Module-2

User Interface Design Process (UIDP)

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Obstacles in the Development Path

- Nobody ever gets it right the first time
- Development is chock-full of surprises.
- Good design requires living in a sea of changes.
- Even if you have made the best system humanly possible, people will still
- make mistakes when using it.
- Designers need good tools.
- You must have behavioral design goals like performance design goals.

Common Pitfalls

- No early analysis and understanding of the user's needs and expectations.
- Little or no creation of design element prototypes.
- No usability testing.
- No common design team vision of user interface design goals
- Poor communication between members of the development

Usability and Usability Testing

- Definition: “The capability to be used by humans easily and effectively, where
  - Easily = to a specified level of subjective assessment
  - Effectively = to a specified level of human performance
- Usability testing is the practice of testing how easy a design is to use on a group of representative users

Human Characteristics in Design-1

- **Perception** - awareness and understanding of the elements and objects of our environment through the physical sensation of our various senses, including sight, sound, smell, and so forth. Perception is influenced, in part, by experience.
- **Memory** - is the faculty of the brain by which data or information is encoded, stored, and retrieved when needed.
  - Two components: **long-term** and **short-term** (or working) memory.
- **Sensory Storage** - is the buffer where the automatic processing of information collected from our senses takes place.
- **Visual Activity** - The capacity of the eye to resolve details is called visual activity.
- **Mental Model** - is simply an internal representation of a person's current understanding of something.

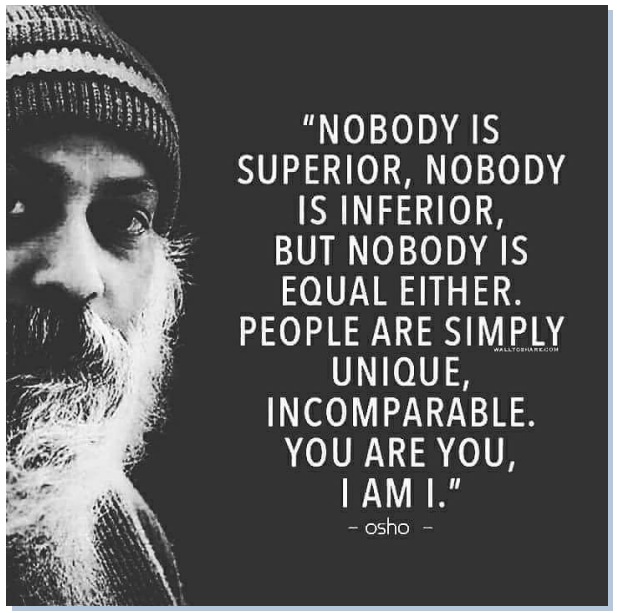
Human Characteristics in Design-2

- **Performance Load** - The effort to perform a task
  - **Cognitive load** is the amount of mental activity required to perform a task or achieve an objective.
  - **Kinematic load** is the degree of physical activity or effort necessary to perform a task or achieve an objective.

To Reduce Cognitive load	To Reduce Kinematic load
• Eliminating noise or unnecessary information from screens. • Properly formatting and grouping information. • Providing aids to allow the user to rely on powers of recognition, not recall. • Automating tasks that require extensive memory.	• Minimizing the number of steps to accomplish tasks. • Minimizing control actions and movements. • Automating repetitive tasks.

Human Characteristics in Design-3

- Individual Differences
  - Task Completion Speed
    - Text Editing
    - Information Search
    - Web Use
    - Programming



Human Considerations in the Design of Business Systems-1

KNOWLEDGE/EXPERIENCE	
Computer Literacy	Highly technical or experienced, moderate computer experience, or none.
System Experience	High, moderate, or low knowledge of a particular system and its methods of interaction.
Application Experience	High, moderate, or low knowledge of similar systems.
Task Experience	Level of knowledge of job and job tasks.
Other Systems Use	Frequent or infrequent use of other systems in doing job.
Education	High school, college, or advanced degree.
Reading Level	Less than 5th grade, 5th–12th, more than 12th grade.
Typing Skill	Expert (135 WPM), skilled (90 WPM), good (55 WPM), average (40 WPM), or "hunt and peck" (10 WPM).
Native Language or Culture	English, another, or several.

Human Considerations in the Design of Business Systems-2

JOB/TASK/NEED	
Type of System Use	Mandatory or discretionary use of the system.
Frequency of Use	Continual, frequent, occasional, or once-in-a-lifetime use of system.
Task or Need Importance	High, moderate, or low importance of the task being performed.
Task Structure	Repetitiveness or predictability of tasks being automated, high, moderate, or low.
Social Interactions	Verbal communication with another person required or not required.
Primary Training	Extensive or formal training, self-training through manuals, or no training.
Turnover Rate	High, moderate, or low turnover rate for jobholders.
Job Category	Executive, manager, professional, secretary, clerk.
Lifestyle	For Web e-commerce systems, includes hobbies, recreational pursuits, and economic status.

Human Considerations in the Design of Business Systems-3

PSYCHOLOGICAL CHARACTERISTICS	
Attitude	Positive, neutral, or negative feeling toward job or system.
Motivation	Low, moderate, or high due to interest or fear.
Patience	Patience or impatience expected in accomplishing goal.
Expectations	Kinds and reasonableness.
Stress Level	High, some, or no stress generally resulting from task performance.
Cognitive Style	Verbal or spatial, analytic or intuitive, concrete or abstract.
PHYSICAL CHARACTERISTICS	
Age	Young, middle aged, or elderly.
Gender	Male or female.
Handedness	Left, right, or ambidextrous.
Disabilities	Blind, defective vision, deafness, motor handicap.

Human Interaction Speeds

READING	
Prose text:	250–300 words per minute.
Proofreading text on paper:	200 words per minute.
Proofreading text on a monitor:	180 words per minute.
Listening:	150–160 words per minute.
Speaking to a computer:	105 words per minute.
After recognition corrections:	25 words per minute.
KEYING: TYPEWRITER	
Fast typist:	150 words per minute and higher.
Average typist:	60–70 words per minute.
COMPUTER	
Transcription:	33 words per minute.
Composition:	19 words per minute.
TWO FINGER TYPISTS	
Memorized text:	37 words per minute.
Copying text:	27 words per minute.
HAND PRINTING	
Memorized text:	31 words per minute.
Copying text:	22 words per minute.

Business Definition and Requirements Analysis-1

- The objective of this phase is to establish **the need for a system**. A requirement is an objective that must be met. A product description is developed and refined, based on input from users, marketing, or other interested parties.
- Before beginning the analysis, the developer should be **aware of the policies** and work culture of the organization being studied. He or she should also be familiar with any current system or process the new system is intended to supplement or replace.
- Two Methods
  - **Direct Methods**
  - **Indirect Methods**

Business Definition and Requirements Analysis-2

DIRECT METHODS
Individual Face-to-Face Interview • A one-on-one visit with the user to obtain inform somewhat open-ended.
Telephone Interview or Survey • A structured interview conducted via telephone.
Traditional Focus Group • A small group of users and a moderator brought requirements.
Facilitated Team Workshop • A facilitated, structured workshop held with user information. Similar to the Traditional Focus Grou
Observational Field Study • Users are observed and monitored for an extend
Requirements Prototyping • A demo, or very early prototype, is presented to u functionality.
User-Interface Prototyping • A demo, or early prototype, is presented to users and problems.
Usability Laboratory Testing • Users at work are observed, evaluated, and meas laboratory.
Card Sorting for Web Sites • A technique to establish groupings of informatio

INDIRECT METHODS
MIS Intermediary • A company representative defines the user's goals a developers.
Paper Survey or Questionnaire • A survey or questionnaire is administered to a sampl methods to obtain their needs.
Electronic Survey or Questionnaire • A survey or questionnaire is administered to a sampl Web to obtain their needs.
Electronic Focus Group • A small group of users and a moderator discuss the workstations.
Marketing and Sales • Company representatives who regularly meet custon needs, current and potential.
Support Line • Information collected by the unit that helps custome analyzed (Customer Support, Technical Support, Hel
E-Mail or Bulletin Board • Problems, questions, and suggestions from users po through e-mail are analyzed.
User Group • Improvements are suggested by customer groups wh discuss software usage.
Competitor Analyses • A review of competitor's products or Web sites is use design requirements and identify tasks.

Design Standards or Style Guides-1

- A design standard or style guide documents an agreed-upon way of doing something.
- In interface design it describes the appearance and behavior of the interface and provides some guidance on the proper use of system components.
- It also defines the interface principles, rules, guidelines, and conventions that must be followed in detailed design.
- In some instances, federal laws may require the application of specific design principles.

Design Standards or Style Guides-2

- Value of Standards and Guidelines - This is **valuable to users** because the standards and guidelines,
  - Allow faster performance.
  - Reduce errors.
  - Reduce training time.
  - Better system utilization.
  - Improve satisfaction (UX).
  - Improve system acceptance.
  - Reduce development and support costs.

Design Standards or Style Guides-3

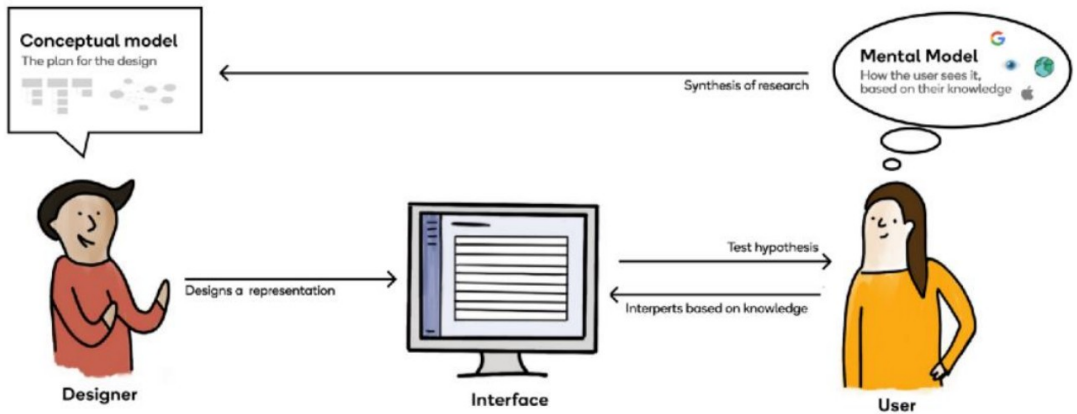
- They are **valuable to system developers** because they
  - Increase visibility of the human-computer interface.
  - Simplify design.
  - Provide more programming and design aids, reducing programming time.
  - Reduce redundant effort.
  - Reduce training time.
  - Provide a benchmark for quality control testing.

Design Standards or Style Guides-4

- **Commercial Style Guides**
  - Apple Human Interface Guidelines for the Macintosh
    - https://developer.apple.com/design/human-interface-guidelines/
  - IBM Ease of Use Web site
    - https://www.ibm.com/design/language/
  - Microsoft Windows User Interface Guidelines
    - https://docs.microsoft.com/en-us/windows/win32/uxguide/designprinciples
  - Oracle Java Look and Feel Design Guidelines
    - https://www.oracle.com/java/technologies/jpl1-building-userinterface.html

Conceptual Model Design

- **Guidelines for Designing Conceptual Models**
  - Reflect the user's mental model, not the designer's.
  - Comply with expectancies, habits, routines, and stereotypes.
  - Provide action-response compatibility.
  - Make invisible parts and processes of a system visible.
  - Provide proper and correct feedback.
  - Avoid anything unnecessary or irrelevant.
  - Provide design consistency.
  - Provide documentation and a help system that will reinforce the conceptual mod



Reference

- Galitz, Wilbert O. The essential guide to user interface design: an introduction to GUI design principles and techniques. John Wiley & Sons, 2007.