

User requirements

Unit 3



Learning outcomes

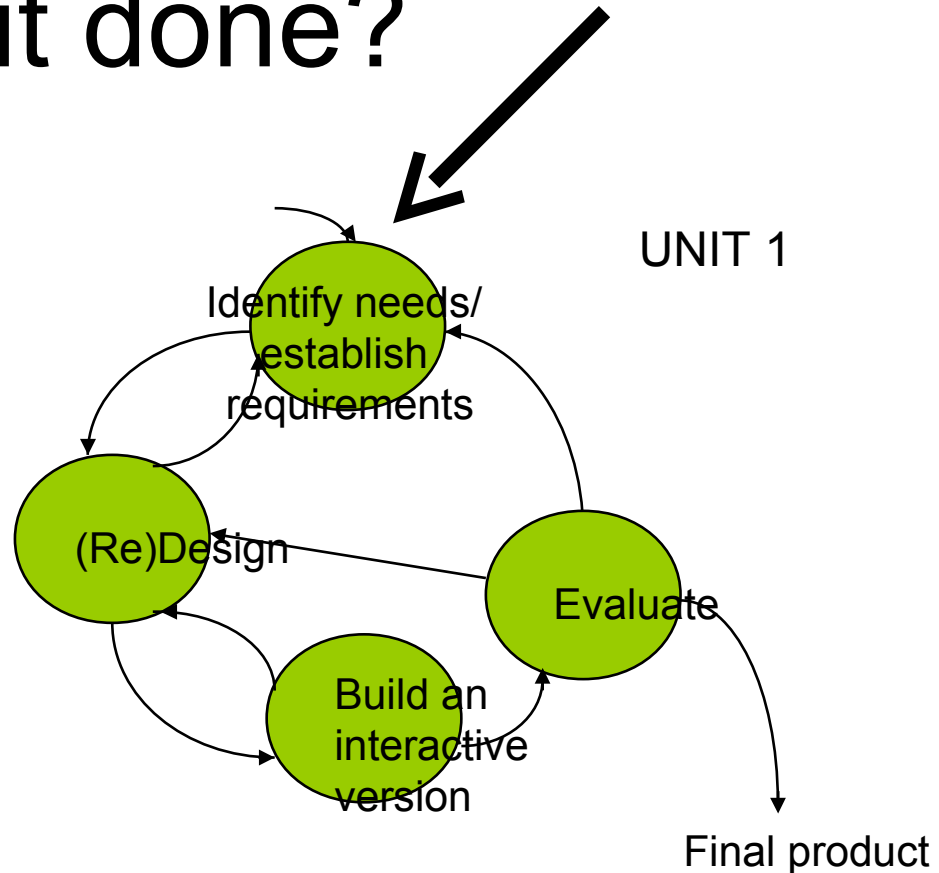
- Understand
 - The importance of requirements
 - Different types of requirements
- Learn how to gather data
- Review basic techniques for task descriptions
 - Scenarios
 - Task analysis

What is done?

- Identifying needs
 - Understand as much as possible about the user, their work and the context of use
 - See PACT analysis (unit 1)
- Establish a set of 'stable' requirements
 - Requirements MUST be justified and related to data
 - Set up clear success metrics, usability, user experience requirements

How is it done?

- Data gathering activities
- Data analysis activities
- Expression as 'requirements'
- All of this is iterative



Why is it done?

- 38 members of the BCS, the Association of Project Managers and the Institute of Management
- 1,027 projects (half of which development)
- 12.7% successful
- only 2.3% of success were development projects, 18.2% maintenance projects and 79.5% data conversion
- Taylor, A. (2000)
- <http://archive.bcs.org/BCS/Products/publishing/itnow/OnlineArchive/jan00/professionalpractice.htm>



Figure 3: Causes of failure.

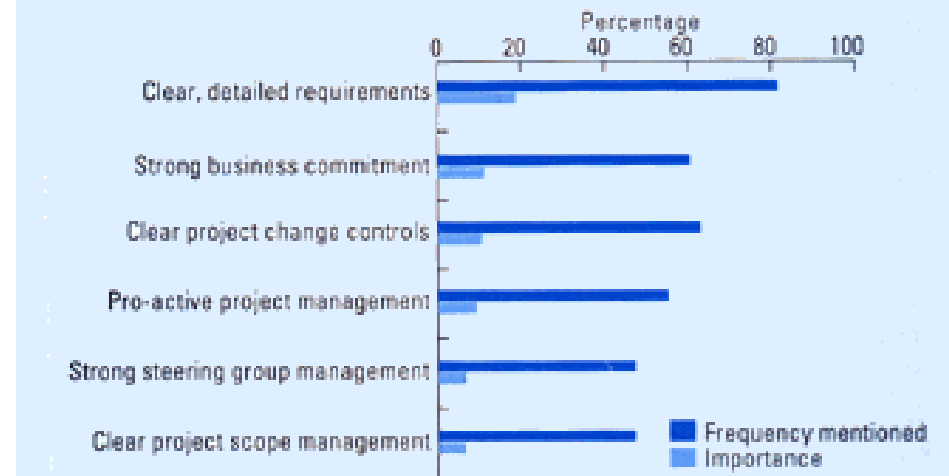


Figure 4: Critical success factors.

Requirements type

- Functional
 - Fundamental or essential characteristics of the product
 - Describe what the product has to do or what processing actions it is to take
 - Historically the main focus of requirements activities

Example

- For a multifunction PDA
 - Phones function must be accessible while connected to the internet
- For a nuclear power control system
 - The system will be able to monitor the temperature of the reactors

Requirements type (2)

- Non functional
 - Properties that the functions must have
 - Describe the constraints that there are on the system and its development
 - Covers a number of aspects of design: image, usability, performance, maintainability, security, cultural acceptability, etc.
 - As important as functional requirements for the product's success.

Example

- For a multifunction PDA – Look and feel
 - The system must present an up-market, business like image
- For a nuclear power control system - Usability
 - Warnings signals **MUST** be clear and unambiguous

Other kinds of requirements

- Data
 - Type volatility, size/amount persistence accuracy of data
- Environment or context of use
 - physical: dusty? noisy? vibration? light? heat? humidity? (e.g. ATM)
 - social: sharing of files, of displays, in paper, across great distances, work individually, privacy for clients
 - organisational: hierarchy, IT department's attitude and remit, user support, communications structure and infrastructure, availability of training

User requirements

- Users: Who are they?
 - Characteristics: ability, background, attitude to computers
- System use: novice, expert, casual, frequent
 - Novice: step-by-step (prompted), constrained, clear information, e.g., wizard prompting
 - Expert: flexibility, access power
 - Frequent: short cuts
 - Casual/infrequent: clear instructions, e.g., menu paths

Exercise

Suggest one key functional, data, environmental, usability, and look and feel requirements for

- Self-service filling and payment system for a petrol (gas) station
- On-board ship data analysis system for geologists searching for oil
- Fashion clothes website

Data-gathering

- Studying documentations
- Researching similar products
- Interviews
- Questionnaires
- Observation

Studying documentation

- Procedures and rules are often written down in manuals
- Good source of data about the steps involved in an activity and any regulations governing a task
- Good for understanding legislation, and getting background information
- Not to be used in isolation
- Advantage: No stakeholders time

Observation

- Naturalistic observation:
 - Spend time with stakeholders in their day-to-day tasks, observing their activities
- Gain insights into stakeholders' tasks
- Good for understanding the nature and context of the tasks
- It requires time and commitment from a member of the design team, and can result in a huge amount of data

Questionnaires

- A series of questions designed to elicit specific information
- Questions may require different kinds of answers:
 - simple YES/NO; choice between pre-set answers; comment
- Often used in conjunction with other techniques
- Can give quantitative or qualitative data
- Good for answering specific questions from a large, dispersed group of people

Interviews & Focus Group

- Structured, unstructured or semi-structured
- Good for exploring issues
- Time consuming and may be infeasible to visit everyone
- Focus group
 - Group interviews
 - Good at gaining a consensus view and/or highlighting areas of conflict
- Props e.g. sample scenarios of use, prototypes, can be used in interviews

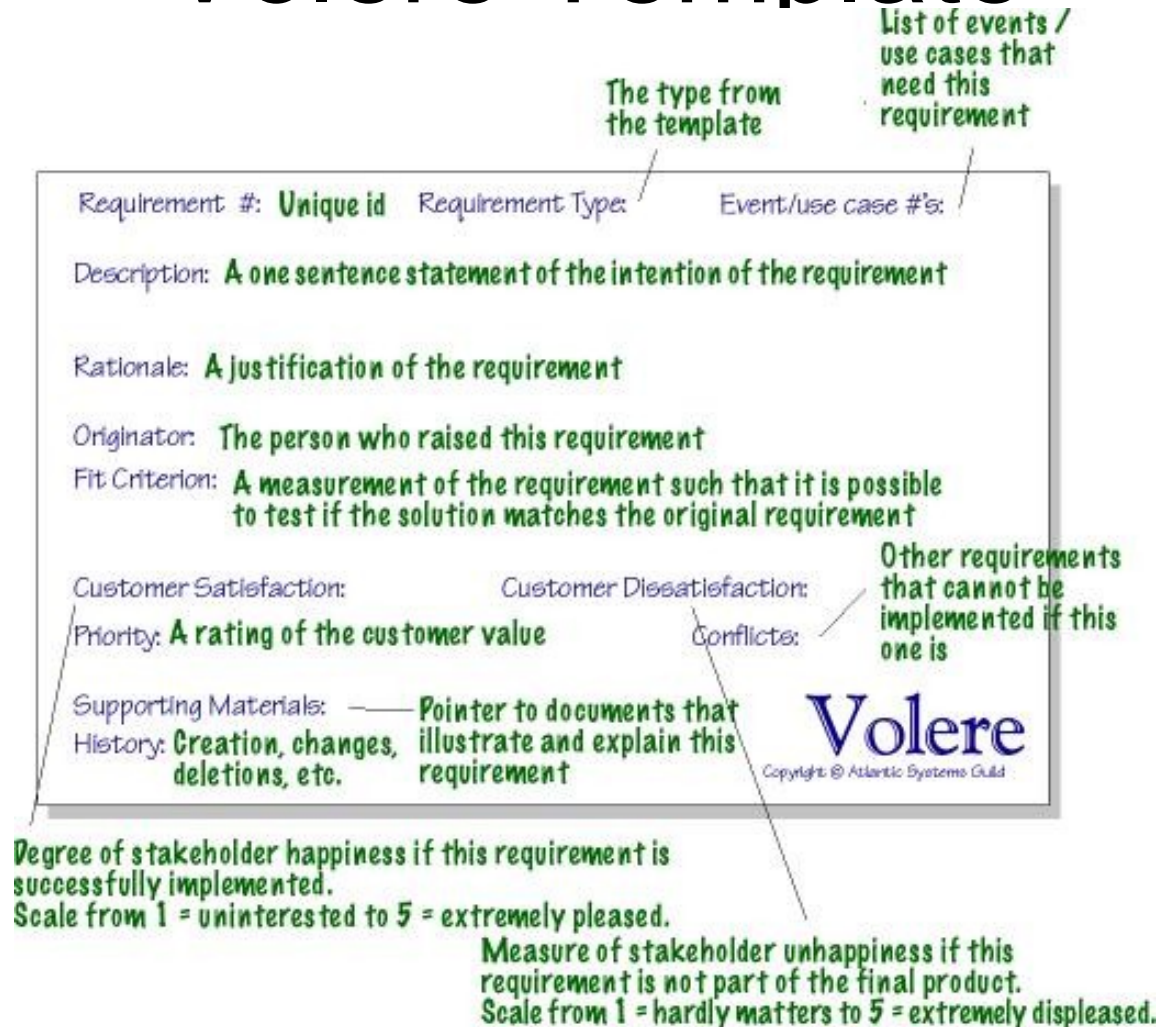
Which techniques to gather req?

- Depends on:
- Amount of time, level of detail and risk associated with the findings
- Knowledge of the analyst
- Kind of task to be studied:
 - Sequential steps or overlapping series of subtasks
 - High or low, complex or simple information?
 - Task for a layman or a skilled practitioner?

Requirements templates

- Standard format, or template, for specifying requirements
 - Unique reference number specifying whether the requirement is functional or not
 - A one sentence summary
 - The source(s) of the requirement
 - The rationale for it

Volere Template



Problems with data gathering - stakeholders

- Identifying and involving the right people:
 - users, managers, developers, customer reps?, union reps?, shareholders?
- Involving stakeholders
 - workshops, interviews, workplace studies, participatory design
- ‘Real’ users, not managers
 - traditionally a problem in software engineering, but better now
 - Availability of key people

Problems with data gathering (2)

- Requirements management: control, ownership
- Communication between parties:
 - within development team
 - with customer/user
 - between users: different parts of an organisation use different terminology
- Domain knowledge distributed and implicit:
 - difficult to dig up and understand
 - knowledge articulation

Guidelines

- Involve all the stakeholder groups
- Involve more than one representative from each stakeholder group
- Use a combination of data gathering techniques
- Support the process with props such as prototypes and task descriptions
- Run a pilot session
- Consider carefully how to record the data

Personas

- **A persona is a fictional user, with a made-up life**
- Capture user characteristics
- Not real people, but synthesised from real user characteristics
- Should not be idealised
- Bring them to life with a name, characteristics, goals, personal background
- Develop multiple personas

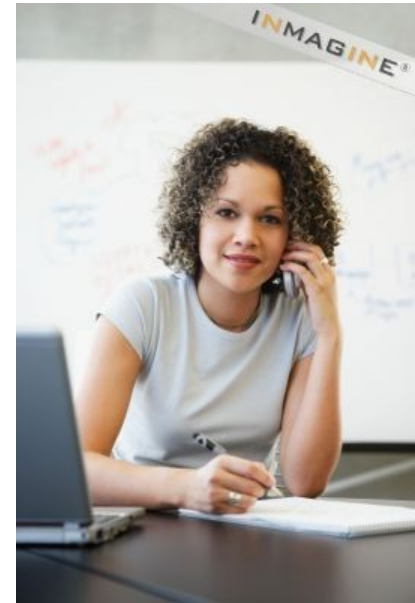
Sarah Red is 24 years old and works as a web-designer at Zurich Insurance. Sarah has a BA in three dimensional design from Middlesex University and an M.A. in computer related design from the Royal College of Art in London. She has worked for Zurich for the past two years and quite openly dislikes it.

Sarah is a talented designer who likes to experience the latest technology and has won several prizes for her design. Yet, in her job she has to be very conservative. She prepares forms for on-line quotes and provides general information about the company to their web-customer.

Sarah dreams of joining a designer studio in London where she could fulfil her talent. The current position, although boring, offers a good salary and the possibility of living in London where she can search for her dream job.

Sarah works in the web-development team. Her new boss is Elisabeth, a software engineer who does not understand the user experience and is more concerned with technical details than with design. Sarah is reasonably free in her job, as nobody seems to care.

Sarah's been told that the company has adopted edgeConnect and that her group will start using it by next month. Sarah is worried about this decision: she thinks it is going to kill creativity and to make her job even more boring. She has been told that she will be in charge of designing a template layout for the car sector, and she wished she could use flash. She welcomes anyway the idea of a change and a training course sounds interesting.



Scenarios

- Key technique in interaction system design (Rosson and Carroll 2002)
- Iterative tools to be used throughout the design process
- User stories = informal narrative description which reports about user tasks and activities.
 - Short snippets which tend to focus on the user needs and motivations to perform a task rather than on the use of a technology.

- The summer term has just started and Fritz, a computer-science student at the Technische Universität Dresden, has decided to attend a course on "User Interface generation for Web Services". He logs in the University portal and accesses an overview of all lectures, sport and language courses. He tries to subscribe to the UI course but the system indicates a timetabling conflict with the course on 'Service-oriented Architecture' he previously registered to. Fritz sign in an Italian course, which is automatically displayed in his personal weekly calendar.
- Fritz wonders whether he should change his study plan to accommodate for the UI course. Thus he decides to ask other students' opinion. He joins a chat room, but nobody is there. Fritz waits for other students while working on an assignment using the library service.

- Looking at the watch on the portal, he realizes that he has only 30 minutes before a date with a girl met at the University online social network. Fritz switches on his PDA and logs into the university portal while boarding the tram. A beep indicates that some students have joined the chat room and after a short negotiation he manages to swap his place from the “Service-oriented Architecture” course with a place in the User Interface course with another student. The system is automatically updated, just in time for his date.

Video-example



Example 6. Knowledge Navigator™ vision video for a future notebook computer [E6 Dubberly and Mitch '87].

Summary

- There are different kinds of requirement, each is significant for interaction design
- The most commonly-used techniques for data gathering are: questionnaires, interviews, focus groups and workshops, naturalistic observation, studying documentation
- Scenarios and personas can be used to articulate existing and envisioned work practices.

How to Interview

- Plan a set of central questions – what do you want to know?
 - a few good questions gets things started
 - avoid leading questions do not bias the interview
 - focuses the interview
 - could be based on results of user observations
- Let user responses lead follow-up questions
 - follow interesting leads
 - vary questions to suit the context
 - probe more deeply on interesting issues as they arise



Wording questions

- Start with an easy question then move into more sensitive ones
- Clearly phrased and easily understood
 - Start with what, how, why, when
 - Avoid questions which could be answered by yes or no or precise answers
- Use interview probes
 - Scenarios, pictures, contextual cues

Tricks

- Prompts
 - Remain silent
 - Repeat the last question
 - Repeat the last few words by the interviewee
- Probes
 - Verbal
 - ‘could you give me some examples of that’
 - ‘would an example of that be’
 - Could you give me a bit more details on
 - Design
 - Interfaces
 - Scenario, storyboard
- Checks
 - ‘If I can summarise what I think you’ve said...’
 - ‘What this means, then is that,...’
 - So let me check if I have understood you correctly’

Retrospective testing interviews

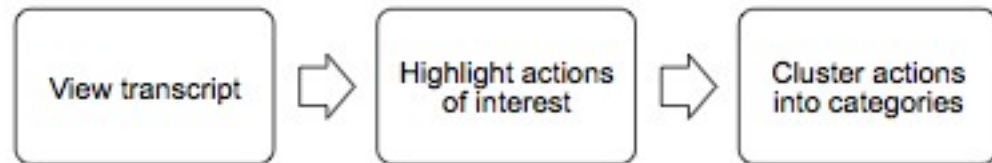
- Post-use
 - perform an observational study asking users to interact with a product
 - create a video record of it
 - have users view the video and comment on what they did
 - clarify events that occurred during system use
 - excellent for grounding interview
 - avoid erroneous reconstruction
 - users often offer concrete suggestions
 - Problem: prone to rationalization of events/thoughts by user

Transcribing

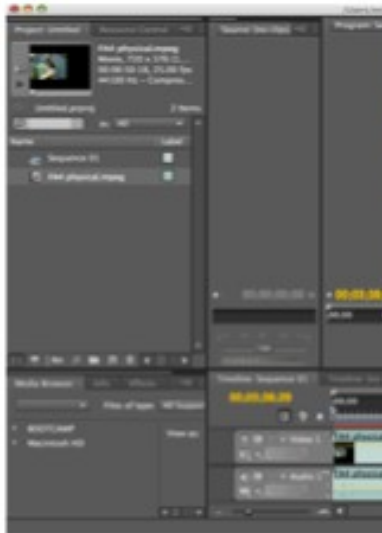
- Writing up the interviews / if needed
 - 5hours :1 hour (or more depending on typing speed and audio quality)
- Add informal notes (analysis – reflection)
- Think of level of richness needed
 - Emotion, false starts
- Labelling

Simple qualitative analysis

- Look for key events/patterns of behavior that drive the activity



- - Recurring patterns or themes
 - Emergent from data
 - Emergent from theory
- Categorizing data
 - Categorization scheme may be emergent or pre-specified
- Looking for critical incidents
 - Helps to focus in on key events



C1 (copy C2 – raise her hands high)
 C2 *once upon a time*
 C1 *upon a time (together with C2)*
 C1 *there was a bottle...*
 C1 (tap the bottle)
 C2 (watch C1)
 C1 *and then along came the baby horse..*
 C1 (drags the baby horse to grass1)
 C1 *and then*
 C2 *she go to have a milk*
 C2 (drags the bottle to the baby horse – animation)
 C1 *and then... mama came*
 C1 (watch C2)
 C2 *geetheeup... geetheeup...* (mimicking the horse and drags the mummy horse to grass1 next to the baby horse)
 C2 *daddy came along* (drags the daddy horse to grass1 next to the mummy horse)
 C2 (watch C1)
 C1 *then mummy when along..* (drags the mummy horse to grass2)
 C2 *she go.. and she go.. to somewhere else.. and she live there up in the sky..* (steals the mummy horse from C1 and drags to the hill near grass3)
 C1 (watch C2)
 C2 *oh dear!.. i'm in the wrong way!*
 C2 (watch C1)
 C1 *but daddy..* (drags the daddy horse to the hill next to the mummy horse).. *oh dear.. the wrong way ..*
 C1 *and then...* (try to drag the baby horse)
 C2 *Nof Nof.. baby stay there* (prevent C1 from dragging the baby horse)
 C2 *waaaa... she cried.. and the baby was lonely* (tap the baby horse)
 --Minute: 1-2--
 C1 (try to drag the baby horse)
 C2 *Nof.. stay there* (prevent C1 from dragging the baby horse)
 C2 *and then... here the bad.. bad witch came..* (drags the mummy human to grass1)
 C1 *and the bad man..* (drags the daddy human to grass1)
 C2 *smash.. smash.. smash..* (tap the mummy human)
 C1 (drags the daddy human next to the mummy human)
 C1 *a tree came along* (drags the tree1 to grass1)
 C2 *the tree go there..* (steal the tree1 from C1 and drags to the corner of grass1)
 C1 *but then.. they eat the tree* (drags the daddy human to tree1)
 C2 (drag baby horse to tree1)
 C1 (watch C2)
 C2 *just go..* (drags the baby horse far away from tree1 at grass1)
 C1 *and then... and then.. along came.. and then..* (drags the baby sheep to the pond – animation)
 C2 (drags the mummy human next to the daddy human next to tree1)
 C2 (watch C1)
 C1 *and then..* (smiling)
 C2 (press the right button – animation)
 C1 (sucks finger)

Categorising the data

- Different levels of details (general themes, word to word analysis)
 - Based on theory or emergent from data
 - Orthogonal category
 - Reliability (inter-rater reliability: percentage of agreement between different categorisation)
 - Example from book
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Coding

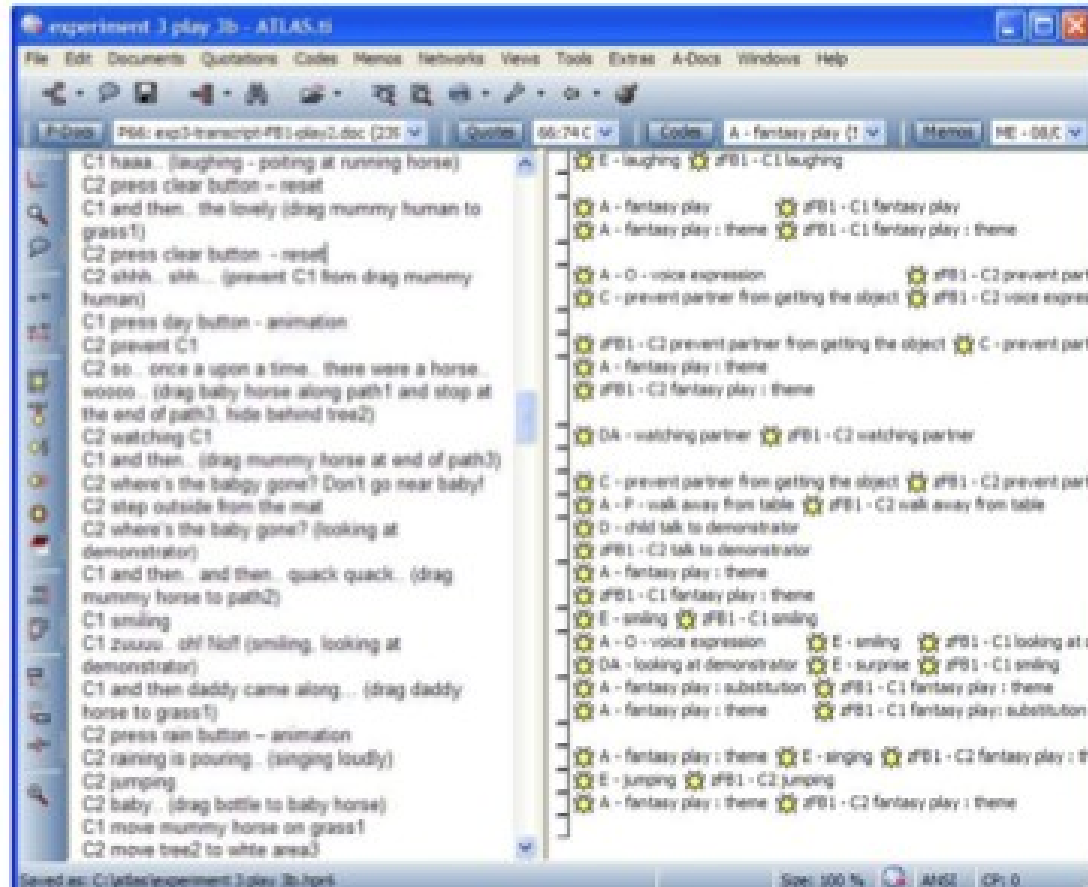
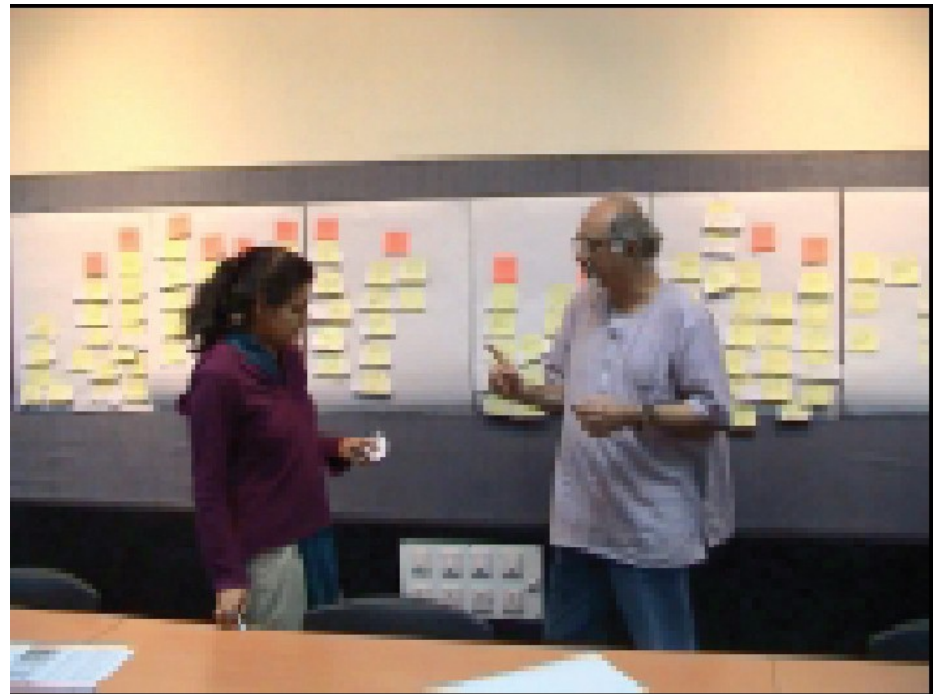


Figure 13: Atlas.ti qualitative analysis software

Affinity analysis

- Organise individual ideas and insights into a hierarchy showing common structure and theme
- Notes are grouped together because they are similar in some fashion
- The groups are not pre-defined but emerge from the data



Analyzing Critical incidents

- People talk about incidents that stood out
 - usually discuss extremely annoying problems with fervor
 - not representative, but important to them
 - often raises issues not seen in lab tests

Recommended reading

- Chapter 7 1st Edition
- Chapter 10 2nd Edition