Methods for eliciting user requirements and evaluating design proposals: Contextual aspects

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- Whose coming for dinner?
- It’s mum and dab!
Context

• Int_r__t
• She very often uses the Intern_t.

• Ch__s_
• Choose? Cheese?
• A ch__s_ sandwich
• A ch__se sa__wi_h
• A ch__s_ __nd__ch

Context

Definitions:
• The part of a text or statement that surrounds a particular word or passage and determines its meaning
• The circumstances in which an event occurs; a setting
Context

Different definitions

• "Location, nearby people, objects, and changes to those objects"
• "People, time of day, temperature, season etc."
• "The user’s location, identity, location, and time"
• "The user’s emotional state, focus of attention, location and orientation, time of day, and people in the user’s environment"
• "The user’s physical, social, emotional and informational state"

Von Hippel’s ”sticky information”

• Proposal: To solve a problem, needed information and problem solving capabilities must be brought together at a single locus
• When the information can be shifted without cost this is no problem
• When the information is costly to acquire, transfer and use - "sticky" - problem solving can be affected
• "Sticky information"
  – Involves no attributes of the ‘information’ per se
  – Some information is “tacit”
    • Human skills are often tacit, tacit knowledge (Polyanski 1958)
    • Practice
  – The interplay between many factors is "sticky information"
  – Gatekeepers may contribute to making the information "sticky"
  – The ‘context’ carries in itself information that cannot be transferred by any other than the context

• Problem solving ‘in context’ has been observed to be more efficient than when choosing another locus
• Shifting activities between ‘lab’ and ‘field’ instead of transferring information to the ‘lab’
  – Iterative development
  – Prototypes the ‘mediator’
  – Prototyping may help reduce ‘stickiness’ of the information
    • Making information transfer less dependent on verbal communication
The importance of context

• Evaluating design solutions

An example

Project: Development of a self service ticketing machine
• Two usability tests
  – One in a lab environment
  – One in the real use context
• Results
  – No difference in results in terms of type of problems; number of problems, etc. between the two contexts
• Conclusion
  – One may without any problem test the usability of products in a lab environment
The importance of context

• Eliciting requirements

• Different approaches where ‘context’ is stressed
  – Ethnography
    • “Writing the culture”, studies with the purpose to understand, to make the implicit explicit
    • Participation and involvement of the ‘researchers’
  – Naturalistic studies
  – Emphatic Design
  – Contextual Inquiry
    • Part of the Contextual Design Process
    • Contextual Interview (combination of observation, interview, reconstruction of events)
    • Understanding develops in collaboration between user-developer, in ‘work’

• Does not imply the degree of user involvement
• More or less structured
• Cover different stages of the development process
Context

• Context may be understood as 'environment'
  – Environment refers to more than the physical environment
  – "Environmental requirements" (Preece et al.)
    • The circumstances in which the product will be expected to operate
    • Physical environment
      – Light, sound, pollutants, etc.
    • Social environment
      – Collaboration, attitudes, etc.
    • Organizational environment
      – Infrastructure, support etc.
    • Technical environment

Context

• Context may be understood as something more complex
• Something shaped over time, taking into consideration cultural issues and historical events
• Including individuals, goals, infrastructure ....
Goal
Individual
Activity
Artefacts
Environment

Context

Individual → Goal
Activity
Artefacts
Level 1

User ↔ Artefact
Task/Goal

Task/Goal
Level 2
Level 3

- Activity
  - Relates to motives/needs, shaped in a cultural-historic context
- Action
  - Relates to concrete goals
- Operation
  - Relates to 'local conditions'
• **Goals**
  - What is the user trying to accomplish? How do the user’s actions fit into the objectives of the organization?
• **Process**
  - What are the steps the user will follow? How does information flow from one step to the next? What are the various roles (such as creator, contributor, editor, or approver) that are involved?
• **Inputs & Outputs**
  - What materials and information will the user need to successfully use the interface? What will they need from the interface to continue with their overarching goals?
• **Experience**
  - What similar things has the user done in their past? How has the organization survived without this design in the past?
• **Constraints**
  - What physical, temporal, or financial constraints are likely to impose themselves on the user’s work?
• **Physical Environment**
  - How much room does the user have to work? What materials on their desk? What access do they have to necessary information (such as user manuals)? What is taped to their monitor?
• **Tools In use**
  - What hardware and software does the user currently use?
• **Relationships**
  - What are the interconnections between the primary user and other people who are affected by the tool?
The importance of context

• Evaluating long-term usability

Example

• Project: CAD
• Hypothesis
  – Unuse or low degree of use associated with poor interface design
• Method
  – Individual contextual interviews with users of CAD
  – Questionnaires to users
• Results
Problems importing CAD-data
New versions of tool
Problems related to user interface design
Not enough computer power
Geometries too detailed
Difficult to run models
Problems making simplifications
Lack of proper education
Wrong way of working
REDUCED SYSTEM EFFICIENCY

Activity

User

Artefact

Goal/consequence

Communication

Expectations

Several tasks

Introduction of new versions

System size

System complexity

Computer power

On-line help functions

Manuals

User interface

Functionality of system

Fit/Miss

Knowledge

Expectations

Frustration
Methodological consequences

• The time that has to be spent!
  – Enough time to understand the individual’s ‘object’, the motive behind an activity
  – The individual’s objects change (over time)
  – Actions become operations (over time)

• Activity
  – Activity is more than individual episodes
• Different data collection methods and methods for data analysis are needed
  – Triangulation of different data collection methods
    • Question based
    • Observation based
    • "Historical documents"

• Perspective
  – "The researcher’s" perspective and approach will influence the outcome of the study, the ambition to understand from the user’s perspective
"… We cannot fully understand how people learn and work if the unit of study is the unaided individual with no access to other people or to artifacts for accomplishing the object at hand. Thus we are motivated to study context to understand relations among individuals, artifacts, and social groups. …" (Nardi, B., 1997)

A model for thought

- Requirements do not emerge in a vacuum
- Requirements emerge in a context - a use situation
- The use situation as a whole must be addressed and understood before we can make any recommendations as to the design of the artefact-to-be, and hence, also of the use situation-to-be.
• Detachment from the actual use situation will shift the focus of the user-artefact study from that of the artefact as a mediating object (or tool) in a use activity to that of studying fits and misfits between the properties of the artefact and the properties of the human being in interaction.
• While the user–artefact relation at the ‘lower’, less complex, level may be described in terms of isolated cause and effect (or stimuli response) relationships, the higher level describe a complex system of interdependencies in which the role of the artefact has changed into that of a ‘mediating object’ within an activity.
• While the relation at the lower level may be addressed by means of single measurements, the more complex levels must be addressed by other methods, contextual methods, in order to form an understanding of the complex picture.