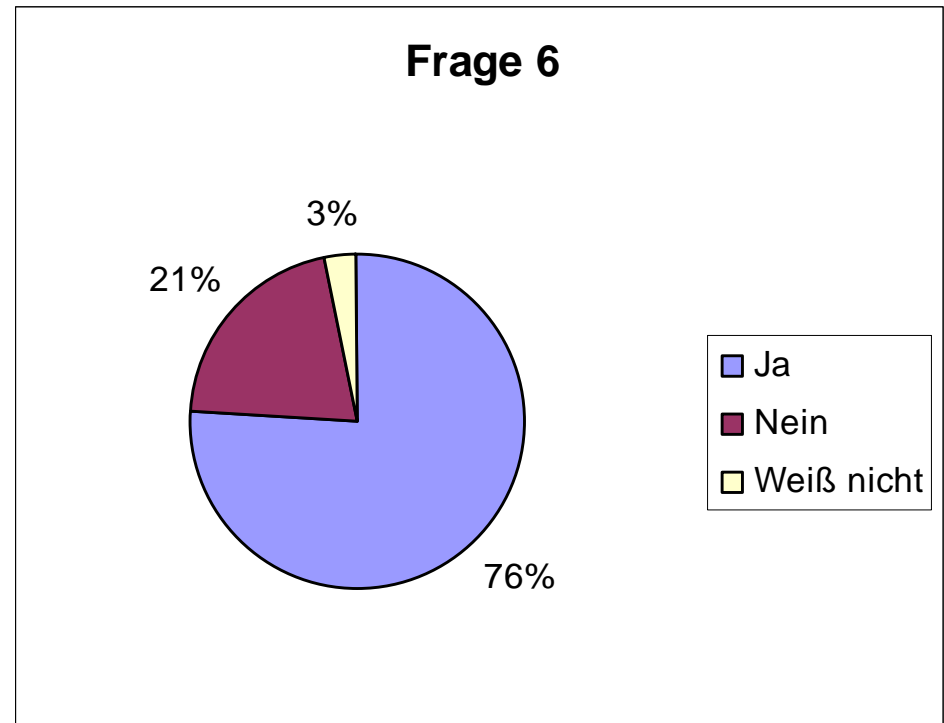
Data preparation (training courses) and questionnaire

- Provided Datasets of software
- Evaluation of available tutorials
- General emphasis on raster functionalities
- Verification / Comparison with ArcGIS
- Evaluation Sheet for students

Questionnaire – some results

- In total: 33 Evaluation

Do you think that now or in future OS GIS will substitute proprietary software?



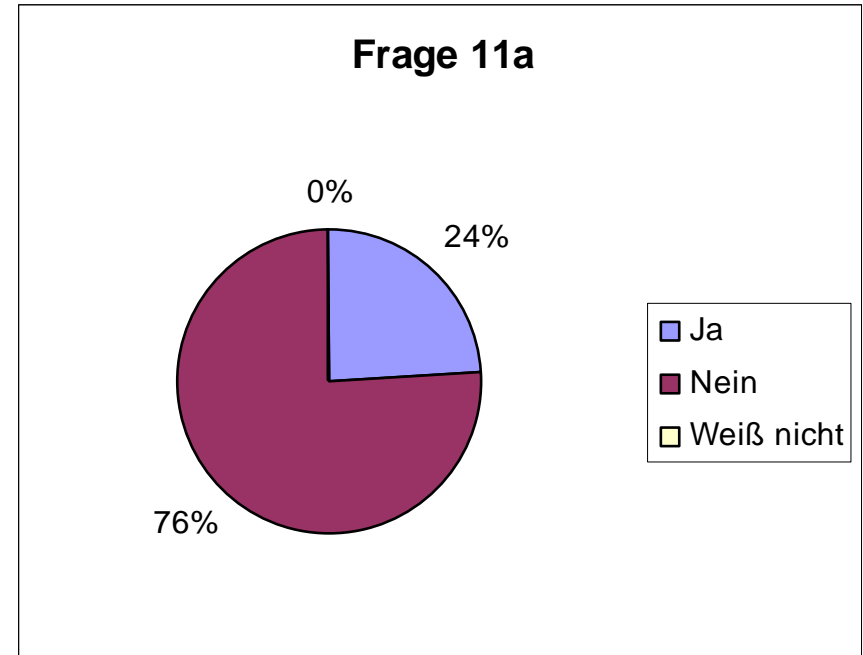
Questionnaire – some results

- In total: 33 Evaluation

Would you prefer, to learn in university/ training centers/ courses exclusively OS GI software?

Some student comments:

- “So far no demand on labor market”
- “Still not accepted – not internationally used”
- “Not wide spread”
- “No implemented help system”
- “Too complicated for beginners”



Some student comments:

- “Good opportunity for self-employed”
- “ I Like the philosophy”
- “Same and better quality than proprietary software”
- “Teacher has to be up to date”
- “Testing at home...no problem!”

Results, Recommendations, Outlook

- **Very positive feedbacks!** → Student' s side
- Surprisingly broad functionality → Software's side
- Easier to adopt for students with no experience in GIS (ongoing research?)
→ my (subjective) side (as teacher)
 - **Substitution not all at once, but step by step (Extensions)**
 - **Greater user community in education field (exchange of assignments, ideas, experience...)**
- Pace of change
- System administration -> security
- Not “THE one GI software” but taking the best parts of everything

References & Acknowledgement

- Mitasova H. (2006) [Open Source GIS: A GRASS GIS Approach. 3rd edition.](#) The Kluwer international series in Engineering and Computer Science (SECS): Volume 773. Kluwer Academic Publishers, Boston, Dordrecht, London. ISBN: 1-4020-8064-6. 424 pages
- Thank a lot for all work, done by programmers and all other involved people for the great OS software!!!
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- Furthermore I have to express my gratitude to all students who participated in the study! use it or loose it;-)

Questions? -- Thank you for your attention! --



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