

1) State the obstacles and pitfalls faced in UID?**Ans)**

- The development path of a computer system is littered with obstacles and traps, many of them human in nature.
- Gould (1988) has made these general observations about design:
 - Nobody ever gets it right the first time.
 - Development is chock-full of surprises.
 - Good design requires living in a sea of changes.
 - Making contracts to ignore change will never eliminate the need for change.
 - Even if you have made the best system humanly possible, people will still make mistakes when using it.
 - Designers need good tools.
- The first five conditions listed will occur naturally because people are people, both as users and as developers.
- User mistakes that always occur can be reduced.
- Pitfalls in the design process exist because of a flawed design process.
- Common pitfalls are:
 - 1) No early analysis and understanding of the user's needs and expectations.
 - 2) A focus on using design features or components that are "neat" or "glitzy."
 - 3) Little or no creation of design element prototypes.
 - 4) No usability testing.
 - 5) Poor communication between members of the development team.

2) How obstacles and pitfalls faced in UID can be eliminated by the designers?**OR****Explain the five commandments in designing for the people.****Ans)****1) Gain a complete understanding of users and their tasks:**

- The users are the customers.
- Today, people expect a level of design sophistication from all interfaces, including Web sites.
- The product must be geared to people's needs, not those of the developers.
- A wide gap in technical abilities, goals, and attitudes often exists between users and developers.

2) Solicit early and ongoing user involvement:

- Involving the users in design from the beginning provides us knowledge about their jobs, tasks, and needs.
- People dislike change for a variety of reasons like fear of the unknown and lack of identification with the system.
- User involvement should be based on job or task knowledge, not status or position.
- The boss seldom knows what is really happening out in the office.

3) Perform rapid prototyping and testing:

- Prototyping and testing the product will quickly identify problems and allow you to develop solutions.
- Prototyping and testing must be continually performed during all stages of development.
- Encountering a series of problems early in system use will create a negative first impression in the customer's mind.
- It is also much harder and costlier to fix a product after its release.

4) Modify and iterate the design as much as necessary:

- Design proceeds through a series of stages.
- Problems detected in one stage may force the developer to revisit a previous stage.
- This is normal and should be expected.
- Continuous testing and modifying should be done until all design goals are met.

5) Integrate the design of all the system components:

- The software, the documentation, the help function and training needs are all important elements of a graphical system.
- A system is being constructed, not simply a software.
- All the possible problems earlier in the design must be addressed more effectively.

3) List the common usability problems.

Ans)

Common Usability problems:

1. Ambiguous menus and icons.
2. Languages that permit only single-direction movement through a system.
3. Input and direct manipulation limits.
4. Highlighting and selection limitations.
5. Unclear step sequences.
6. More steps to manage the interface than to perform tasks.
7. Complex linkage between and within applications.
8. Inadequate feedback and confirmation.
9. Lack of system anticipation and intelligence.
10. Inadequate error messages, help, tutorials and documentation

4) Explain the Web usability problems.

Ans)

1) Visual clutter:

- A lack of "white space," meaningless graphics, and unnecessary and wasteful decoration often turn pages into jungles of visual noise.
- Useless displayed elements are actually a form of visual noise.

2) Impaired information readability:

- Page readability is diminished by poor developer choices in colors and graphics.
- A person's attention is directed towards trying to understand why the differences exist, instead of being focused toward identifying and understanding the page's content.
- Backgrounds that are brightly colored or contain pictures or patterns greatly reduce the importance of the overwritten text.

3) Incomprehensible components:

- Some design elements do not give the user any clue about their function.
- Some icons and graphics do not contain text to explain what they do.
- Command buttons or areas that are clickable often won't be clicked.
- Language is also often confusing, with the developer's terminology being used, not that of the user.

4) Annoying distractions:

- Elements constantly in motion, scrolling marquees or text, blinking text, or looping continually running animations compete with meaningful content for the user's eye's and attention and destroy a page's readability.
- Automatically presented music or other sounds interrupt one's concentration.
- Non-requested pop-up windows must be removed. That wastes more of the user's time.

5) Confusing navigation:

- Poor, little or no organization exists among pages.
- The size and depth of many Web sites can eventually lead to a "lost in space" feeling as perceived site structure evaporates as one navigates.
- Navigation links lead to dead-ends from which there is no return, or boomerang you right back to the spot where you are standing without you being aware of it.
- Some navigation elements are invisible.
- Confusing navigation violates expectations and results in disturbing unexpected behavior.

6) Inefficient navigation:

- A person must transverse content-free pages to find what is meaningful.
- Large graphics waste screen space and add to the page count.
- The path through the navigation maze is often long and tedious.
- Massive use of short pages with little content often creates the feeling that one is "link drunk."

7) Inefficient operations:

- Time is wasted doing many things.
- Page download times can be excessive.
- Pages that contain, for example, large graphics and maps, large chunky headings, or many colors, take longer to download than text.

8) Excessive or inefficient page scrolling:

- Long pages requiring scrolling frequently lead to the user's losing context as related information's spatial proximity increases and some information entirely disappears from view and, therefore, from memory.
- Out of sight is often out of mind.
- If navigation elements and important content are hidden below the page top, they may be missed entirely.
- To scroll to do something important or complete a task can be very annoying.

9) Information overload:

- Poorly organized or large amounts of information taxes one's memory and can be overwhelming.
- Heavy mental loads can result from making decisions concerning which links to follow and which to abandon, given the large number of choices available.
- One easily becomes buried in decisions and information.
- Requiring even minimal amounts of learning to use a Web site adds to the mental load.

10) Design inconsistency:

- The business system user may visit a handful of systems in one day, the Web user may visit dozens, or many more.
- It is expected that site differences will and must exist because each Web site owner strives for its own identity.
- For the user's sake, some consistency must exist to permit a seamless flow between sites.
- When users are forced to remember different color meanings in different places, it causes confusion between links and underlined text.
- The Web is a form of the graphical user interface, and GUI guidelines should be followed.

11) Outdated information:

- A Web site should be "current."
- Outdated information destroys a site's credibility in the minds of many users.
- If that happens then useless site is not very usable.

12) Stale design caused by emulation of printed documents and past systems:

- The Web is a new medium with expanded user interaction and information display possibilities.
- Websites should be rethought and redesigned using the most appropriate and robust design techniques available.
- Developers often have created a product to please themselves and "look cool," not to please their users.

5) Mention the importance of usability with its measures.

Ans)

Importance of Usability:

- It supports users in completing actions accurately.
- It is more efficient.
- It makes users to use pleasantly.
- It supports a range of user actions and only shows an error in genuine erroneous situations.
- It makes new users accomplish goals easily.

Some Practical Measures of Usability:

- Are people asking a lot of questions or often reaching for a manual?
- Are frequent exasperation responses heard?
- Are there many irrelevant actions being performed?
- Are there many things to ignore?
- Do a number of people want to use the product?

Some Objective Measures of Usability:

- How effective is the interface?
- How learnable is the interface?
- How flexible is the interface?

6) Discuss the impact of human characteristics in design.

Ans)

1) Perception

- Perception is our 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 partly by experience.
- Other perceptual characteristics include the following:
 - a) Proximity
 - b) Similarity
 - c) Matching patterns
 - d) Succinctness
 - e) Closure
 - f) Contest
 - f) Unity
 - g) Continuity
 - h) Balance
 - i) Expectancy
 - k) Signals versus noise

2) Memory:

- Memory is viewed as consisting of two components: long-term and short-term memory.
- Short-term memory receives information from either the senses or long-term memory.
- Long-term memory contains the knowledge we possess.

3) Sensory Storage:

- Sensory storage is the buffer where the automatic processing of information collected from our senses takes place.
- It constantly scans the environment for things that are important to pass on to higher memory.
- Design the interface so that all aspects and elements serve a definite purpose.

4) Visual Acuity:

- Capacity of the eye to resolve details is called visual acuity.
- Phenomenon that results in an object becoming more distinct as we turn our eyes towards it and rapidly losing distinctness as we turn our eyes away from it.

5) Foveal and Peripheral Vision:

- Foveal vision is used to focus directly on something.
- Peripheral vision senses anything in the area surrounding the location we are looking at, but what is there cannot be clearly resolved because of the limitations in visual acuity.

6) Information Processing:

- The information that our senses collect has to be processed in some meaningful way.
- There are two levels - High level and Low level.
- Higher level performs reasoning and problem solving.
- Lower level perceives the physical form of information sensed.

7) Mental Models:

- A mental model is an internal representation of a person's current understanding of something.
- The key to forming this is design consistency and design standards.

8) Movement Control:

- Once data has been perceived and an appropriate action decided upon, a response must be made.
- In many cases the response is a movement.

- Big buttons are better than small buttons. They provide a larger target for the user to access with the screen pointer.

9) Learning:

- Learning is the process of encoding in long-term memory information that is contained in short-term memory.
- Our ability to learn clearly differentiates people from machines.

10) Skill:

- Goal of human performance is to perform skillfully.
- It requires linking inputs and responses into a sequence of action.
- System and screen design must permit development of increasingly skillful performance.

11) Individual Differences:

- An advantageous human characteristic is that we all differ in looks, feelings, motor abilities, intellectual abilities, learning abilities and speed, and so on.
- Design must provide for the needs of all potential users.

7) Explain briefly about human interaction speeds.

Ans)

Reading:

Prose text:	250–300 words per minute.
Proof reading text on paper:	200 words per minute.
Proof reading 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.

8) Explain the techniques for determining the user requirements using Direct Method.

Ans)

1. Individual Face-to-Face Interview:

- A one-on-one visit is held with the user.
- It may be structured or somewhat open-ended.
- Formal questionnaire should not be used.

2. Telephone Interview or Survey:

- Interview conducted using the telephone.
- It must be structured and well planned.
- Telephone interviews are less expensive than personal interviews.

3. Traditional Focus Group:

- Small group of users (8 to 12) and a moderator brought together to discuss the requirements.
- Session lasts for about two hours.
- Purpose - Understand user's experiences, attitudes, beliefs and desires and obtain their reactions to ideas.

4. Facilitated Team Workshop:

- Similar in structure and content to a traditional focus group.
- Less formal.

5. Observational Field Study:

- Users are observed and monitored for an extended time to learn what they do.
- It can be time-consuming and expensive.

6. Requirements Prototyping:

- A demo, or very early prototype, is presented to users for comments concerning functionality.

7. User-Interface Prototyping:

- A demo, or early prototype, is presented to users to understand user-interface issues and problems.

8. Usability Laboratory Testing:

- Users at work are observed, evaluated and measured in a specially constructed laboratory.
- Usability tests discovers what people actually do.

9. Card Sorting for Web Sites:

- A technique to establish groupings of information for Web sites.

9) Explain the guidelines for designing conceptual model.

Ans)

1) Reflect the user's mental model, not the designer's:

- A user will have different expectations and levels of knowledge than the designer.
- The user is concerned with the task to be performed, the business objectives that must be fulfilled.

2) Draw physical analogies or present metaphors:

- Replicate what is familiar and well known.
- A metaphor must be widely applicable within an interface, to be effective.

3) Comply with expectancies, habits, routines and stereotypes:

- Use familiar associations, avoiding the new and unfamiliar.
- Use words and symbols in their customary ways.

4) Provide action-response compatibility:

- All system responses should be compatible with the actions that elicit them.
- For example, Names of commands should reflect the actions that will occur.

5) Make invisible parts and process of a system visible:

- New users of a system often make erroneous or incomplete assumptions about what is invisible and develop a faulty mental model.
- As more experience is gained, their mental models evolve to become more accurate and complete.

6) Provide proper and correct feedback:

- Be generous in providing feedback.
- Keep a person informed of what is happening, and what has happened, at all times.

7) Avoid anything unnecessary or irrelevant:

- Never display irrelevant information on the screen.
- People may try to interpret it and integrate it into their mental models, thereby creating a false one.

8) Provide design consistency:

- Design consistency reduces the number of concepts to be learned.
- If an occasional inconsistency cannot be avoided, explain it to the user.

9) Provide documentation and a help system that will reinforce the conceptual model:

- Do not rely on the people to uncover consistencies and metaphors themselves.
- The help system should offer advice to improve mental models.

10) Promote the development of both novice and expert mental models:

- Novices and experts are likely to bring to bear different mental models when using a system.

10) Write a note on guidelines that must be followed during detailed interface design that are valuable for users and developers.

Ans)

Valuable to users because they:

- Allow faster performance.
- Reduce errors.
- Reduce training time.
- Provides better system utilization.
- Improve satisfaction.
- Improve system acceptance.

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.

11) Explain techniques for determining requirements using indirect method.

Ans)

1. MIS Intermediary:

- A company representative who defines the user's goals and needs to designers and developers.
- Too often this person does not have the breadth of knowledge needed to satisfy all design requirements.

2. Paper Survey or Questionnaire:

- A paper questionnaire given to a sample of users to obtain their needs.
- They may take a long time to collect and may be difficult to analyze.

3. Electronic Survey or Questionnaire:

- A questionnaire is given to a sample of users via e-mail or the Web.
- It is much faster than those distributed in a paper format.

4. Electronic Focus Group Similar:

- It is similar to a traditional focus group except but the discussion is accomplished electronically using specialized software on a workstation, e-mail or a Web site.

5. Marketing and Sales:

- Company representatives regularly meet customers, obtain their suggestions or needs.
- Business representatives have knowledge of the nature of customers, the business, and the needs that have to be met.

6. Support Line:

- Information collected by unit that helps customers with day-to-day problems.
- It is cheap.

7. E-Mail, Bulletin Boards or Guest Book:

- Problems, questions and suggestions by users posted to a bulletin board, a guest book, or through e-mail are gathered and evaluated.
- It is cheap.

8. User Group:

- User groups have the potential to provide a lot of good information, if organized properly.
- They require careful planning.

9. Competitor Analysis:

- Either designers can perform this evaluation or users can be asked to perform the evaluation.

10. Trade Show:

- Customers at a trade show can be exposed to a prototype and asked for comments.

11. Other Media Analysis:

- Analyze how other media, print or broadcast, presents the process, information, or subject matter of interest.

12. System Testing:

- New requirements and feedback can be accumulated, evaluated, and implemented as necessary