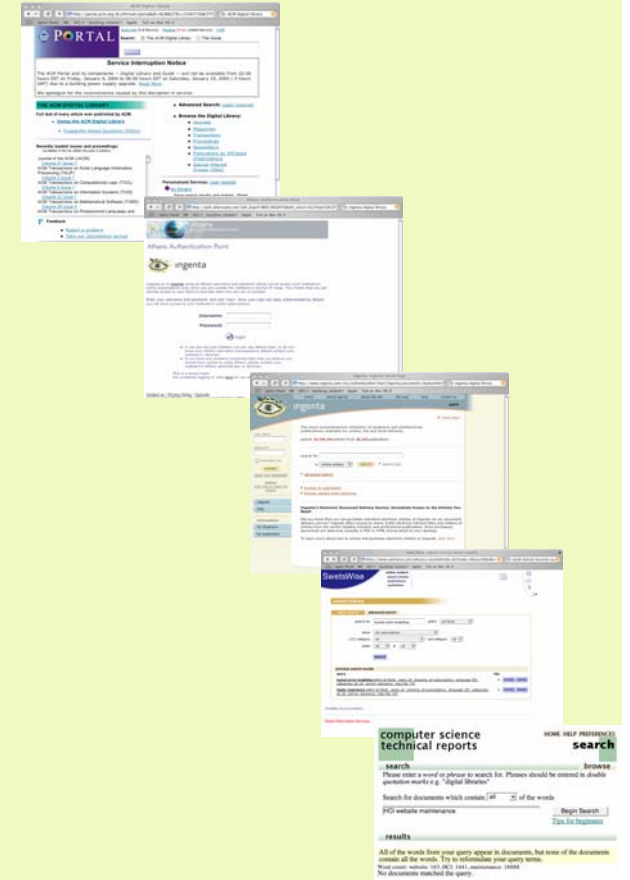# Understanding User's Experiences: Evaluation of Digital Libraries

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Overview

- Background

- Some desiderata for DLs

- Some approaches to evaluation
  - Quantitative
  - Qualitative
  - Analytical

- The realities of design culture & practice

Background

- My specialism is in Human–Computer Interaction
  - Developing and applying novel evaluation methods
  - Understanding use in context
  - Developing new interaction techniques
  - Understanding usability in design practice
- All being applied to DLs as an interesting type of complex system

Apparent motivations for DL developments

- Cutting costs
- Reducing storage problem
- Improving preservation
- Improving access
  - A focus for this talk

One view
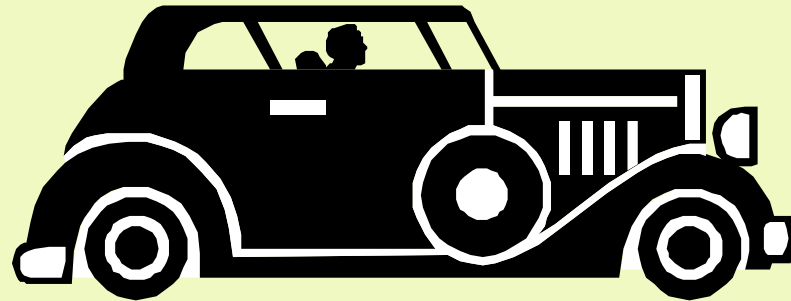
"It's like being given a Rolls Royce and only being able to sound the horn"

Desiderata

- Users should find what they want quickly and easily (even with fuzzy reqts).
- It should be easy to familiarise with contents, structure, features.
- Important features of different media should be preserved.
- DLs should support desirable working practices.
- DLs should support collaborations over information.

Quantitative approaches

- "Classic" experimental design used to compare versions.
  - Good for studying effects of incremental changes.
  - Need working system.
  - Easy to apply.
  - Typically capture details for pre-selected tasks but not naturalistic behaviours.

- Transaction log analysis.
  - Good complement to other techniques, but lacks explanatory power.

Qualitative approaches
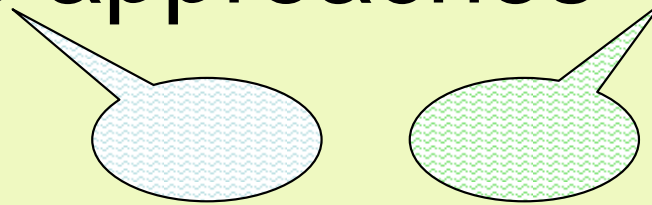
- Data collection:
  - Interviews.
  - Contextual Inquiry.
  - Observation.
  - Think-aloud.
  - Transaction logs.

- Analysis:
  - Grounded Theory
  - With particular questions in mind (e.g. process or use of search terms)

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Example 1:
Organisational factors

Work in the NHS

(with Anne Adams & Simon Attfield)

Background

- Policy shift towards Evidence Based Medicine (EBM)
  - Heavier focus on *information*
- Increasing technology focus
  - E.g. electronic health records
- Developments in National Electronic Library for Health

National electronic Library for Health

◄ ► ↻ + 🔖 http://www.nelh.nhs.uk/   Q▾ NHS Direct

📖 epsrc Panel   ME   UCL ▾   teaching-related ▾   Apple   TeX on Mac OS X

National electronic Library for Health

NHS

● NHS Direct Online   ● nhs.uk   ● Department of Health   ● Social Care   ● Public Health   6th January 2004

Know How
○ Commission for Health Improvement
○ Maternity (MIDIRS)
○ National Patient Safety Agency
○ National Service Frameworks Zones
○ NeLH Guidelines Finder
○ NHS Modernisation Agency
○ NICE
○ Prodigy
○ Protocols and Care Pathways

Knowledge
○ Anatomy
○ Bandolier
○ British National Formulary
○ Clinical Databases
○ Clinical Evidence December
○ Cochrane Library 2003/4
○ Electronic Publishing
○ Full-text Journals
○ Health Care Needs Assessment
○ MEDLINE/PubMed
○ National Knowledge Service
○ NHS Cost & Effectiveness Reviews
○ NHS R&D Health Tech. Programme
○ OMNI Reviewed Internet Resources
○ Patient-Centred Care
○ Research Findings Register
○ ZETOC

Specialist Libraries
By Subject:
Cancer | Cardiovascular Diseases | Child Health | Infection | Diabetes | Emergency Care | Health Informatics | Health Management | Knowledge

Welcome
The National electronic Library for Health Programme is working with NHS Libraries to develop a digital library for NHS staff, patients and the public.

○ New to NeLH? | Athens registration
○ Site map | Tour NeLH resources
○ Digital Libraries Network
○ NeLH December 2003 Newsletter

Pilot Search Engine
[   ] search
search tips   about our search

Highlight
2004 Development Plans. The shape of things to come [more...]

Take a Tour of NeLH
Tours of key resources on NeLH are now available [more...]

Whats New?
Book Now for Latest Free Phone-In Learning Session
Professor Paul Glasziou will be speaking on "Applying the results of systematic reviews and trials to

Hitting the Headlines
What's this feature?   archive

Combination therapy for benign prostatic hyperplasia

Combination therapy with doxazosin and finasteride reduces the risk of benign prostatic hyperplasia getting worse, reported the Daily Telegraph on 18 December 2003. The newspaper accurately reported the findings of a large well-conducted randomised controlled trial. [more...]
Added:19/12/03

Focus on... Bandolier
What's this feature?   archive

Adverse Nondrug Reactions
An investigation of two studies in this under-researched area.
[HTML]

Reducing diagnostic tests in primary care
A Dutch randomised trial supports the view that primary care can substantially reduce the ordering of test.
[HTML]

Document of the Week
What's this feature?   archive

Method

- Interviews and focus groups with over 140 health professionals to date
  - Doctors, nurses, AHPs, librarians, technical staff, … and a few patients
  - 2 general hospitals, a mental health trust & an NHS Direct call centre
- All transcribed and analysed using Ground Theory approach.

Findings (1): different needs

- Information nearly all presented for doctors, rather than nurses or patients
- EBM vs. Evidence Based Practice
- National / International vs. local information
  - E.g. ward protocols, telephone lists

(2) Information as a threat

- **Junior staff** perceive information hoarding by senior staff
- Also crisis management approach. E.g.:*"you're just sort of thrown in at the deep end and when you do it wrong they do sort of pull you up about it."*
- Hiding senior staff's lack of up to date knowledge?
- Information hoarding $\Rightarrow$ technology hoarding.
  - Physical location
  - Social restrictions

- **Senior staff**: Junior staff don't need technology access – they need practical knowledge.
- Higher status staff need theoretical knowledge.
- A little knowledge is dangerous.
- Computers are play-things for research, and should not be on the wards. They are too time-consuming.
- Digital libraries threaten current hierarchical information dissemination processes.
- Internet provides possibilities for abuse.
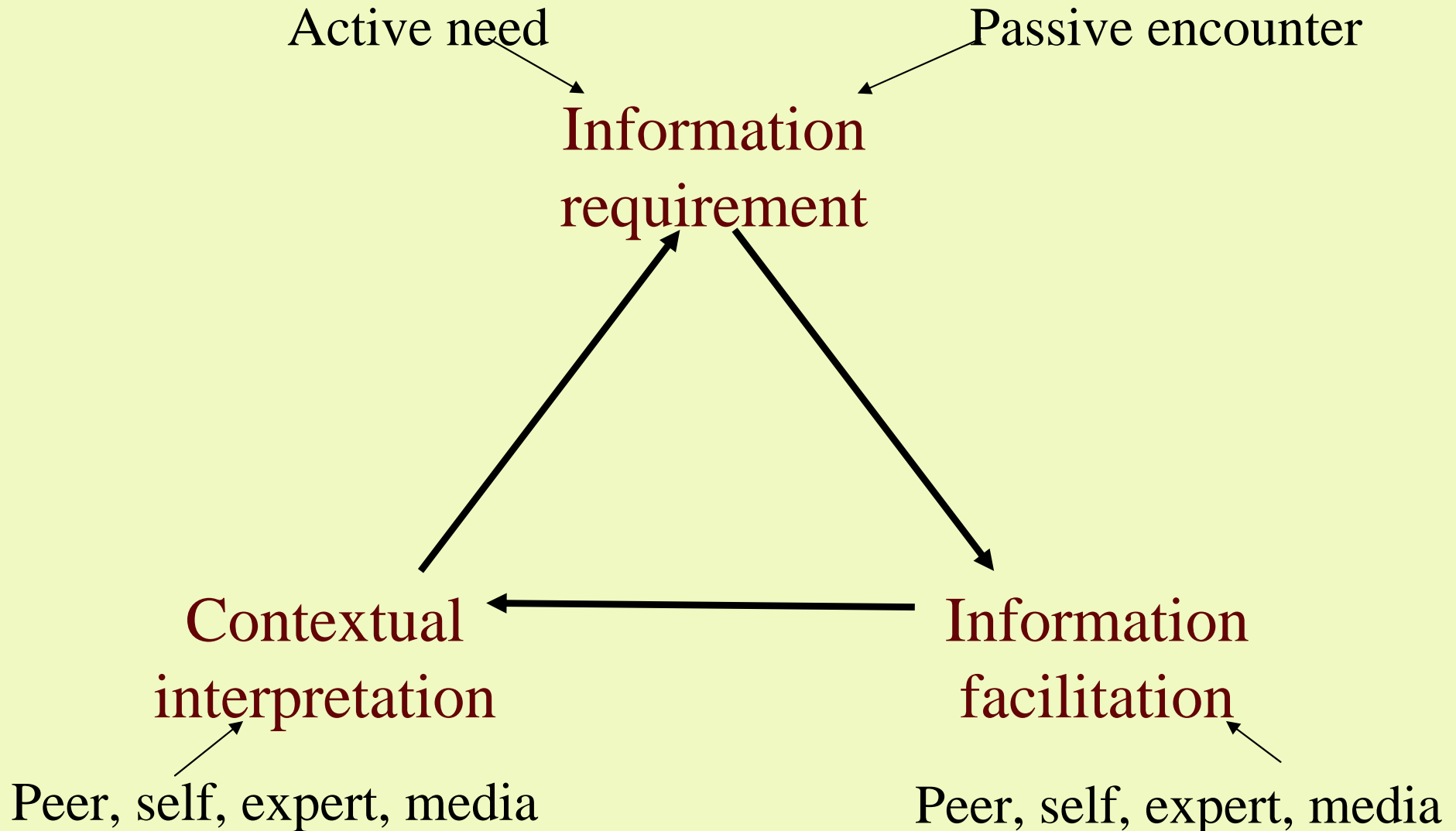
(3) Communities of Practice

- 3 different settings
- Just providing computers is not enough
- Intermediaries support learning and practice
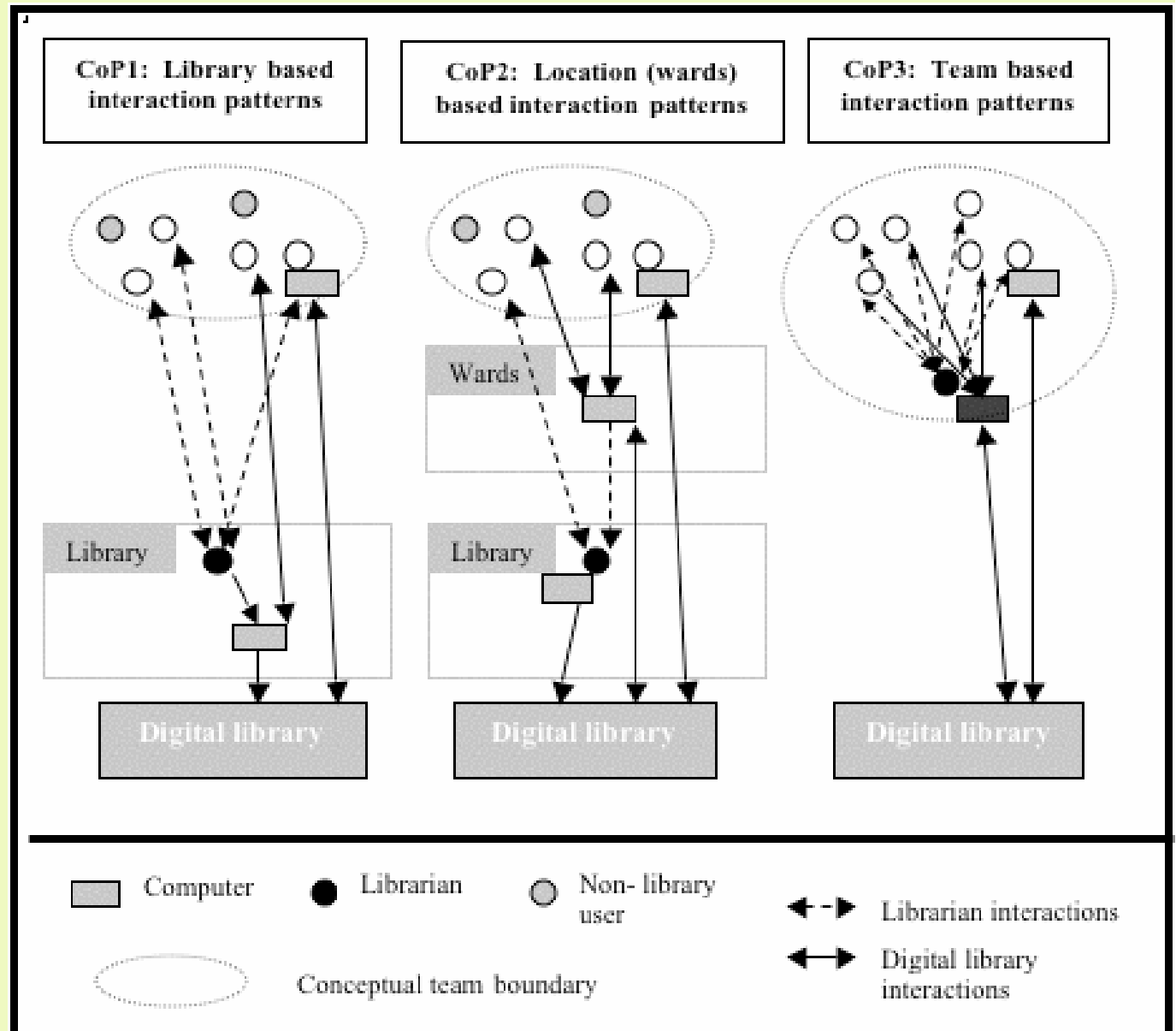
(4) Information mediators

- Four roles w.r.t. information:
  - Initiator
    - Recognises need for information and initiates search for it
  - Facilitator
    - Eases access to information
  - Mediator
    - Mediates information interpretation and modification
  - Trainer
    - Provides user training to work with resources
- Roles may be taken by librarians or information users

(5) The health 'information journey'

Active need　　　　　　　　　　　　Passive encounter

Information requirement

Contextual interpretation

Information facilitation

Peer, self, expert, media　　　　　　Peer, self, expert, media

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Understanding organisational impacts

- Recognise that…
  - Even non-personal information can be threatening, so changes need to be introduced carefully
  - Information needs to be mediated in various ways to make it usable
  - Recognising and working with *Communities of Practice* can make information use more effective and satisfying

End of example
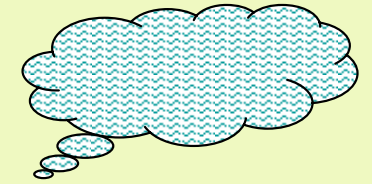
Analytical approaches

- Generally do not involve users, but do require experts (but expert in what??).
  - Expert Walkthrough
  - Checklists
  - Cognitive Walkthrough
  - CASSM
  - Claims Analysis

Example 2:
Cognitive Walkthrough

Cognitive Walkthrough: Overview

- Based on cognitive theory
- Assumes users are novices exploring interface
- Asks 4 questions for every step in interaction:
    - Will user form correct goal?
    - Will they see correct action?
    - Will they associate action with goal?
    - Will feedback tell them they're making progress?

Cognitive Walkthrough: Example

Cognitive Walkthrough: Findings

- Surprisingly analyst-dependent.
- Surprisingly dealt with local and surface effects.
- Of limited scope but well structured.
- Needs well-defined tasks.

End of example

Building usability into design

- Challenges
  - Avoid 'too little too late'
  - Ambiguity over who the users are
    - Creators, Composers, Consumers
  - Access to HCI expertise
  - Ways of thinking…
- I'm not aware of much work on this…

Example 3:
Claims Analysis in
Design Practice

Building in usability
(with Suzette Keith & Bob Fields)

Method

- Participation in development projects with two DL development teams (one commercial, one academic) over 3 years.

- Investigate strengths and limitations of various user-oriented methods in design practice.

- Narrow focus to Claims Analysis...

Claims Analysis

- Is a form of "psychological design rationale"
  - Considers design features in terms of +ve and -ve effects on users

- *Demands* a scenario-based approach to design
  - We also added personas and information seeking models

- Initially has minimal methodology
  - 1999 paper proposes structure based on goals, actions and feedback

Scenario: example

A researcher is conducting a literature search for a new project on haptic interfaces. The user has only worked with digital libraries a few times before, and does not have sophisticated information seeking skills. She decides to search Ingenta to find relevant articles. Initially, her searching is exploratory, but it gradually becomes more focused as she gains familiarity with the contents and structure of the library.

Claims Analysis: Example

Goal: enter query
+: clear search box
-: difficult to formulate query

Action: click on box then type
+: clear that it's possible to type here
-: not clear need to click first

Feedback: text appears
+: user can easily track

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Findings (1): design culture

- Problem vs solution focus
  - No interest in problems that can't be solved.

- Function-based vs scenario-based design
  - "I've got this function…"

(2) Usability methods

- Most of the techniques we applied (e.g. Heuristic Evaluation, Cognitive Walkthrough) dealt well with superficial aspects of design but not with the deeper issues of information use.

- Claims Analysis didn't work quite as its developers suggest, but did give leverage in the right places…
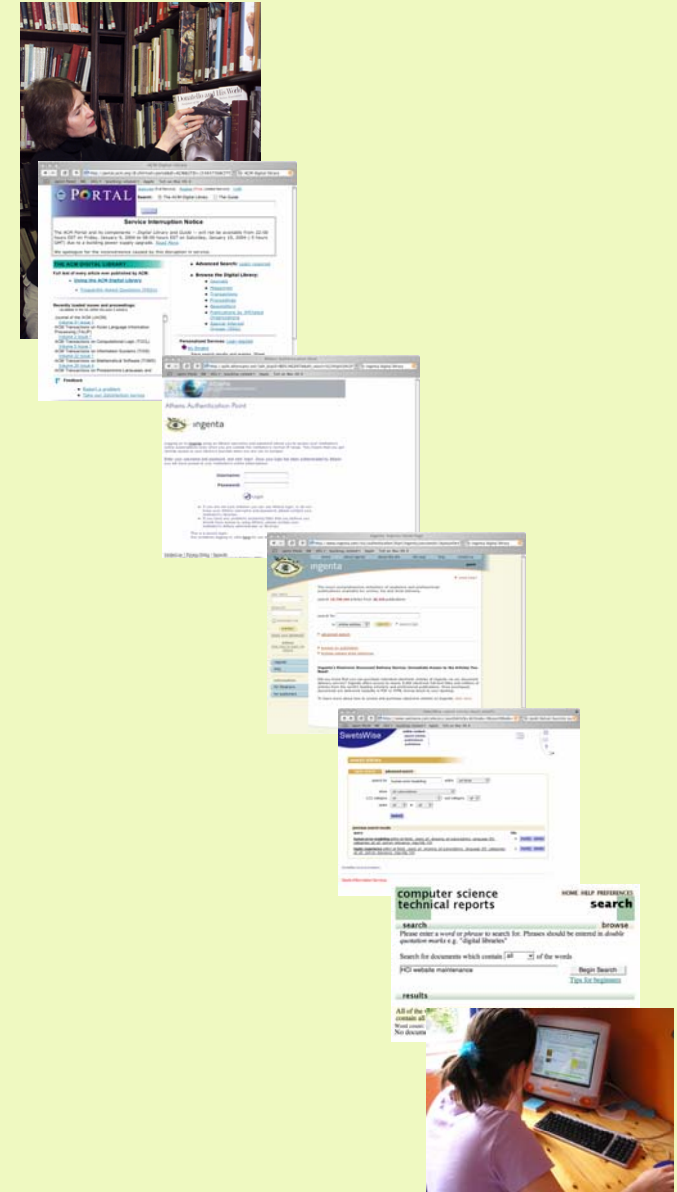
(3) Use of Claims Analysis

- Generating the actual claims was "too academic"
- Scenarios and personas were perceived as giving real value
- Scenarios and personas could integrate theory about information seeking practice as well as cognition, and therefore have theoretical grounding
- Most personas were based on people they knew…
- Novel design features were hard to assess
  - No empirical data for personas or scenarios

Challenges in design

- Bridging the gulfs between cultures and value systems
  - Shouldn't be a surprise…

- 'Shrink wrapping' personas and scenarios to be useful in new situations

Summary

- Digital libraries pose a raft of difficulties
  - Their design processes are messy
  - They can be perceived as threatening
  - They currently have poor basic usability
  - Information seeking and use are poorly understood
- We're making headway, but there's a lot to do…

Thank you!

http://www.uclic.ucl.ac.uk/annb/DLUsability/DLindex.html