UNIT I

UI PROGRAMMING

1. The Importance of the User Interface
    2. Part 2 The User Interface Design Process
    3. Step 1 Know Your User or Client
    4. Step 2 Understand the Business Function

Unit 1 Understanding User

1.1 Common problem with Usability

1.2 Human characteristics in Design

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Principles of User Interface Design

OBSTACLES AND PITFALLS IN DEVELOPMENT PATH

- No body ever gets it right for the first time
- Development is chock full of surprises.
- Good design requires living in a sea of changes.
- Designers need good tools.
- Performance design goals
- People may make mistakes while using a good system also

COMMON PITFALLS

- No early analysis and understanding the users needs and expectations.
- A focus on using design features or components .
- No usability testing.
- No common design team vision.
- Poor communication

COMMON USABILITY PROBLEMS

- Ambiguous menus and icons.
- Languages that permit only single direction movement through a system.
- Input and direct manipulation limits.
- Complex linkage.
- Inadequate feedback.
- Lack of system anticipation.
- Inadequate error messages.

COMMON USABILITY PROBLEMS

- Visual clutter
- Impaired information readability
- Incomprehensible components
- Annoying distractions.
- Confusing navigation.
- Inefficient operations
- Inefficient page scrolling.
- Information overload

HUMAN INTERACTION WITH COMPUTERS

- Why people have trouble with computers
- Responses to poor design
- People and their tasks

Why People Have Trouble with Computers

- Extensive technical knowledge but little behavioral training.
- With its extensive graphical capabilities.
- Poorly designed interfaces.
- What makes a system difficult to use in the eyes of its user?
- Use of jargon

Why People Have Trouble with Computers

- Non-obvious design
- Fine distinctions
- Disparity in problem-solving strategies
- an "error-preventing" strategy
- Design inconsistency

Responses to Poor Design

1. Psychological

Typical psychological responses to poor design are as follows:

Confusion - The conceptual model or underlying framework cannot be understood or established.

Annoyance - Inconsistencies in design, slow computer reaction times, difficulties in quickly finding information, outdated information, and visual screen distractions are a few of the many things that may annoy users.

Frustration - Inflexible and unforgiving systems are a major source of frustration.

Responses to Poor Design

1. Psychological

Typical psychological responses to poor design are as follows:

Panic or stress - Over complex systems and procedures, unexpected long delays during times of severe or unusual pressure, or long response times.

Boredom - Boredom results from, among other things, improper computer pacing (slow response times or long download times) or over simplistic jobs or tasks. A bored individual is also likely to make more performance errors.

Responses to Poor Design

2. Physical

When people do something, they expect the benefits of what they are doing to outweigh the cost or effort to do it. The following physical reactions are:

Abandonment of the system - In business systems this was a common reaction of managerial and professional personnel.

With the Web, almost all users can exercise this option.

Partial use of the system -This is the most common user reaction to most computer systems. Many aspects of many systems often go unused.

UNDERSTAND THE BUSINESS FUNCTION

Business definition and requirements analysis

- Direct methods
- Indirect methods
- Requirements collection guidelines

Business Definition and Requirements Analysis

The objective of this phase is to establish the need for a system. A product description is developed and refined, based on input from users, marketing, or other interested parties.

Information Collection Techniques

There are many techniques for capturing information for determining requirements. Keil and Carmel (1995), Popowicz (1995), and Fuccella et al. (1999) described many of the following methods. The techniques listed are classified as direct and indirect.

- **Direct methods** consist of face-to-face meetings with, or actual viewing of, users to solicit requirements.
- **Indirect methods** impose an intermediary, someone or something, between the users and the developers.

Direct Methods

Person-to-person encounters permit multiple channels of communication (body language, voice inflections, and so on) and provide the opportunity to immediately follow up on vague or incomplete data.

Here are some recommended direct methods for getting input from users.

- Individual Face-to-Face Interview
- Telephone Interview or Survey
- Traditional Focus Group
- Facilitated Team Workshop
- Observational Field Study
- Requirements Prototyping
- User-Interface Prototyping
- Card Sorting for Web Sites

Indirect Methods

An indirect method of requirements determination is one that places an intermediary between the developer and the user. This intermediary may be electronic or another person. Using an intermediary can certainly provide useful information.

- MIS Intermediary
- Paper Survey or Questionnaire
- Electronic Survey or Questionnaire
- Electronic Focus Group
- Marketing and Sales
- Support Line
- E-Mail, Bulletin Boards, or Guest Book
- User Group
- Competitor Analysis
- Trade Show
- Other Media Analysis
- System Testing

Possible Problems in Requirements Collection

Like other aspects of the design process, problems may occur in the requirements determination phase. Stone et al. (2005) says the following situations can hinder collection of the proper information:

■ **Not enough user, customer, and other interested party involvement in the process.** The result may be incomplete requirements.

■ **Lack of requirements management or coordination**. Requirement modifications are not recorded, tracked properly, or carried out. Requirements may be inaccurate or incomplete.

■ **Communication problems among all participants.** It is possible that not all participants understand the exact requirements.

■

Possible Problems in Requirements Collection

■ **Capturing the relevant information may be difficult.** The relevant knowledge may exist in many places and locations,
including books, operating manuals, and in people's heads.

■ **People who do understand the problem may be constrained.** Heavy workloads and a lack of time may make people reluctant to, or unable to, participate.

■ **Organizational and political factors and agendas may influence the process**. The resulting views may not tally with the users views. Resistance to new ideas and change may be reflected in comments made.

■ **Disparities in knowledge may exist**. Some people may know what they want only in general terms, whereas others may be forceful and detailed about their wants. Getting a balanced view may be difficult.

■ **Changing economic and business environments and personnel roles**. As a result, want and needs change as well.

Understanding the User's Work

The technique used to gain an understanding of what the computer system must do is called task analysis. Another object of task analysis is to gain a picture of the user's mental model.

Mental Models

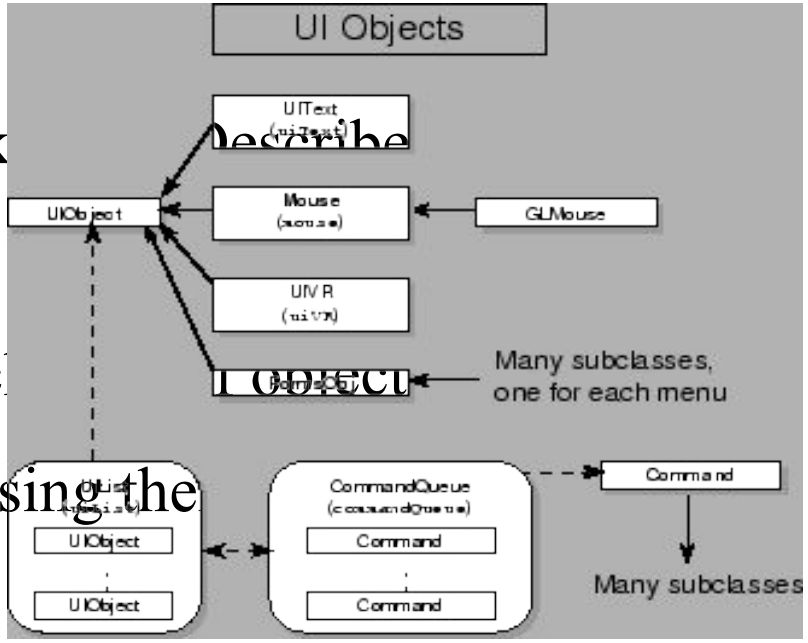
A mental model is an internal representation of a person's current conceptualization and understanding of something: themselves, other people, the environment, and the thing with which they interact.

Performing a Task Analysis

- Task analysis involves breaking down the user's activities to the individual task level. The goal is to obtain an understanding of why and how people currently do the things that will be automated.
- Task analysis also provides information concerning workflows; the interrelationships between people, objects, and actions; and the user's conceptual frameworks. The output of a task analysis is a complete description of all user tasks and interactions.
- Work activities are studied and/or described by users using the techniques just reviewed: direct observation, interviews, questionnaires, or obtaining measurements of actual current system usage.

Defining Objects

- Determine all objects that have to be manipulated to get work
  - The objects used in tasks.
  - Object behaviour and characteristics that differentiate eac
  - The relationship of objects to each other and the people using the
    - The actions performed.
    - The objects to which actions apply.
  - Information or attributes that each object in the task must preserve, display, or allow to be edited.
  - Identify the objects and actions that appear most often in the workflow.
  - Make the several most important objects very obvious and easy to manipulate.



Developing Metaphors

- Choose the analogy that works best for each object and its actions.
- Use real-world metaphors.
- Use simple metaphors.
- Use common metaphors.
- Multiple metaphors may coexist.
- Use major metaphors, even if you can’t exactly replicate them visually.
- Test the selected metaphors.

A metaphor is a concept where one’s body of knowledge about one thing is used to understand something else.

Metaphors act as building blocks of a system, aiding understanding of how a system works and is organized.

The User’s New Mental Model

When the system is implemented, and a person interacts with the new system and its interface, an attempt will be made by the person to understand the system based upon the existing mental model brought to the interaction.

Value of Standards and Guidelines

Developing and applying design standards or guidelines achieves design consistency. This is valuable to users because the standards and guidelines

- Allow faster performance.
- Reduce errors.
- Reduce training time.
- Foster better system utilization.
- Improve satisfaction.
- Improve system acceptance.
- Reduce development and support costs.

They are valuable to system developers because they

- Increase visibility of the human-computer interface.
- Simplify design.
- Provide more programming and design aids, reducing programming time.
- Reduce redundant effort.
- Provide a benchmark for quality control testing.

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User Interface Standards

Several ISO standards now exist for human-computer interaction and usability. They are as follows:

- ISO 9241: Ergonomic requirements for office work with visual display terminals.
- ISO 14915: Software ergonomics for multimedia user interfaces.
- ISO 13407: Human-centered design processes for interactive systems.
- ISO/CD 20282: Ease of operation of everyday products.

Web Guidelines and Style Guides

Web interface design issues have also unleashed a plethora of Web-specific design guidelines and style guides, many of which are found on the Web itself.

Customized Style Guides

A customized style guide can also be created for an organization or system to be developed. In creating such a document

- Include checklists to present principles and guidelines.
- Provide a rationale for why the particular guidelines should be used.
- Provide a rationale describing the conditions under which various design alternatives are appropriate.
- Include concrete examples of correct design.
- Design the guideline document following recognized principles for good document design.
- Provide good access mechanisms such as a thorough index, a table of contents, glossaries, and checklists.

Checklists and rationale.
Checklists permit ease in scanning, ease in referring to key points, and make a document more readable by breaking up long sequences of text.
Concrete examples. To be effective, a guideline must include many concrete examples of correct design. Imitation is often a way people learn.
Document design and access. Always design the document, be it paper or electronic, by following recognized principles for good document design.

Design Support and Implementation

■ Use all available reference sources in creating the guidelines.

■ Use development and implementation tools that support the guidelines.

■ Begin applying the guidelines immediately.

Available Reference Sources. Use all the available reference design sources in creating guidelines. Example-Apple, IBM, Microsoft, and Sun Microsystems.

Tools. Use tools that support implementation of the guidelines that are established

Applying the Guidelines. Two questions often asked are, “Is it too late to develop and implement standards?” and, “What will be the impact on systems and screens now being used?”