User Interface Design

Lecture 4: Requirement Establishing

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Learning Objectives

- Explain the importance of requirements

- Explain the different types of requirements

- Describe data gathering for requirements

Requirements Establishing

▶ Ask What? How? Who?
  - What we want to create (develop)?
  - What are the final goals?
  - Can we (re)use an existing solution?
  - How the software will be used?
  - Who will use the developed application?

▶ Use a combination of data gathering techniques

Why must requirements be written down?

- Define the goals of the project
- Sets customer expectations
- Basis of the contract between customer and supplier
- Writing is thinking
- Allows thorough inspection and testing
- Can be kept up to date
- Allows tracking - estimates/actuals
- Team communication tool

- A requirement is 20-50 times more expensive to repair at end of a project than at beginning ($100 -> $2000-5000)

Requirements Establishing

Types of information about requirements

1. Functional Requirements
2. Non Functional Requirements
3. Technical requirements
4. Usability requirements
5. Environment or context of use requirements
6. User requirements

Requirements Establishing

1. Functional requirements: A **function** is described as a set of inputs, the behavior, and outputs. **Functional requirements** may be calculations, technical details, data manipulation and processing and other specific functionality that define what a system is supposed to accomplish.

2. Non-functional requirements: a *non-functional requirement* is a *requirement* that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. E.g., reliability, safety.
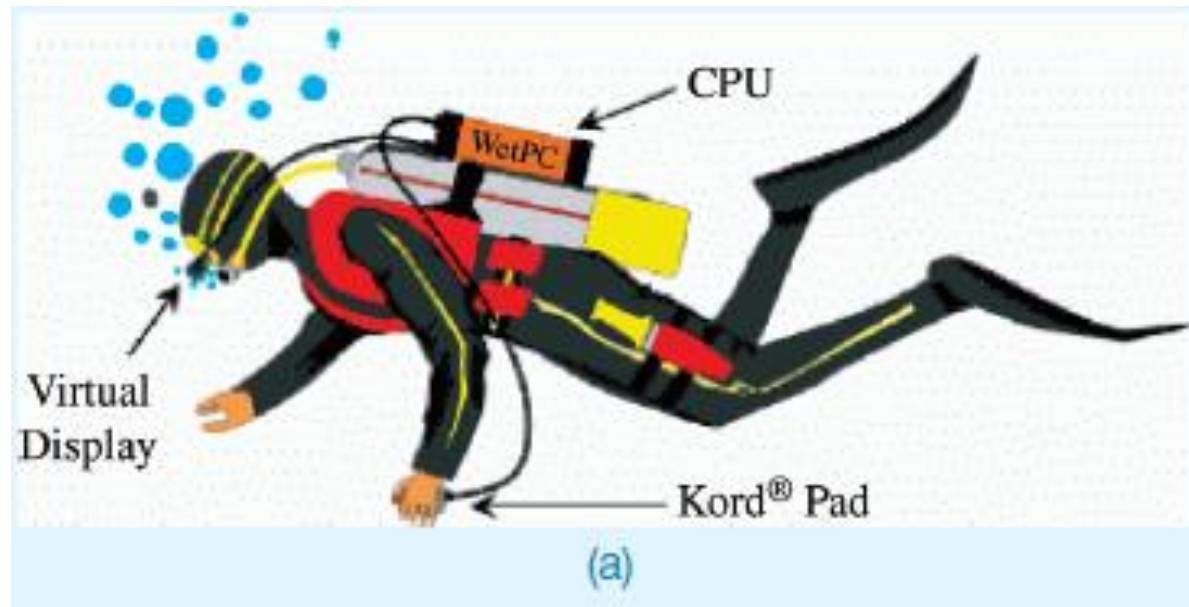
Requirements Establishing

3. **Technical requirements**: hardware and software requirements, for example: which language it's programmed in, which operating system it's created for, and which standards it must meet

4. **Usability requirements**: e.g., easy to use, easy to learn, easy to remember, 90% of the users in the 18-25 age group should be able to order a book within 2 minutes

5. **Environment or context of use requirements**: Physical environment, social environment, and organization environment.

Underwater computing

Figure 10.2 (a) The components of WetPC's underwater computer.

Source: Reproduced by permission of WetPC Pty Ltd. http://www.wetpc.com.au/WetPC.

Requirements Establishing

6. **User requirements**: who are the users and what they do (tasks).

— Characteristics: nationality, educational background, attitude to computers

— System use: novice, expert, casual, frequent
   — Novice: prompted, constrained, clear
   — Expert: flexibility, access/power
   — Frequent: short cuts
   — Casual/infrequent: clear menu paths

Exercise !

‣ Who are the stakeholders, and what can be the requirements for the following systems?
- ATM
- E-commerace site for selling male cloths
- Self service petrol station payment system

A test – are you awake?

https://www.youtube.com/watch?v=IGQmdoK_ZfY&feature=player_embedded#!

Data Gathering Techniques

- Gathering requirement can use various data gathering techniques. Each method has its advantages and disadvantages:

  1. Interview
  2. Focus group
  3. Questionnaires
  4. Ethnographic observation
  5. Triangulation

1. Interview

▸ Direct Interview consists of meeting with individuals or small groups to ask questions about their roles, responsibilities and needs for the proposed system.

▸ This method can be classified into two types:

1. Structured interview – prior to interview session , the interviewer prepares specific set of questions.

2. Unstructured interview – interviewer has general goals or subject

Choosing Interview Questions

- **Open-Ended questions**
  - No pre-specified answers like *what you think about …?*
  - Advantages: give interviewees more sense of involvement; put interviewee at ease as they respond in their own words
  - Disadvantages: takes long time to answer; difficult to summarize

- **Close-Ended questions**
  - Respondent is asked to choose from a set of specified responses
  - Examples: True or False, Multiple choice, rating a response
  - Advantages: takes less time to answer and more topics covered
  - Disadvantages: useful information may be overlooked

Guidelines for Effective Interviewing

Guidelines	What Is Involved
Plan the interview	Prepare interviewee by making an appointment and explaining the purpose of the interview. Prepare a checklist, an agenda, and questions.
Be neutral	Avoid asking leading questions.
Listen and take notes	Give your undivided attention to the interviewee and take notes or tape-record the interview (if permission is granted).
Review notes	Review your notes within 48 hours of the meeting. If you discover follow-up questions or need additional information, contact the interviewee.
Seek diverse views	Interview a wide range of people, including potential users and managers.

Interview Guide

Interview Outline	

Interviewee:
  Name of person being interviewed
	Interviewer:
	  Name of person leading interview

Location/Medium:
  Office, conference room, or phone number
	Appointment Date:
	  Start Time:
	  End Time:

Objectives:
  What data to collect
  On what to gain agreement
  What areas to explore
	Reminders:
	  Background/experience of interviewee
	  Known opinions of interviewee

Agenda:
  Introduction
  Background on Project
  Overview of Interview
    Topics to Be Covered
    Permission to Tape Record
  Topic 1 Questions
  Topic 2 Questions
  ...
  Summary of Major Points
  Questions from Interviewee
  Closing
	Approximate Time:
	  1 minute
	  2 minutes
	
	  1 minute
	
	  5 minutes
	  7 minutes
	  ...
	  2 minutes
	  5 minutes
	  1 minute

General Observations: *Interviewee seemed busy—probably need to call in a few days for follow-up questions because he gave only short answers. PC was turned off—probably not a regular PC user.*	
Unresolved Issues, Topics Not Covered: *He needs to look up sales figures from 1998. He raised the issue of how to handle returned goods, but we did not have time to discuss.*	

Interview Guide

Interviewee:	Date:
Questions:	Notes:
When to ask question, if conditional *Question: 1* Have you used the current sales tracking system? If so, how often? *If yes, go to Question 2*	*Answer* Yes, I ask for a report on my product line weekly. *Observations* Seemed anxious—may be overestimating usage frequency
Question: 2 What do you like least about this system?	*Answer* Sales are shown in units, not dollars. *Observations* System can show sales in dollars, but user does not know this.

2. Focus Groups

▸ Focus groups: group of users to discuss a preliminary given issue

▸ 6 to 12 participants - typically around 10

▸ 3 to 5 groups

▸ good mix of people
  - each group – representative sample of target audience
  - watch out for too heterogeneous groups

During a Focus Group Session

▸ Clarify reason of question

▸ Phrase questions in terms of probes
  ▸ e.g, "why …"

▸ Pay attention to non-verbal aspects

▸ Be aware of personal biases

▸ Give summaries in your own words at intermediate points

Pros & Cons of Focus Groups

+ Ideas of one can trigger ideas in others
+ Time and cost efficient
+ Incorrect facts can be corrected
+ Controversial issues quickly identified
+ Reach a not foreseen level of detail

– Ensure balance between talkers and shy users
– Sometimes difficult to coordinate
– difficult for geographically isolated alternative – online/phone interviews
– difficult when target population is small

3. Questionnaire

▸ Questionnaires:

  ▸ Often used in conjunction with other
     techniques

  ▸ Can give quantitative or qualitative data

▸ Good for:
  - demographics
  - evaluation of specific features or properties
  - prompting requirements

▸ Question types (closed & open questions)

▸ Scales (for precision & effort needed to decide on a response)

Scale Question

▸ Likert scale (attitudinal scale)

   ▸ a set statements with semantic differential

   ▸ measure user's attitude, preferences, and subjective reactions

   ▸ measure the strength of users opinion - by counting the number of responses at each point in the scale

   ▸ typically 5-point scale: **strongly disagree ⇔ strongly agree**

Strongly Disagree 1	2	3	4	Strongly Agree 5
○	○	○	○	○

Questionnaire Tips

▸ Avoid complicated questions
▸ Clear and unambiguous questions
▸ As few questions as possible (~ 2 A4)
▸ Additional info, e.g. "any other comments" option

▸ Pilot the questionnaire before giving it to users
  ▸ test whether the questions gather the need info
  ▸ decide on statistics to apply before finalizing the questionnaire
  ▸ balanced mix of closed and open questions
  ▸ balance positive and negative questions

4. Ethnographic observation

- Close observation of human behaviour in the field
    - What do people really do?
    - How do they interact with the computer?
    - What's the context?

- Traditionally looking at office interactions

- More important for mobile

4. Ethnographic observation

▸ Ethnographic studies form a 'bridge' between users and designers

▸ Let the designer understand
  – what people do in a setting
  – how they organize their activities

▸ focus on recording behavior—analysis comes later

4. Ethnographic Observation

‣ **Preparation**
  ‣ Understand organization policies and work culture.
  ‣ Familiarize yourself with the system and its history.
  ‣ Set initial goals and prepare questions.
  ‣ Gain access and permission to observe/interview.

‣ **Field Study**
  ‣ Establish connection with managers and users.
  ‣ Observe/interview users in their workplace and collect subjective/objective quantitative/qualitative data.
  ‣ Follow any leads that emerge from the visits.

4. Ethnographic Observation

- **Analysis**
  - Compile the collected data in numerical, textual, and multimedia databases.
  - Quantify data and compile statistics.
  - Reduce and interpret the data.
  - Refine the goals and the process used.

- **Reporting**
  - Consider multiple audiences and goals.
  - Prepare a report and present the findings.

4. Ethnographic observation

▶ **Observer or Hawthorne effect**

▶ Fairly strong evidence from many studies that results are influenced by:

- people feeling special because they're being paid more attention
- being treated differently by being studied
- can be positive (we're important, the desire to please)
- can be negative (the perceived goal is to reduce skill/autonomy/pay/head count.

Data gathering techniques

▸ How to select the best technique for gathering data. It depends on:

 1. The focus of the project (kind of data)
 2. The participants involved (time)
 3. The nature of the technique (equipment)
 4. The resources available

Triangulation

- All user research techniques have their own **limitations**

- Use **multiple techniques** to fully understand a design scenario

- Choose techniques **that account for the weaknesses** of each other

- Choose techniques to cover both **depth and breadth** of the user experience