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# Information Systems Analysis

*Topic 11:*

*Principles of Interface Design and the  
Requirements and Characteristics of Users  
that Motivate These*

# Objectives

- Identify the principles and good practice of interface design
- Analyse the requirements of the users of an interface
- Analyse the characteristics of the users of an interface
- Demonstrate how good interface design can address the requirements and characteristics of an interface user

# HCI and Information Systems Analysis - 1

- Whatever analysis methodology an analyst uses, he or she needs to ensure that they work through the following tasks when analysing and specifying the requirements for the development of a human computer interface:
  - Problem statement definition
  - User analysis
  - Task analysis

# HCI and Information Systems Analysis - 2

- Requirements specification (including a usability specification)
- Modelling the interface
- Design
- Evaluation

# Problem Statement Definition

- The analyst needs to define:
  - what system requires a new or updated interface
  - what type of interface is needed
  - what will the interface be used for
  - who will use it

# Information Gathering

- These can include:
  - Interviews
  - Focus groups
  - Questionnaires
  - Observations
  - Documentation

# User Analysis - 1

- Identifies users and their characteristics:
  - Demographic data
    - For example: age, gender, general educational level, position at the organisation, cultural background, any special requirements, technology training and knowledge, experience with similar systems/products, etc.
  - Skills and knowledge
    - For example: cognitive styles, skill sets, capabilities, proficiencies

# User Analysis - 2

- Work or work related factors:
  - For example: organisation-specific knowledge and experience, job characteristics, job familiarity, frequency of using technology, expertise level (novice, intermittent, frequent), familiarity with specific hardware and software, technology skill base such as using a keyboard, familiarity with interaction styles



# User Analysis - 3

- Are users:
  - Experienced?
  - New?
  - Executive?
  - Managerial?
  - Operational?
- An effective user interface should match the skills, experience and expectations of its users and be able to meet the needs of different types of users, e.g. visually impaired.

# Task Analysis - 1

- The analyst will need to differentiate between what the technology does and what the users do.
- The following aspects will need to be examined and documented:
  - task workflow
  - distribution of work
  - users' work skills
  - frequency of use of technology
  - ordering of tasks

# Task Analysis - 2

- The analyst will need to establish what the users' goals are and what they need to do to achieve their goals.
- Descriptions of scenarios and conditions under which users perform their tasks will need to be provided.
- Opportunities need to be identified that will support user activities, for example, sound may need to be added and used to draw the users' attention to items on various screens.

# Techniques for Task Analysis

- The analyst can use the following:
  - **Task Decomposition** (tasks are split into subtasks or sequences)
  - **Knowledge-based techniques** (identifies what users need to know in order to use the interface)
  - **Hierarchical Task Analysis** (tasks are decomposed into subtasks)

# Hierarchical Task Analysis - 1

- The analyst must:
  - Identify major tasks - tasks must be visible and accessed easily
  - Identify tasks to be achieved and include the subtasks associated with them
  - Determine the frequency of tasks and include the level of detail
  - Determine the necessary or typical order in which the tasks are undertaken

# Hierarchical Task Analysis - 2

- Put into a logical sequence tasks that belong to the same group or that are related in some way
- Identify parallel tasks
- Build up hierarchy of tasks/subtasks
- Ask users to check the analysis
- Analyse individual tasks for possible error conditions
- Define the users' goals and actions

# Hierarchical Task Analysis - 3

- Hierarchical task analysis should also:
  - represent descriptions of the tasks that need to be undertaken
  - predict potential difficulties
  - evaluate the system against usability
  - evaluate the system against the functional requirements

# Demonstrate how Good Interface Design can address the Requirements and Characteristics of the User - 1

- Improve users' task performance and reduce their effort.
- Prevent user errors/include efficient error messages
- Be appropriate for the tasks, the information needed and the way that it is presented.
- Facilitate a satisfying, engaging and enjoyable interaction
- Appear simple but effective



# Demonstrate how Good Interface Design can address the Requirements and Characteristics of the User - 2

- Be appropriate for the level of expertise
- Be appropriate for the knowledge and skills base
- Be appropriate for the general educational level
- Meet organisation-specific knowledge and/or experience requirements
- Easy to use
- Consistent
- Reliable
- Provide relevant feedback

# Summary

## *This topic covers:*

- The principles and good practice of interface design
- Analysis of the requirements and characteristics of interface users
- How good interface design can address these requirements and characteristics

# References

- Preece, J., Rogers, Y. and Sharp, H. (2002) *Interaction Design: Beyond Human-Computer Interaction*, John Wiley & Sons, New York.
- Hinze-Hoare, V. (2007). *Review and Analysis of Human Computer Interaction (HCI) Principles*.  
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