



WSEAS 2005 Conference on Engineering Education, Athens, Greece, July 8-10



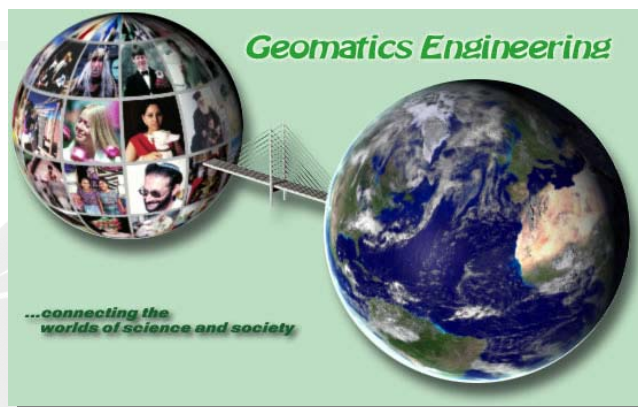
GEOTOPOS - Supporting Geomatics Engineering education with a knowledge database of geosciences-based digital content

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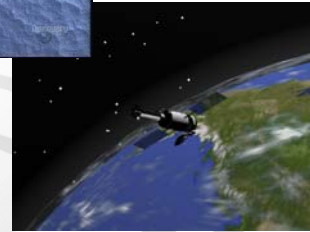
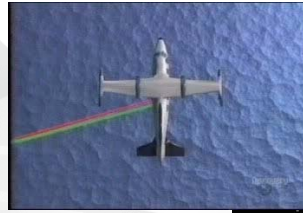
"Being an Engineer means doing for 10 cents what any fool can do for a dollar." - Rudyard Kipling

1. A modern discipline and the practical application of knowledge about the geographic space that surrounds us

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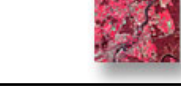
Geomatics Engineering



2. Is closely connected to technology and Earth System Science, e.g.

- *Terrestrial, Marine, Airborne and Satellite Sensors*
- *Synergistic physical system of interrelated phenomena*

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Geomatics Engineering



3. *Integrates the acquisition, modeling, analysis and management of spatiotemporal data in a variety of science and application domains*

- *Environmental studies, planning, land development, ...*
- *Geodesy, Geophysics, Geotectonics, ...*
- *Navigation and Positioning, ...*

These trends require new ways of teaching and learning

- ✓ *Support evolving interdisciplinary workforce requirements*

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Geomatics Engineering



The integration of *spatial information (and not just data) infrastructure* into the educational work at universities presents a novelty (and a challenge) to an e-learning environment

- *Practical work in class depends heavily on data availability*
- *Linking resource discovery services with educational curricula and learner-centered data tools, virtual field labs, case studies, ...*
- *Allow students to test newly achieved knowledge actively*

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Educational Needs in

Geomatics Engineering




- **Sharpen focus on increasing volume and complexity of information**
 - *Keep up-to-date with the required know-how, methods and tools (e.g. integrated education and workforce activities)*
- **Greater integration of education and workforce capabilities with data-driven science, e.g. through**
 - *Concept synthesis,*
 - *problem solving and applications design,*
 - *applying discovered relationships within available data to scientific processes and practical applications (e.g. sustainable development, resource management, ...)*


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Digital geo-Knowledge Database



GEOTOPOS



A project of the "Operational Programme for Education and Initial Vocational Training - EPEAEK II", co-funded by the EU and the Hellenic Ministry of Education

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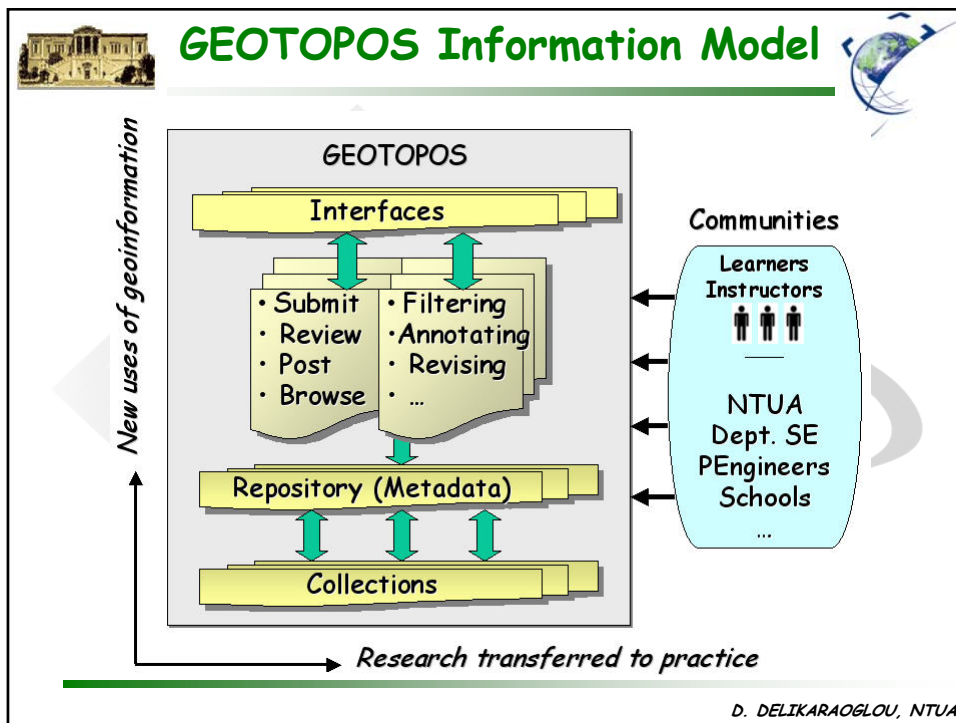


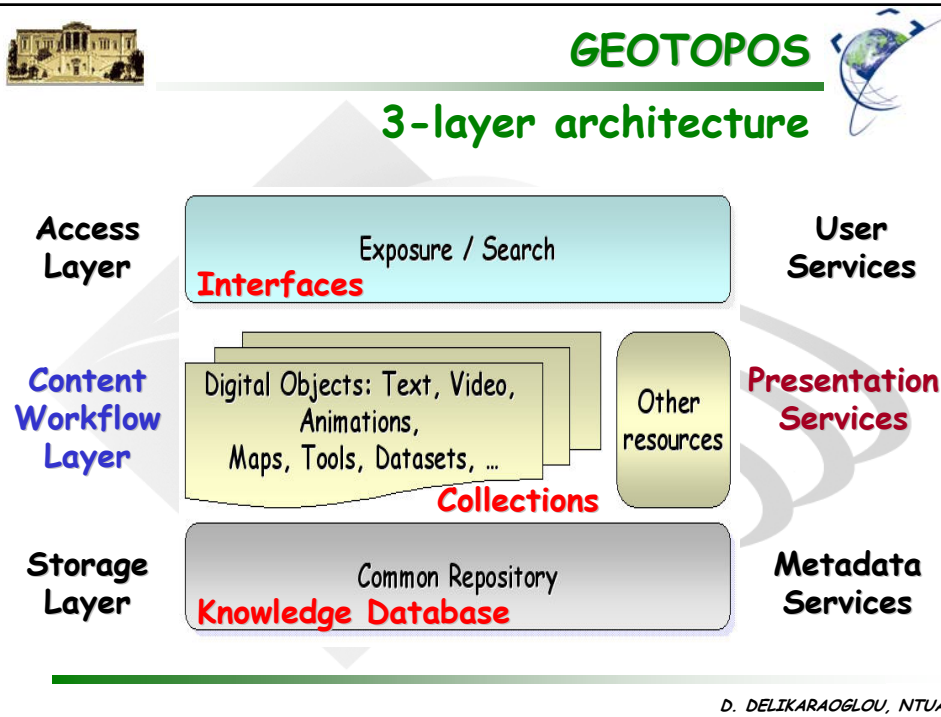
GEOTOPOS - Implied Design



Digital → web-based resources
Geo → Geosciences-based content
Knowledge → Supporting education and research (and the promotion and management of knowledge related to the study of the Earth as a system)
Database → Efficient store-search-retrieve

An e-repository (Digital Library) of geo-educational resources + e-learning tools





Didactical Structure

The ECLASS concept on how to use educational material

- **E (= Entry)** - Introduction to thematic topic, scope, context of a resource
- **C (= Clarify)** - Describe the main parts of a learning unit and explains key concepts about a specific topic
- **L (= Look)** - Review examples or sample data, through visualization, illustrations, animations, video, ...
- **A (= Act)** - Actively engage students through virtual labs, virtual field trips and work, and hands-on analysis of real data
- **S (= Self Assessment)** - Automated or peer review or tutor feedback on learning accomplishments
- **S (= Summary)** - Re-iterate main points, suggest further study

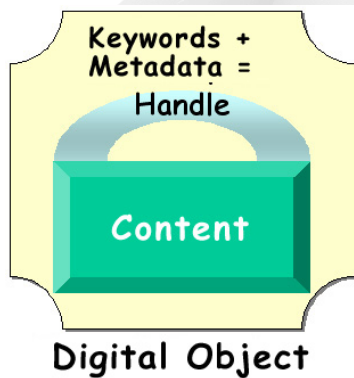
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Digital Objects



The smallest units of digital content with an educational context

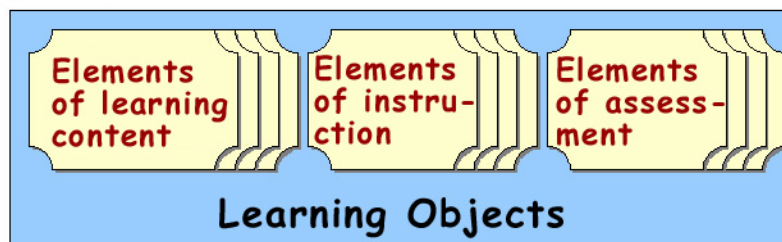


- Text docs (text, pdf, ...)
- Images, Aerial Photos, Satellite Images
- Atlases, Maps & viewers
- Audio
- Video & Animations
- Comp. routines, modules, ...
- Analysis & visualization, mapping tools, ...
- Links to high educational value web sites (e.g. NASA, ESA, ...)
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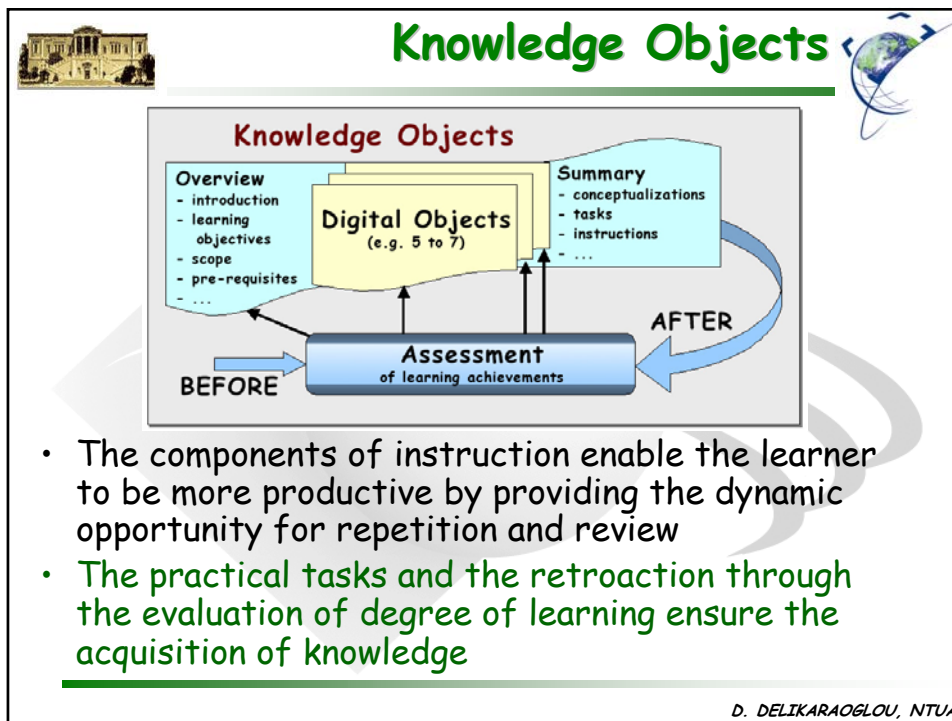
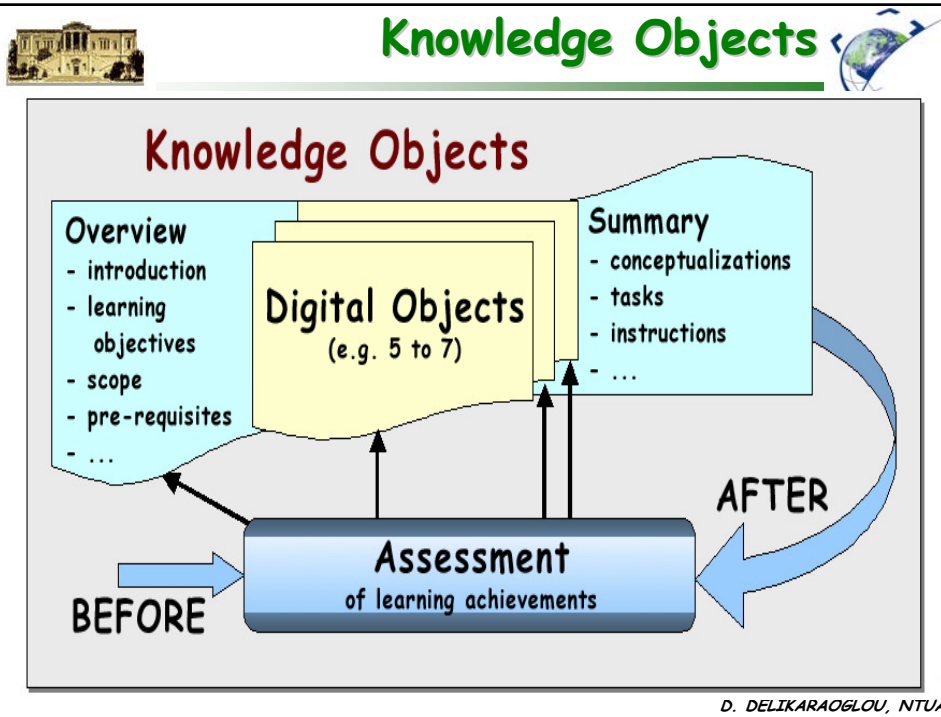


Learning Objects



- Small number of digital objects, which as stand alone or in combination represent a **learning context** (*concept, principle, event, procedure, ...*) and the **practical activities** (case studies, quizzes, experiments, exercises,...) of a learning situation
- Focused around a specific learning objective

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Re-usable (re-purposing)



Digital Objects

CENTRAL IDEA: Organize educational content into discrete digital resources which

- they can be used as originally intended
- they can be altered, or
- they can be re-combined

So that to meet the needs of other educators or to serve in *different educational levels and learning contexts and situations*

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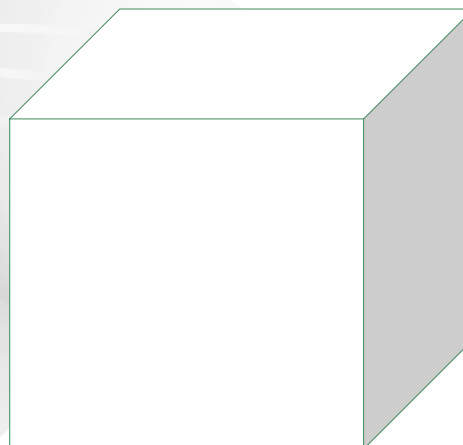
Re-usable (re-purposing)



Digital Objects

CENTRAL IDEA: Organize educational content into discrete digital resources which can be re-used on different situations

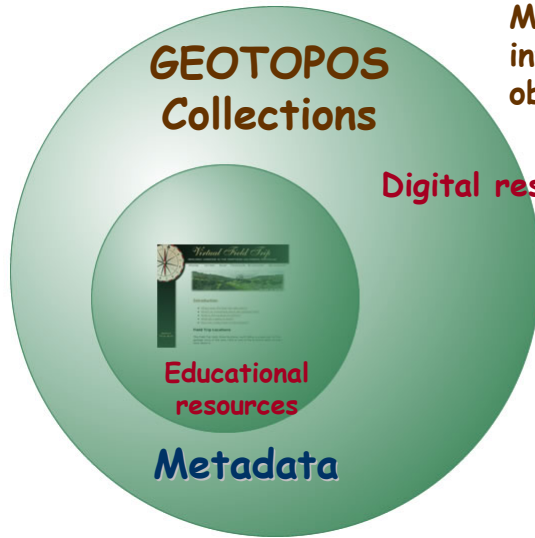
Learning programme
Course Content
Labs, Assignments, Virtual field trips, ...
Learning Content
Digital Objects



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Metadata



Metadata are “embedded” into *Collections* of digital objects

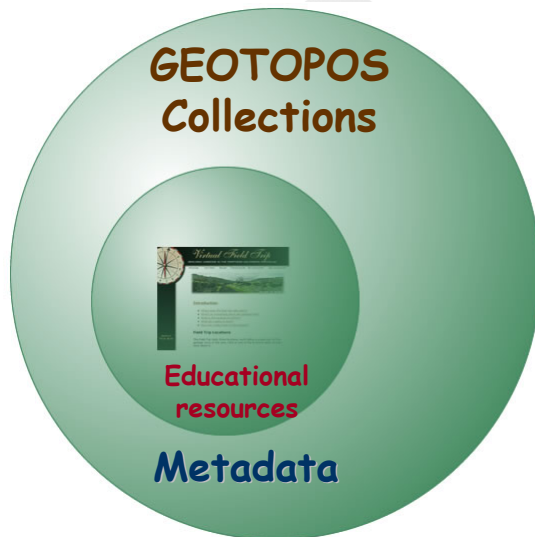
Digital resources in various forms

Digital Objects are “accompanied” with information that pertains to their properties and their content (*key-metadata*) so that to manage them into a networked environment

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Collections



Collections are digital resources grouped together because they are organized around a theme, a resource type or some other criteria, e.g. : common format; topic coverage; geographic coverage; temporal coverage; pertinence to a particular study or project objective; source of origin; or physical location.

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Summary & Conclusion



- **GOAL:** the progressive development of an integrated learning environment for Earth System Science education
- GEOTOPOS combines the concepts & application of
 - Knowledge management techniques
 - e-Learning, Distant Learning, ...
 - Information mining through web usage
- **Major Advantage:** the capability offered to re-use and re-purpose the available educational resources, so that to serve multiple educational situations and needs

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Conclusion



- A tool, and a platform for collecting, managing, indexing, and distributing educational content ⇒ *enhance the traditional learning process and address multiple learning styles and needs*
- A way to manage selected research materials and publications of high quality and educational value, in a professionally maintained repository, and to give them greater visibility and accessibility over time
- The success of GEOTOPOS as a service depends not only on the development of a critical mass of content, but also on the development of a critical mass of users

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