towards a curriculum in digital cultural heritage studies

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expected achievements of a learning process

- to develop in the learner the capacity
  - to use innovatively the knowledge acquired
  - to acquire further knowledge
  - to adapt to changing conditions (which may require, for example, learning a new profession)
  - to generate and transmit to others new knowledge
traditional instruction

- frontal lecture – transmission of instructors' personal knowledge
- memorization without critical interpretation
- exam – expel memorized knowledge (not of learners but of instructors').
- forget most in a couple of months
Towards a digital approach to CH studies

The development of knowledge, skills and cognitive processes is influenced by demands and constraints of the available *knowledge technologies*.

*Cognitive processes* are a consequence of the interaction between cognitive structures and cognitive technologies.

*Technology*: Human knowledge applied in solving problems – it serves to complement and augment natural human abilities.

*Knowledge or Cognitive Technology*: the means (instrumental or methodological) which contribute to

the completion and expansion of the natural abilities of the human mind, in processes relating to the

handling of knowledge, thinking, learning and solving problems.
cognitive technologies

- mental and computational devices that support, guide, and extend the thinking processes of their users
- knowledge construction and facilitation tools
- activate cognitive learning strategies and critical thinking
- engage generative processing of information
an evolutionary perspective

- **animals evolution** – endo-somatic: adapt to new conditions by physiological changes of organs (fur, body size, wings, etc...)

- **human specie evolution** – exo-somatic: develop external organs to help us adapt along the evolutionary path (tools, engines, telephone, computers, etc...)

  - crucial to the development of cognitive abilities
cognitive tools

some premises

- Knowledge acquisition and integration is a constructive process.

- When using cognitive tools, learners engage in knowledge construction rather than in knowledge reproduction (a “mindful” engagement).

- Learners create knowledge that reflects their comprehension and conception of the information rather than focusing on the presentation of “objective” knowledge.
Lessons learned

- CHIRON – Marie-Curie EST project
- EPOCH – IST NoE
Perceived needs (CHIRON)

- Difficulty of hiring people with the appropriate pre-requisites and background
- Difficulty of managing the problem by individual institutions: necessity of networking
- Little impact on participating institutions
- Little impact on permanent educational programs

Source: Niccolucci, 2007, BTA - Paestum
Perceived needs (EPOCH)

- Training is the most frequent request by heritage professionals
- The diffusion of IT in the practice of Cultural Heritage is slowed down - sometimes blocked - by the lack of computer skills
- The quality of IT applications is influenced by the capacity of heritage professionals to dynamically contribute to the development of new tools and control their relevance

Source: Niccolucci, 2007, BTA - Paestum
Adapt tools to needs against “user oriented basic research”

- Collaboration and cooperation – inter-disciplinary approach
- Mediate tensions and narrow gaps - know the other!
- Create tools to be used as “cognitive partners of reasoning” and not merely “fancy, fast or fashionable “ tools to answer old questions.
Some examples from the EU

BTA Paestum conference
Some EU experiences

UK

2006: 38 Higher Education providers delivering undergraduate degrees in Archaeology

2006: 27 Higher Education institutions delivering postgraduate degrees in archaeology

Second year modules:

- **Computing I**
  - Quantitative data analysis
  - Geographical Information Systems

- **Computing II**
  - Database design
  - Web publication

**Skill gap identified**

*Information Technology – most important gap 74% asked*

Source: Richards, 2007, BTA - Paestum
Taught one-year Masters programmes

- University of Birmingham: MA Landscape Archaeology & Geomatics
- University of Southampton: MSc in Archaeological Computing (Spatial Technologies) / (Virtual Pasts)
- University College London: MSc in GIS and Spatial Analysis
- University of York: MSc in Archaeological Information Systems

Source: Richards, 2007, BTA - Paestum
Some EU Experiences

FRANCE

Three complementary networks:

ISA, *Information spatiale et archéologie*

MoDyS, *Modélisation et Dynamiques Spatiales*

M2ISA, Méthodologies pour la Modélisation de l'Information Spatiale Appliquée aux Sciences de l’Homme et de la Société

Source: Lorains, 2007, BTA - Paestum
Network ISA : Information Spatiale et Archéologie

Aim: Development of methodologies for the research and development of the management of archaeological spatial information


Teams from CNRS, universities, INRAP and regional entities

Promoted by:

- Dijon
- Lyon
- Nice
- Tours
- Besançon
- Nanterre
- Toulouse

Source: Lorains, 2007, BTA - Paestum

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Specialization example

Diplôme Propre de l’Ecole d’Architecture
Culture Numérique et Patrimoine Architectural

Ce cycle de spécialisation en architecture offre aux candidats un lieu de formation et de réflexion centré sur les outils numériques les plus récents et les méthodes qu’ils induisent au service du relevé en architecture, de la modélisation géométrique, de la production d’images de synthèse et de leur exploitation dans un contexte multimédia fortement pluridisciplinaire. La formation est ouverte principalement aux architectes. Elle constitue la spécialisation cohérente, au-delà du diplôme d’architecte, pour les étudiants ayant suivi les enseignements au patrimoine de l’ENSA Marseille. Cependant, également sur dossier, on peut accueillir des diplômés en Arts plastiques, en archéologie, en histoire de l’Art, des ingénieurs en informatique et des diplômés en audiovisuel afin de constituer un groupe pluridisciplinaire garant de richesse dans la mise en œuvre des maquettes numériques élaborées au cours de l’année.

Source: Lorains, 2007, BTA - Paestum
Some EU experiences

**SPAIN**

Source: Farjas, 2007, BTA - Paestum
Máster Universitario en Gestión del Territorio y del Patrimonio Cultural (junto al título de Máster se propone el título de Experto)

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TOTAL MÓDULO: 19 120 70 285

Source: Farjas, 2007, BTA - Paestum

towards a curriculum in digital cultural heritage studies, preparing for the challenges of tomorrow
Some EU experiences

GREECE

Eighteen Universities offer 343 post-graduate courses (according to 2007 e-learning platform) – a few are interdisciplinary programs

- University of Crete, depts. Of Archeology, Computer Sciences and Institutes for Mediterranean Studies
  - post-graduate programme entitled “Advanced Methods and Information Systems in Archaeology: Research and Management of the Material Remains of Aegean Cultures”

- Panteion University in Athens
  - MA in Cultural Policy, Management and Communication

Source: Bounia, Economou, 2007, BTA - Paestum
The School of Social Sciences

- M.Sc. in Cultural Informatics
  - Museology
  
- Design of Digital Cultural Products

Source: Bounia, Economou, 2007, BTA - Paestum
The School of Social Sciences

- M.Sc. Multimedia Systems of Cultural Heritage
  - Interaction design and multimedia systems,
  - Heritage computing and digitization of collections
  - Content management.

- Digital applications for the presentation of exhibits,
- Interaction Design,
- Digitization of collections,
- 3D Digitization and Visualization,
- Content Management Systems,
- Multimedia Design
- 3D Animation.

Source: Bounia, Economou, 2007, BTA - Paestum
Lessons learned

- Offer consists of mostly specialization courses
  - Aimed at teaching *how to use* IST tools
  - Organized mostly by individual depts.
  - A few inter-departmental courses
  - Some initiatives involve the creation of networks (the French and Greek examples).
Some suggestions for building a successful curricula

- good balance of theory & practice, and of culture & ICT
- focus more on methodologies, new ways of thinking with ICT rather than teaching the use of ICT (the traditional way)
- critical analysis through real case studies
- promote inter-disciplinary research
- Collaboration on developing tools
- adapt curriculum to possibilities
- create new research questions
social benefits

- bridge between technology and social sciences and humanities.
- link between public, private and research sectors
- attract industry students to social sciences
- create needed specialization
- promote social cohesion

KEY CONCEPT: Collaborations: Inter-departmental, Inter-university and International co-operations
### DRAFT PROPOSAL FOR A SYLLABUS OF COURSES IN DIGITAL HUMANITIES

<table>
<thead>
<tr>
<th>Course Title</th>
<th>No.</th>
<th>Module Name</th>
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<td>Impact of ICT</td>
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<td>Text analysis</td>
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<td>Standards</td>
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<td>Building databases</td>
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<td>Visualization and Image processing</td>
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23/02/08 towards a curriculum in digital cultural heritage studies, preparing for the challenges of tomorrow
## Course I

### Introduction, theory, methodology and history of research

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<th>a. History of research</th>
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<td>i. history of computing</td>
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<td>ii. logics and mathematics</td>
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<td>iii. how computers work</td>
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<tr>
<td>iv. digital humanities – state-of-the-art and successful stories</td>
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</table>

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<tr>
<th>b. Knowledge representation</th>
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<tbody>
<tr>
<td>i. classification systems and methods</td>
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<td>ii. types of knowledge and epistemology</td>
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<td>iii. philosophy of language and communication</td>
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<td>iv. logic and aesthetics</td>
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<th>c. Research methods</th>
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<tbody>
<tr>
<td>i. project design and performance characteristics of digital tools</td>
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<td>ii. text analysis</td>
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<td>iii. data capture, storage and processing</td>
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<td>iv. electronic publication</td>
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</tbody>
</table>

23/02/08 towards a curriculum in digital cultural heritage studies, preparing for the challenges of tomorrow
Course I

d. New trends in Digital Humanities
   i. Fuzzy logic, Chaos theory and Expert systems
   ii. Agent Based modeling and Empirical Modeling
   iii. Artificial Intelligence
   iv. Natural Language processing
   v. Time, temporal relations and predictive modeling

e. Impact of ICT
   i. Shift from work to text and back
   ii. Form and expression
   iii. Social and economic impact
   iv. Information sharing and information overflow
Course

Data Acquisition

a. Text analysis
   i. Digitization and OCR
   ii. Mark-up (JITM, COCOA)
   iii. DTD

b. Online data harvesting
   i. Internet search and evaluate
   ii. Query building
   iii. Knowledge recovery
   iv. Resource selection strategies
   v. Data mining (NORA, D2K, T2K)

c. Remote sensing and image processing
   i. Image acquisition (3D scanner and photogrammetry)
   ii. Video mosaicing
   iii. Satellite and aerial photos
   iv. Remote sensing
   v. Nomadic technologies (total station, PDA, etc.)
   vi. CAD systems
Course III

a. Text managing
   i. Encoding and XML
   ii. Tagging
   iii. Knowledge compilation
   iv. Automatic planning

b. Standards
   i. Building ontology
   ii. Thesauri definition
   iii. CIDOC and other standards
   iv. Data and metadata
   v. Mapping data formats
   vi. Indexing

c. Building databases
   i. Types of databases (OO, relational, reference collection, training databases
   ii. Storing multi media
   iii. Spatial data management
   iv. Non-structured data
   v. Building queries
Course IV

a. Text interpretation
   i. Interactive concordance
   ii. Digital annotation

b. Visualization and Image processing
   i. Pattern recognition
   ii. Video analysis
   iii. Graphic representation and investigation

c. Data investigation
   i. Virtual reality and 3D modelling
   ii. Predictive modelling
   iii. Expert systems and simulations
   iv. Temporal and spatial GIS
   v. Landscape and environment reconstruction
   vi. Spatial analysis

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Course V

a. Collaborative tools
   i. New forms of collaboration (3D, wiki, online resources)
   ii. Creation of dictionaries and translation tools
   iii. Creation of domain knowledge
   iv. Grid technologies

b. Knowledge representation
   i. Multimedia applications
   ii. Interfaces and Human – computer interaction
   iii. Augmented reality, haptic devices
   iv. ICT in museum environments
   v. Game design
Communication

Course V

c. Internet technologies
   i. HTML, JAVA etc.
d. Managing online collections
   i. eXist and XML
   ii. MSQl
   iii. CSS
e. Electronic publishing
   i. Web authoring
      ii. Photoshop, Dreamweaver, and ImageReady
   iii. Flash, other web design software
   iv. eBooks
Towards a curriculum in digital cultural heritage studies, preparing for the challenges of tomorrow.
## Who Should Attend

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<thead>
<tr>
<th>Module No.</th>
<th>Anthropology Archaeology</th>
<th>Geography</th>
<th>History and Art History</th>
<th>Knowledge Management</th>
<th>Literature</th>
<th>Museology</th>
<th>New Media, Communication and Design</th>
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Thank you for the audience

Contacts

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