UNIT 3

Understanding the Principles of Good Interface and Screen design

Objectives:

- The different human factors to be considered in the Screen Design.
- The various technical issues to be considered for Screen Design.

Contents:

1.0 Introduction

A good interface and screen design are based on some guiding principles. A good interface design shows the **capabilities, needs**, and **tasks of its users**. It should also be developed considering the **physical constraints of the hardware**. The design should use the **software capabilities** effectively and finally achieve the **business objectives** for which it is designed**.**

There are some general **design guidelines** that primarily deal with user considerations as given below:

- A test for a good design
- Organizing screen elements.
- Screen navigation and flow.
- Visually pleasing composition.
- Typography.
- Keying procedures.

- Data output.
- Web sites and Web pages.

The topic of Understanding the principles of Good Interface and Screen Design is discussed in two sections. In the **first section**, we study the **screen design issues considering various human factors.** The **second section** discusses the **technological considerations in interface design**. In the first section, we study how the user uses the screen and what are his requirements, screen, and web page meaning, and their purpose, testing method for a good design, and other related issues like the organization of the elements clearly and meaningfully, presentation of the information in a simple and meaningful way, design guidelines for web pages and small screens.

The second section deals with Graphical Systems and Web Systems.

2.0 Human Considerations in Interface and Screen Design

Many factors related to the screen design affect the use of a screen or Web page as listed below:

- The amount of information presented on the screen.
- The organization of information.
- The language used to communicate with the user.
- The methods of displaying the components and the use of aesthetics.
- Consistency of a screen or page with other screens or pages.

2.1 How to Distract the User

2.1.1 Aspects of the poor design affecting the user

According to Barnett (1993, 2005), the following were the list of poor design issues which affected the use of paper forms. These are thought to be affecting the electronic forms and web pages too.

- Unclear captions and badly worded questions – may cause rereading and can
  - be interpreted incorrectly.
- Improper type and graphic emphasis – may lead to the hiding of important
  - information.

- Misleading headings - may create confusion about the content.
- Cluttered and cramped layout – may create a bad initial impact and leads to more errors.
- Poor quality of presentation, legibility, appearance, and arrangement reduces user performance.

According to Howlett (1995), the most common problems in the visual interface design are:

- Visual inconsistency in screen detail presentation and with the operating system.
- Overuse of design features and elements.
- Overuse of three-dimensional presentations.
- Overuse of too many bright colors.
- Poorly designed icons
- Bad typography

According to Nielsen (2005e), there were some design mistakes found when users submitted the Alert Box which are listed below:

- There were legibility problems when font sizes were small and there was poor contrast between text and backgrounds.
- Presentation of links in a non-standard way created confusion.
- Flash usage was found to be annoying.
- Navigation and searching were poor.
- Forms were cumbersome to fill.

Other distractions affecting Web Page users are as below:

- Too many auditory and visual interruptions.
- Too much visual clutter.
- Poor information readability and clarity.
- Screen components are not understandable.
- Confusing and inefficient navigation.
- Excessive or inefficient page scrolling.
- Too much information or outdated information.

- Old design copied from the paged forms.

2.2 What users want

The response of the people, when enquired about their requirements from a screen, are as given below:

- The appearance should be clean, clutter-free, and orderly.
- There should be a proper one-to-one mapping between the elements and their function.
- Information should be located where expected.
- There should be a clear indication of the relationships between elements.
- The language used should be plain, simple English.
- The method of finding things in a system should be simple.
- There should be a clear indication before making any permanent changes.

2.3 What users do

The user performs the following tasks when interacting with a computer:

- Identification of a task to be performed.
- Making a decision on a method to complete a task.
- Changing the computer's controls as required.
- Collecting useful data and ignoring meaningless data.
- Judging whether the decisions were relevant or not.

2.4 Goals of Interface Design

For an easy and pleasant experience for the user, an interface should be designed so that their visual, intellectual, memory, and motor work is reduced and also instructions imposed by the technology are minimized or eliminated.

2.5 Test for a Good Design

The best test to identify a good design is to check **whether all screen elements like the field captions, data, title, headings, text, and information, types of controls, navigation elements,** can be identified **without reading the words** that identify them.

2.6 Screen Meaning and Purpose

Every screen element, text, organization, color, graphic, message, animation, and all forms of feedback should have a meaning and a function.

The useful information on the screen is known as a signal and the information on the screen without a purpose is called noise.

2.7 Organizing Visual elements

A **good design** is where there is **visual clarity**. Here the display elements are presented in a meaningful, recognizable, and understandable way.

Visual clarity is affected by several factors as given below:

- There should be consistency in design
- The composition of the elements should be visually pleasing.
- There should be a logical and sequential ordering of the elements.
- The right amount of information should be presented with groupings and proper alignment avoiding visual clutter.

2.8 Consistency

Consistency in any component design is as important as it is required for a person in his attitudes, thoughts, and beliefs.

Studies by Koyani et al., 2004 found that consistency has the following benefits:

- It leads to a reduction in task completion and learning times
- It gives an increase in user satisfaction.
- It also aids learning.
- It establishes expectations and allows a person to use conceptual learning and transfer training.
- It enables the user to easily find the location of screen elements.

Inconsistency in a screen design will result in following limitations:

- It forces the user to memorize, and remember, a number of different ways to do something or understand what is presented on the screen.
- It makes it difficult for a complete structure to emerge.

- It can also be distracting and confusing.
- It also creates a screen variation that makes it difficult to notice another variation that may be important for a person's task or need.

NOTE: In Web site design consistency greatly enhances visual scanning which is a frequent user activity and provides stability and reduces navigation confusion.

2.9 Starting Point

A person scans an array of information based on the composition of a display and how it has been learnt.

Screen designs generally provide a **starting point** in the **screen's upper-left corner**.

To focus the user's attention the following design methods are followed in respect of the display components:

2.9.1 Textual Display

Studies by Streveler and Wasserman (1984) found that visual targets located in the upper-left quadrant of a screen were found the fastest and those located in the lower-right quadrant took the longest to find. This is due to the habit formed from reading text.

2.9.2 Graphical and Web Displays

Graphical displays change a person's scanning behavior due to the visual cues like color, depth, form, and the movement they provide.

Studies in this regard have found the following observations:

- People do take advantage of visual details such as white space or components that stand out conspicuously from other components.
- People tend to look at text first, not images.
- Larger type dominates over the smaller type and when they are of the same size text is more easily observed. So to become an entry point, images must be much larger than text.
- Changing information is looked at before non-changing information.
- Eye tracking studies indicate that in information-based sites people tend to look first at text, not images, by a margin of nearly two to one.

Regarding the user reading a web page, studies have found the following:

- People often read Web pages in an F-shaped pattern: two horizontal stripes followed by a vertical stripe.
- Also reading/scanning pattern is comprised of these three components:
  - People first look horizontally, across the upper part of the content area.
  - Then they scan the content's left side in a vertical movement.
  - Scan speeds can vary.
  - Sometimes the scan pattern can resemble an upside-down L or an E

2.10 Ordering of data or content

In a web page design, in order to retain the user's short-term memory, the number of information elements on a screen has to be kept to a minimum. Also to lower memory requirements, a logical, meaningful, and sensible arrangement of screen data and content is required. The content ordering on a web page should be completely based on the importance of information.

General schemes of ordering information are as given below:

- Divide the information into logical, meaningful, and sensible units.
- Organize this information according to its relationship with the data.
- Order the screen components with the user's priority and needs as given below:
  - Sequence of use.
  - Frequency of use.
  - Function.
  - Importance.
  - General to specific.
- Any information that needs to be compared is visible at the same time.
- Only needed information is visible on the screen.

2.10.1 Ordering Web Pages:

Research conducted by Koyani et al. (2004) gives us a list of content ordering guidelines for web pages as below:

- A level of importance for the content should be established.

- The critical information should be placed near the top of the Web site.
- The important items should be placed at the top of a page and consistently.
- Information should be organized clearly and the scheme should facilitate scanning.
- For an easy comparison, information should be structured.

2.11 Navigation and Flow

Navigation is basically guiding the eye to scan the content on the screen. This can be best done by grouping and aligning screen controls and appropriately using border lines. A person's attention should be directed to the elements in the order of their importance focusing the attention using different display schemes. The tab order should follow a logical order of information and the command buttons should be located at the end of the tab order.

The screen navigation scheme should consider the following points:

- The ordering of screen information and elements should be rhythmic, guiding a person's eye through the display. It should encourage natural movement sequences and minimize pointer and eye movement distances.
- The most important and frequently used elements or controls should be located at the top left.
- The flow should be maintained from top-to-bottom and left to right.
- Attention should be sequentially directed in the order based on the information being,
  - Critical
  - Important
  - Secondary
  - Peripheral

2.12 Visually Pleasing Composition

Research studies indicate that during the scanning of a display in a clockwise direction, a person's visualization is affected by the following factors:

- The symmetrical balance and weight of the titles of the display
- Text content of the display

Also when exposed to uncertainty, the perceptual mechanism in a person needs some order and meaning. When a cluttered screen is presented, a person needs some time to understand.

The following qualities are needed in a screen display for it to be pleasing:

- **Balance** – This can be provided by an equal weight of the screen elements on the left and right, top, and bottom of the screen.

  Figure 3.1 shows a balance Vs instability of elements on a screen.
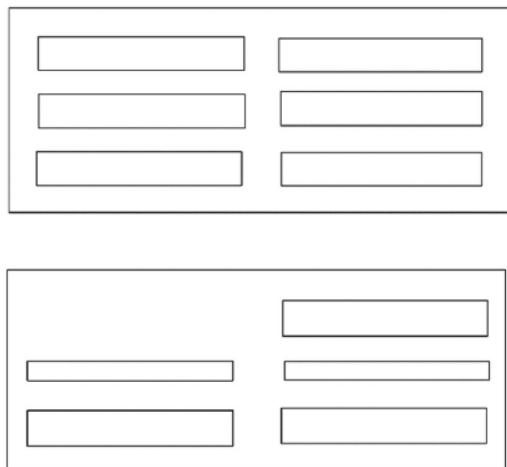
Figure 3.1: Balance (Versus instability)

- **Symmetry** – Can be done by replicating elements left and right of the screen centerline.

Figure 3.2 shows a non-symmetry Vs symmetry of elements on a screen.

- **Regularity** – The horizontal and vertical alignment points should be consistently spaced and element sizes, shapes, colors, and spacing should be similar.

- **Predictability** – This can be established by following some conventional order or arrangements of the elements.

- **Sequentiality** – The screen elements should be arranged in an obvious, logical, rhythmic, and efficient manner to guide the eye through the screen.
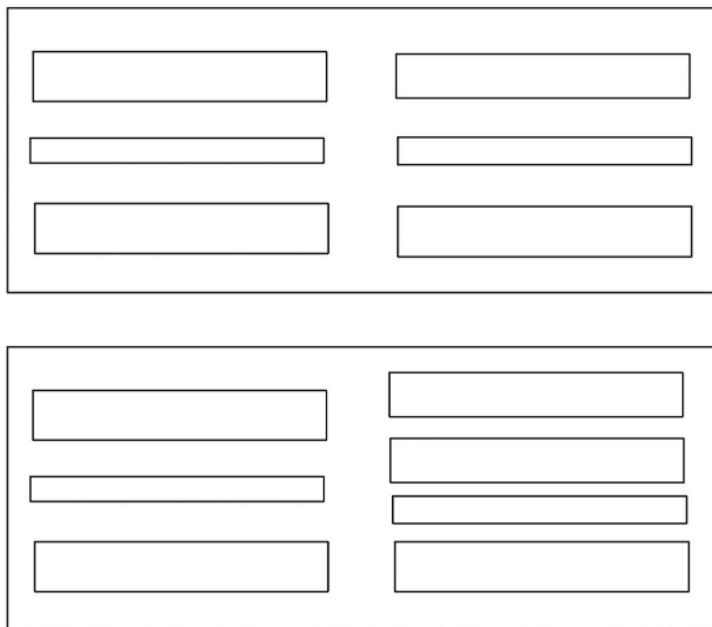
Figure 3.2: Non-symmetry Vs. Symmetry of Elements

- **Economy** – To get the message on the screen easily, usage of fewer font styles and colors can be used.

- **Proportion** – This can be provided by groupings of data or text with a pleasing proportion.

- **Simplicity** – Fewer elements on the screen can make visualization simpler.

- **Groupings** – Here the functionally associated elements can be grouped and evenly spaced.

There are various guidelines for creating groupings as given below :

- Spatial groupings should have five degrees of visual angle (1.67
  - inches in diameter or about 6 to 7 lines of text, 12 to 14 characters in width).
- Allow 1/8 to 1/4 inch between each group.
- The groupings should be visually reinforced in the following ways:
  - Adequate separation should be provided between groupings using white space.
  - Line borders should be provided around groups.

- Meaningful titles should be given for each grouping

2.13 Distinctiveness

In regards to screen design, distinctiveness refers to the proper **separation of the screen elements** so that they are clearly **distinguished from each other**.

It is achieved through the following:

- There should be adequate separation between adjacent elements and screen boundaries.
- There should be enough separation between parts of an element.
- There should be enough space between the screen controls, field, and group borders.
- Also, the screen controls, field, and group borders should not touch the window borders.
- The buttons and their labels should not touch window borders or each other.
- The colors and shades of the adjacent screen elements should contrast well with one another.

2.14 Focus and Emphasis

Drawing the attention of the users to the **important part of the screen** is a vital consideration of the screen design and this can be done by applying a visual emphasis technique.

The components on the screen which should be given importance are:

- Critical elements
- Changing elements
- Prominent elements

In this regard, Olsen (2002) in his research found that **abrupt environmental changes (or edges)** such as **color changes** capture a **person's attention**.

Wu and Yuan (2003) found that by **highlighting** the elements of a matrix, **comparing, and finding discrepancies** in a pair of data **becomes easier**.

Further, research by Silvers and Keiner (1997) says that **inappropriate highlighting** of text resulted in lower reading comprehension scores.

In conclusion, if visual emphasis has to be effective, it should always be used appropriately.

Visual Emphasis can be achieved by the following **techniques**:

- Using more brightness.
- Using a distinctive typeface such as Bold, Italics, and Underlining.
- Blinking an important element
- Using line rulings and surrounding boxes or frames.
- Using Colors.
- Increasing component size.
- Using animation.
- Proper positioning.
- Using a distinctive or unusual shape.
- Isolating the components from unimportant ones.
- By minimizing the screen clutter.

In regards to **web design** emphasis should be given to **new or changed content** and the **page text should not be overwhelmed by the page background.**

2.15 Conveying Depth of Levels or a Three-Dimensional Appearance

Though all the real-world objects are not visually presented in three dimensional, human beings perceive them as three-dimensional.

To foster this perception researchers Marcus (1992) and Lidwel et al., (2003) have given the following techniques:

- **Overlapping** – the relevant element should be displayed fully and the irrelevant element can be hidden beneath it.
- **Drop shadows** - in the creation of the shadows, always assume that a light source is in the upper-left corner of the screen and the shadow in the lower right corner.

- **Highlighting and lowlighting** – Attention can be captured by highlighting the elements of relevance.
- **Growing and Shrinking** - Relevant elements can be made to grow in size, while less important elements remain small or shrink.
- **Beveled or Curved edges** – curved edges around the elements like windows, and buttons can make them appear risen above the screen.
- **Texture, color, size, and clarity change** – this can highlight the relevant elements.

2.16 Presenting Information Simply and Meaningfully

To convey the information on the screen effectively, it should be well presented. In this regard, the screen designer should have the following goals in mind:

- The presentation form should be clear and simple.
- The organization of the content should be easily understandable.
- The information should be absorbed easily.
- The content should be pleasant in its tone and color.

The guidelines for presenting information on screens are as follows:

- For **information to be noticeable and distinguishable** it should be **legible**.
- For **information to be identifiable, interpretable, and attractive** it should be **readable**.
- The information should be presented in a **usable form**.
- For **attracting the attention** of users to the screen elements, **contrasting display features** can be used.
- In order to **guide the eye** to the required element, **visual lines** should be provided.

2.16.1 Typography

Typography is the art of laying out text for print or on screens for aesthetics and readability.

The textual content on the screen not only **gives information**, but the **characteristics of the text** such as the **font type, style, case, and size** can also **benefit the user** in the following ways:

- Can help **communicate the organization of screen elements**.
- Can help **identify the most important screen elements**.
- Can **provide a mood and a reading order**.

2.17 Application and Page size

This issue is more important in the design of web pages.

An application or web page can be designed to have a few long pages with a lot of scrolling to view the page content or many shorter pages with frequent movements between pages.

The main design goal is to **allow the users to move quickly and efficiently** through the pages.

2.17.1 Scrolling and Paging

These are the **two methods** used to **move or navigate** between web pages or an application:

- Scrolling – the popular navigation method used currently.
- Paging – is an older moving technique where movement between pages is through a key press.

The guidelines to be followed while scrolling and paging are as listed below:

Scrolling:

- Scrolling a page to determine its subject and contents should be avoided.
- Vertical page scrolling should be avoided.
- When vertical scrolling is necessary to view an entire page, the below guidelines should be followed:
    - Context-based colors can help while scrolling the page to view its entire contents.
    - Shorter pages can benefit the users if they are looking for specific pieces of
    - information.
    - Highlighting major page items on a page can help in faster scrolling.
    - Provide an "end of page" structure.
- Horizontal page scrolling can be avoided.

Paging:

- There can be two versions of a website created, one with paging and another with scrolling.

2.17.2 Amount of Information to present

In regards to the amount of information to be presented on the screen by the screen designers the following guidelines must be followed:

- Proper amount of information:
  - Too much information is taxing on the user to search for an element
  - Too less information makes the users remember the information on different screens.
- Present all necessary information
- Screen density – this measure gives the amount of something that is present on the screen. **The more the density**, more will be the **time taken** to find the information and **the errors** in finding them.

2.17.3 Paper versus Screen Reading

The printed material is highly readable and attractive compared to screen reading. The CRT -based characters have technical limitations and offer less resolution, so the screen reading speeds are 40% lower and error-prone.

Researchers have found out that reading on paper is always faster with 200 words per minute (wpm). 80% of the users preferred reading on paper over screen reading. So there should be a print option provided for printing the pages on a computer screen if needed.

Screen reading motor skills like scrolling, paging, etc, are found to be more exhausting than turning pages. Also, paper reading is very convenient as it can be done anywhere: in bed, near a pool, or anywhere else.

2.18   Application Screen Elements

The elements on an application screen allow the user to enter, select, delete, view, and modify the data. These elements earlier were only **rectangular boxes** and were known

as **fields**. With the introduction of **graphical systems**, various types of **objects** are used to **place information in a database.**

These **objects** are called **controls.**

The controls have two attributes:

1. A data field – an area where data or information will be keyed, selected, or displayed.
2. A descriptive caption or label - identifies the type of data contained within the field.

Controls contain other information to provide context and help in interpreting the data.

This additional information include title, headings and other instructional information as discussed below:

2.18.1 Title

An appropriate title for the web page or the application helps the user in **understanding of an application's organization** and **navigational structure.**

Title for Windows:
- Window titles must be **located at the top**.
- There should be **no title** for **windows containing messages**.
- The **purpose of the window** should be clearly described by the title
- Use **uppercase or mixed-case** font.
- It should be **spelt fully**.

Title for Web Pages:
- Web page titles must be in the **browser title bar** and on the content pages themselves.
- The **page title** should be **consistent** with the **browser bar title**.
- Titles should be:
  - **descriptive**
  - **unique and meaningfully different** from other Web pages.
  - **concise**

2.18.2 Labels

An appropriate label has the following benefits

- Efficiency of finding an item increases by 90 percent.
- Number of clicks to finish a task reduces by 25 percent.
- Fewer errors and higher user satisfaction.

2.18.3 Data Fields

Data fields should be **visually very clear** and **highlighted**. Data fields are of **three** types**:**

- Data Entry or Modifiable
- Inquiry or display/read-only
- Temporarily inactive data fields

The guidelines for their design are as given below:

- For **Data Entry or Modifiable**
  - The data should be displayed within
  - A line box or a box with a contrasting light-colored background.
  - Long structured data items should be broken into logical pieces.
- For **inquiry or display/read-only screens containing non-changeable data**
  - The data should be displayed on the normal screen background with no borders.
- For **temporarily inactive data fields**
  - The data content of the data field should be displayed with a lighter hue than active fields.
  - The background color of the entry area should not be changed.

Control Caption — Data Field Differentiation

2.18.4 Headings

As headings are used with related controls in applications, they create a common identity.

Benefits of using headings:

- Provide meaning to a section
- They create a group and a visual appeal to it.
- This helps to learn.

Benefits for Web pages:

- Are also used to break up large textual blocks
- Help in creating a visual appeal.
- Help the users find what is required.

In the organization of screen controls there are **three kinds** of headings used:

- Section Headings
- Subsection or row headings
- Field group headings

The design guidelines for these headings are as given below:

Section headings

- A meaningful heading should be given for a section to clearly describe the relationship of the grouped controls as shown in **Fig. 3.3 and Fig. 3.4**
- These headings should be located above their related screen controls.
- They should be displayed in a distinguishable font style and size in mixed case headline style.

ADDRESS

House/Apartment Name or Number:

Street Name:

City Name:

PIN Code:

Fig. 3.3 Section Heading

Fig. 3.4 Section Heading within a boundary

Subsection or row headings

- A meaningful heading should be given for a section to clearly describe the relationship of the grouped controls shown in **Fig. 3.5**
- These headings should be located to the left of the row of associated fields or Topmost row of a group of associated fields.
- These headings should be separated from the adjacent caption through the use of a greater-than signs or a filled-in arrow.
- These headings may be left- or right-aligned.
- They should be displayed in a distinguishable font style and size in mixed case headline style.

Fig. 3.5 Subsection or Row Headings

Field group headings

- A meaningful heading should be given for a section to clearly describe the relationship of the grouped controls as shown in **Fig. 3.6**
- These headings should be centered above the caption to which it applies.
- Relate it to the captions by a solid line.
- They should be displayed in a distinguishable font style and size in mixed case headline style.

Fig. 3.6 Field Group Headings

Other guidelines for screen design:

- Use special symbols where required for emphasis **(as shown in Figure 3.7)**
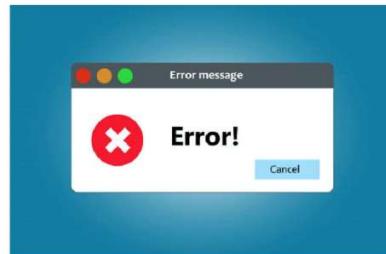

Fig. 3.7 Special Symbol for Emphasis

- Use instructions for data entry for the users **(as shown in 3.8)**

Fig. 3.8 Instructions on a Screen

- Use data field completion aids on a screen as shown in **Figure 3.9**

Date of Birth: /   /   (MM/DD/YYYY)

Fig. 3.9 Completion Aid

Lists:

- A collection of related items should be presented in a vertical list.
- Use sentence or headline-style capitalization in a consistent manner.
- Provide a heading for each list.
- The lists should be ordered in a meaningful way.
  - Arrange equal-value items alphabetically or designate each item with a bullet.
  - Important or frequently chosen items should be placed at the top of the list.
- Ordered items should be numbered.
- For easy identification and scanning, lists should be surrounded by borders, groupings, and white space.

Keying Procedures:

Many a times during large data entry in applications, lot of keying in is required. The main considerations here are:

- Minimizing keystrokes should not be the main concern of design, instead the keying rhythm and the important goals of the system should be of other factors of concern.

Keying Rules:

Following is the Keying Rules for increasing the data entry speed:

- There should be no rules or logical transformations while data is keyed in.
- Formatting of data should not be required.
- Keyed-in data should not be case-sensitive except for password entry.
- Usage of shift key should be avoided.
- Units of measurement should not be required to be keyed in.
- Double-clicking will not cause problems.

Data Output

Data outputs in a computer application or web application may be of two types:

- Reports – consist of a list of records.
- Tables – consist of a list of records derived from a database.

Reports:

Following are the guidelines for creating a report:

Report Body

- Column headings should be provided.
- Units of measurement should be shown.
- Right fonts should be selected.
- Rows should be clearly identified.
- Pages should be broken up logically
- For a wide sizes body, users should be able to resize the columns or wrap the information columnwise.

For headers:

- Include print date, name of the report or the person, the title, retrieval time, logo and other organizational identity details.

For Footers

- Include current page, number of pages, date, data source, format name, URL or location information and legal information.
- Repeat footer at the bottom of every page.

2.19 The Web — Web sites and Web Pages

The content or information on the Web is unlimited and the Web users access a site for **three reasons**:

- A focused search for a piece of information or an answer to a query.
- A less focused browsing.
- Just surfing

2.19.1 Goal of Web Access:

The main reason for web access by users is **sufficient and good content.**

2.19.2 Dimensions of a web site

Three dimensions are considered in the creation of a web site:

- **Structure:** The issues considered in regards to the structure of a web site are:
    - Organization of the information
    - Number of pages
    - Length of each page
- **Navigation:** The issues considered in regards to the navigation of a web site are:
    - Movement of the user around the site.
    - Support given by the site to help the movement.
- **Information content:** The issue considered in regards to the content of a web site is:
    - The information of the site, the quantity of information, and its presentation.

2.19.3 Web User Interaction Styles

Researcher Sellen et al. (2002), studied what the users on the web did for performing their tasks. He found three different Web interaction approaches each with a different flow and activity behavior characteristics.

- **Browsing**
    - It is non-specific surfing.
    - Users move through a Web site at their own pace.
    - Browsing is analogous to shopping.
- **Information finding**
    - This involves finding specific answers to specific questions or requirements.
- **Information gathering**
    - This involves looking for answers for future use.

2.19.4 The Web Experience

There are many factors that affect the user experience of the Web.

The most important of them are as given below:

- The web sites design meeting the user's expectations, capabilities, and limitations.
- The visual appearance and content of the Web site.
- The functionality of the Web site.

The study by Nielsen (2000), Koyani et al. (2004), and Stone et al. (2005) gives us a set the principles used to create a web site. The main goal is to create a site for an efficient, effective, and pleasant experience of the user.

- **Expectations** – User's expectations in respect of the web content, its flow and organization should be met.
- **Tasks** – The design should consider the user's capabilities and limitations and should be easy to use.
- **Visual Appearance** – The visual appearance of the web site screens must be attractive and consistent
- **Information Content**
  - Content should be appropriate to the user's needs and frequently updated.
  - The most important information is should be positioned prominently.
  - The content should be visible without needing to scroll more.
  - Assure that the content is updated frequently
- **Web Page Headings**
  - Properly labelled web page headings will provide a road map to understand the navigation and web site structure.
- **Platforms**
  - The design should consider different platforms and screens.
  - In the design an image-safe area should be specified so that users with a small or large screen can view the screen content.
- **Processes**
  - The windows or graphics which are not required should not be displayed.
  - An option for printing a web page should be provided.
  - A warning message before a time-out should be provided.
- **Downloading -** Design should aim for minimizing downloading time.
  - Include videos, animation, sound, and video only if necessary.

- **Web Applications** - Web applications should be added only if necessary.
- **Accessibility** - Design should aim for a better accessibility of the web content.
- **Assistance** – Design should include instruction which would help in assisting users.

2.19.5 The Web Structure

The Web is a non-linear entity with hundreds of web pages that can be navigated in any number of ways. This makes the web flexible. But flexibility can lead to confusion and the user cannot develop a mental model of a website structure. This, in turn, can make the users disoriented and they can get lost within pages. So a website designer should develop a clear and meaningful site structure before its implementation.

A basic guideline for developing a website is that, the content should be organized in a natural way for the user, which reflects the structure of the tasks which the user wants to perform.

Other guidelines are in regards to the following points:

Page Perusal

The most frequent way in which a user goes through a page is just **scanning or skimming** it and **not going through its details and reading word by word**. So **enhancing this scanning process** is a very critical design issue.

Page Scanning Guidelines

- The page content should be organized in a logical and systematic as follows:
  - Important information should be highlighted.
  - Headings and subheadings should be used at appropriate places.
  - Phrases and sentences should be short in length
  - Paragraphs should be small and readable.
  - Use bullets for lists and tables for drawing attention.
- Keep array information in tables.

Writing Guidelines

- A meaningful title for a content is very important.
- There should be headings and sub headings where required.

- Text should be concise using a simple language.

Presentation

- Important information and concepts must be highlighted.
- Any new information added or modified should be notified.

Web page length

- Page length should be less especially for,
  - Homepage.
  - Navigation pages.
  - Pages to be read faster and downloaded.
- Page length should be longer for,
  - Pages which require uninterrupted reading.
  - Matching the structure to a paper counterpart.
  - Pages to be conveniently downloaded and printed.
- A complete content should be restricted to two or three screens of information.
- Critical information should be located at the top of a page within 4 inch from the top.

Home Page

This is a site's important page as it gives the **first impression** of the site. It can create a **positive or a negative feeling** to the users.

Study by Koyani et al., 2004 reports that people when **asked to find high quality sites**, more than **50% of them look at the home pages** of the sites.

A brief summary of important homepage characteristics is given below:

- **Purpose of home page** – Is to tell the user about the contents of the site and the places to find.
- **Content** – Gives all the content options
- **Size** – Should be limited to one screen
- **Elements to include**
  - Name or logo of Web site owner.
  - Web site name

- Brief description of Web site
- Summary of the key informational content
- Site overview or map
- Navigation links to different parts of the site or major sections.
- Summary of the latest news or promotions.
- Searching facility.
- Announcements of changes to Web site.
- **Organization and Layout**
  - Important information should be placed at the top within 4 inches of the page.
  - Place the remaining elements based on their importance.
- **Access**
  - Access to the home page should be provided from all other pages**.**

Browsing and Searching

Browsing is a process where the user scans the content and tries to explore the relevant items from his or her memory and recognizes them.

Searching on the other hand is a process of recalling. Searching requires keywords which are dug from memory and entered the search field. This results in contents nearer to the keyword.

Guidelines for browsing:

- Scanning the content should be facilitated
- To make moving through the pages easy, a layered structure can be used   along with links.
- Allow the user to leave the site conveniently and reorient themselves when they return.

Searching:

A searching process on the web should result in information and not data and a good searching facility is the one which enables the user to find what is needed from the large amount of data available on the web.

The guidelines for design of searching facility can be studied under the following points:

- **Know Your Search User**
  - The user's expertise level, common terms used by while searching are identified.
  - The type of information and the amount of information that would result from the search is considered.
  - Plan for flexibility in the search process and also the user's switching purpose.
- **Express the Search**
  - What - Here the design issue is to make the search simple. The probability of the search to be successful at the first instance should be high.
  - Where - The search option has to be provided on the home page as far as possible.
  - When - Search options should be clear and the user has to have control over the search.
  - Search Controls **-** Search controls should be provided in the form of text box, structured controls, and a command button. The search text box should be large enough to enter a minimum of 20 characters.
  - There should be separate interfaces for simple and advanced search.
  - Provide guidance and assistance during search process.
- **Launch the Search**
  - Search activation can be done clicking on the command button or pressing the return key.
  - During search refinement, changes to a parameter should automatically produce new results.
- **Progressive Search Refinement**
  - The user should be allowed to control the degree of search with a rapid rough search first and then going for a more refined search process.
- **Presenting Meaningful Results**
  - The main design goal in the presentation of search results is to provide correct information and, in a language, and format which is easy to understand by the user.

- Also provide a search summary and explanatory message to explain search outcomes.
- The results should be presented concisely in the form of a text, arrayed in the order of relevance.
- In case of multipage lists, links should be used to the next search result page.
- For results with only one item, the result page should be presented immediately.

- **Remember the Search**
  - The search entries and search results should be saved automatically.
  - Also, the users can save the results manually.

- **Locatability**
  - Another design issue is to make the website locatable

2.20 Statistical Graphics

Whenever there is a need to **present data in a graphical format** such as a chart or a graph, statistical graphics are used.

Use of Statistical Graphics:

- They help in **communicating complex ideas** with **clarity, precision**, and **efficiency** in a **short time** and **less clutter**.
- They will **bind large amounts of information** together in a **meaningful way.**
- They will also help in **comparing different types of data**.
- They help in presenting **time varying data**.
- They help in **statistical analysis** of data.

3 Technological Considerations in Interface Design

Two factors affect Interface design:

- Characteristics of the hardware being used.
- The interface's controlling software.

The above two factors are divided into various **sub factors** and discussed in the following section:

3.1 Graphical Systems

Screen design must be compatible with the **capabilities of the system** as given below:

- **System power**
  - Processing speed and memory affect the performance of a system in cases of feedback and animation capabilities.
  - A slow screen refresh rate will increase the user's chances of perceiving screen flicker, which results in visual fatigue.
- **Screen size**
  - Large screens can take advantage of windowing systems.
  - Studies by Simmons and Manaham (1999) compared monitors of 15, 17, 19, and 21inches for search activities using Microsoft's Word and Excel, and for browsing the Web and found that the 21-inch monitor resulted in fastest task completion.
- **Screen resolution**
  - Poor screen resolution affects the use of a graphical system.
  - They will not allow the use of sharp and realistic drawings and shapes.
  - Also, Window structure and icon design may be affected.
  - Most common display resolutions currently are 800 x 600 (pixels width and height),1024 x 768 and 1280 x 1024
- **Display colors**
  - More the number of colors, better the graphics effect.
- **Other display features**
  - The screen design process is facilitated by a wide range screen attributes or properties, such higher brightness, reverse polarity, different font sizes and styles, underlining, blinking, line rules and boxes, color, and whitespace.
  - The designer must be aware of the capabilities of the system, their limitations and effective usage.

Screen design must also be compatible with the **capabilities** of:

- **System Platform**
  - The screen design should be compatible with the Windowing platform to be used such as Apple Computer's Macintosh, Microsoft Windows, etc.

- **Development and Implementation Tools being used**

  Today **more than 50 percent of the software code** used on a system is used for the **user interface design**. The tools available to build them are toolkits**,** **interface builders,** and **user interface management systems.**

  Toolkit:

  - It is a library of controls or widgets such as menus, buttons, and scroll bars.
  - They have a programmatic interface and must be used by programmers.
  - They are usually for a specific windowing platform.
  - **Examples:** Motif, OpenLook, and the Macintosh.

  Interface builder*:*

  - Is a graphical tool that helps a programmer create dialog boxes, menus, and other controls.
  - It provides a palette to select and position controls, and to set properties.
  - Interface builders are limited to use in laying out the static parts of the interface.
  - They cannot handle the parts of the interface that involve graphical objects moving around.

  User interface management system (UIMS):

  - This extends the features of a builder by also helping with creating and managing the insides of windows.
  - **Examples:** HyperCard and Visual Basic.

- **Style Guides being used**

Various providers have developed style guide for system developers in order to provide design consistency in interface design.

These guidelines provide the following features:

- They specify the appearance and behavior of the user interface.

- They describe the windows, menus, and other controls for a specific look and functionality.
- They also help in the usage of various components.

Examples of **industry-produced guidelines**:

- Apple's Macintosh Human Interface Guidelines
- IBM's System Application Architecture Common User Access (SAA CUA)
- Microsoft's The Windows Interface Guidelines for Software Design.

4 Summary

In this unit, the focus is on understanding the principles of a good interface and screen design. The discussion is based on design guidelines keeping the user considerations in mind.

The content is divided into two parts: in the first part, various human factors are considered. Here the interface design issues such as people's usage of the system, their expectations from the screen, presentation, and organization of information on the screen are studied. Also, the Website creation guidelines are discussed in the later part of the section.

In the second part of this unit, the technical issues such as the characteristics of hardware such as system power, screen resolution, screen size and colors used are discussed. Also the compatibility of the design with the capabilities of the system such as the platform used, tools and style guides used are discussed.

Questions based on Unit 3 topics

Descriptive Questions:

1. List the factors affecting the screen design. [2 marks]
2. What are the poor design issues affecting the user? [4 marks]
3. What are the common problems in visual interface design? [4 marks]
4. List the distractions affecting the web page users. [4 marks]

5. What are the user requirements for a Screen? [6 marks]

6. What are the factors affecting the visual clarity of the screen? [4 marks]

7. What are the benefits of consistency and limitations of inconsistencies in screen design? [6 marks]

8. What are the schemes for ordering data on a screen? Also, give ordering guidelines for web pages. [6 marks]

9. What is distinctness in the context of screen design? How is it achieved? [6 marks]

10. What are the guidelines for the effective presentation of information on the screen? [5 marks]

11. What is the main design goal of a web page design? [2 marks]

12. What are the two methods to navigate between web pages? Describe them briefly [6 marks]

13. What are the advantages and disadvantages of reading on pages and computer displays? [4 marks]

14. What are the factors affecting the user experience of the web? [3 marks]

15. What are the guidelines to be followed when creating a website? [6 marks]

16. What are the characteristics of a Home page? [6 marks]

17. Compare browsing with searching. List some guidelines for adding these features on a website. [8 marks]

18. What are the technological considerations in the Interface Design [8 marks]

MCQ's [1 mark each]

1. **Which of the following statement is not a design issue affecting electronic forms and web forms?**
   a. Misleading headings
   b. Cluttered and Cramped layout
   c. Improper type and graphic emphasis
   d. Screen navigation and flow

2. **Which of the following statement is not a requirement of a user from a screen?**
   a. The appearance should be cluttered and unorderly.

b. Information should be located where expected.

c. There should be a clear indication of the relationships between elements.

d. The language used should be plain, simple English.

3. **Which of the following is not a task performed by a user when interacting with a computer?**

   a. Identification of a task to be performed.

   b. Making a decision on a method to complete a task.

   c. Testing the above method after deciding

   d. Changing the computer's controls as required.

4. **Which of the following is not a benefit of consistency in screen design?**

   a. Reduction in task completion and learning times

   b. Increase in user satisfaction.

   c. It also aids learning.

   d. It enhances attention level of the user.

5. **People often read Web pages in an _____ shaped pattern.**

   a. D

   b. T

   c. F

   d. L

6. **Which of the below is not correct with reference to ordering of the screen components.**

   a. Frequency of use

   b. Time of use

   c. Sequence of use

   d. Importance

7. **The most important and frequently used elements or controls should be located at the _____**

   a. top left

   b. top right

c. bottom left

d. bottom right

8. **The quality of a screen design to provide an equal weight of the screen elements on the left and right, top, and bottom of the screen is known as,**
   a. Balance
   b. Symmetry
   c. Regularity
   d. Proportion

9. **The quality of a screen design of getting the message on the screen easily by the usage of fewer font styles and colors is known as,**
   a. Sequentiality
   b. Simplicity
   c. Economy
   d. Groupings

State Whether the following statements are True or False [1 mark each]

1. Title, Field Captions, Headings and Navigation are the screen elements considered while testing for a good screen design.

2. The useful information on the screen is known as data and the information on the screen without a purpose is called noise.

3. Visual clarity is not affected by logical and sequential ordering of the elements on the screen.

4. Graphical displays change a person's scanning behavior due to the visual cues like color, depth, form, and the movement they provide.

5. In regard to screen design, distinctiveness refers to the proper separation of the screen elements so that they are clearly distinguished from each other.

6. Visual emphasis technique does not draw the attention of the users to the important part of the screen.

7. The factors that affect an Interface Design are characteristics of the hardware being used and the interface's controlling software.

Fill in the Blanks:

8. The two methods used to navigate between web pages are _____ and _____.

9. The screen elements of a graphical system are known as _____.

10. _____ is the art of laying out text for print or on screens for aesthetics and readability.

11. _____ is a process where the user scans the content and tries to explore the relevant items from his or her memory and recognizes them.

MCQ Key Answers:

1	2	3	4	5	6	7	8	9
d	a	c	d	c	b	a	d	c

Answers for True/False and Fill in the blank questions:

1	2	3	4	5	6	7	8	9	10	11
T	F	F	T	T	F	T	Scrolling and Paging	Fields	Typography	Browsing

References:

[1] Wilbert O. Galitz, "The Essential Guide to User Interface Design", 3rd Edition, Wiley

[2] Ben Shneiderman,Catherine Plaisant, Maxine Cohen, Steven Jacobs, "Designing The User Interface", 5th Edition, Pearson.