



# **User Interfaces and Visualization**

**<http://delos.dis.uniroma1.it/default.aspx>**

**Hanne Albrechtsen  
Risø National Laboratory  
Denmark**

## **Participants in Delos wp 4:**

### **Universities**

- Roma-1, Italy (cluster management)
- CWI, Netherlands
- Forth-ICS, Greece
- Brunel, UK

### **Sector research institutes**

FhG-IPSI, Germany

- Risø National Laboratory, Denmark



## **Overall goal:**

- To elaborate a common understanding of the role and scope of UI research in the DL area and start the development of a theoretical framework

## **Objectives and tasks:**

1. Identify empirical basis (Risø)
2. Characterize all life cycle phases (Forth-ICS)
3. Characterize the users (FhG-IPSI)
4. Characterize contexts/environments (Roma1)
5. Characterize visualisations (Roma1)
6. Develop theoretical framework (Roma1)



## **Problems:**

### **Valuable digital libraries exist**

+ Access for users to digitized repositories

### **Valuable tools for knowledge integration exist**

+ Content management through metadata

- Lack of technology support for collaborative content provision and collaborative research

### **Valuable knowledge about user interface design exists**

- But user interfaces to DLs are often designed in an ad hoc manner.

- Empirical evaluation of DL user interfaces is rarely an integrated activity in DL design



## **Research strategies for 2004:**

- To integrate knowledge about state-of-the art through empirical analysis of digital libraries and users' experience
- To reach a first foundation for a common understanding to build a theoretical framework for visualization in user interfaces to digital libraries
- Collaboration 'outside' the consortium and dissemination of preliminary results



## Work done

### 1. Data gathering and empirical analysis:

- Case studies of advanced digital libraries
- Questionnaire surveys of DL users
- Literature study

### 2. Dissemination:

- Organization of workshop in 2005 on collaboration with wp 3 on audio-visual content and visualization in digital libraries
- Preparation of joint report and publication of main results



## **Empirical basis, highlights from the work done:**

1. Case studies of advanced digital libraries
2. Questionnaire surveys

Reported in the joint deliverable D4.1.1.:

”User Interfaces and Visualization”

By Roma1, Risoe, Forth-ICS and FhG/IPSI

(Draft: September 2004; Final version, October 2004)



## **Case studies of advanced digital libraries**

Cases: four European digital library projects, funded by the European Commission's IST programme

Laurin – libraries and archives collecting newspaper clippings

Collate – collaboratory for film archive research

Scholnet – testbed for searching and annotation of software concepts for DL development

I-Dove – Interactive support tool for development of virtual environments



## **Case studies of advanced digital libraries**

Input: in-depth descriptions of the digital libraries, prepared by the partners, according to guidelines developed to address:

- a. What are the domains covered by the DL
- b. Who are their users
- c. What are their services
- d. How have the DLs been developed
- e. What kinds of visual design have been created
- f. What are the future visions

# Case studies of advanced digital libraries

- Analytical levels:

## 1. Domains:

- Work domains
- Knowledge domains

## 2. Users

- Stakeholders (Experts in mediation and content)
- End-users

## 3. Tasks/services



# Case studies of advanced digital libraries

Domains:

Work domains (involve company strategies and goals):

1. Archives and libraries (Collate and Laurin)
2. Development of common workspaces (I-Dove and Scholnet)

Knowledge domains (involve users' intentions):

1. Film knowledge (Collate)
2. Newspaper content (Laurin)
3. Design and development knowledge (I-Dove and Scholnet)



# Case studies of advanced digital libraries

## Tasks/services

### Tasks:

- Integration of documentary knowledge (Collate, Laurin)
- Development and management of distributed knowledge (I-Dove, Scholnet)

### Services:

- Indexing and annotation (Collate)
- Multilingual thesaurus (Laurin)
- Social navigation tools, tools for VE construction (I-Dove)
- Annotation and IR with relevance feedback (Scholnet)



## Case studies of advanced digital libraries

Users:

Stakeholders/experts:

- Film archive staff, researchers (Collate)
- Librarians in public libraries, journalists (Laurin)
- Content managers (I-Dove, Scholnet)

End-users:

- Broad spectrum (Collate, Laurin)
- Developers (I-Dove, Scholnet)



## Case studies of advanced digital libraries

First results:

Development of a preliminary taxonomy of domain, user, task, services in advanced digital libraries

First suggestions for integration of taxonomy with taxonomy for interface design:

1. Domains, tasks, users
2. Abstraction levels (means and ends for each level of analysis)
3. Action scenarios (task situations)
4. Skill-rule-knowledge behavior (users' cognitive behavior)



## Questionnaire surveys:

1. Questionnaire for digital library end-users
2. Questionnaire for digital library stakeholders

### Main variables:

User background and characteristics

Current experience

Functional requirements

Non-functional requirements (eg. Usability, safety, ethics)

45 responses (12 stakeholders)

## Questionnaire surveys, Preliminary results

### **Functional requirements:**

Communication, collaboration important to stakeholders,  
less important to end-users

Preeminence of the 'document metaphor'

### **Non-functional requirements:**

Conceptual rift between end-users and stakeholders re.  
usability and accessibility



## Questionnaire surveys,

### Stakeholders:

- + DLs should be easy to learn
- DLs should be satisfactory to novel users

### End-users:

- + Universal usability support
- Satisfactory to expert users

## Future work, 1:

- Evaluation of DLs throughout their entire life cycle  
Analytical – empirical, when and how, and who to involve (stakeholders, end-users)
2. Visualization based on empirical analysis of 'domains, tasks, users'
- Stable features: models for characterization
- Dynamic features: action scenarios, design laboratories, evaluation laboratories



## Future work, 2:

3. Taxonomy of interface metaphors for inspiring the creation of visual, audial etc. representations in the user interface of DLs

# The 'Onion model' for empirical analysis of domain task user





