

UI and UX for Responsive Web Design

UI and UX for Responsive Web Design

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Preface

This book, **UI and UX for Responsive Web Design**, provides an understanding of how Responsive Design works and highlights the importance of a UI design. This book also provides the learning process of creating a perfect user experience design for all kinds of users and also on how to create a responsive Website that can be viewed on devices with differing screen sizes and characteristics such as retina displays.

The knowledge and information in this book is the result of the concentrated effort of the Design Team, which is continuously striving to bring to you the latest, the best, and the most relevant subject matter in Information Technology. As a part of Aptech's quality drive, this team does intensive research and curriculum enrichment to keep it in line with industry trends and learner requirements. Please feel free to send your feedback.

Design Team

The image is a promotional graphic for OnlineVarsity. At the top, the "OnlineVarsity" logo is displayed in a white rounded rectangle with a blue border. Below the logo, the word "TechnoWise" is written in large, bold, yellow letters. The background features a hand pointing towards a digital interface composed of glowing blue squares. Inside these squares are various tech-related icons: a Facebook 'f', a WhatsApp speech bubble, a tablet screen, a globe (representing Wikipedia), a Wi-Fi signal, a QR code, a stack of books, a smartphone, an Android logo, and a circuit board. Below this interface, the text "Are you a TECHIE GEEK looking for updates?" is written in a stylized font. A yellow button labeled "Logon to" is positioned above a large yellow call-to-action button containing the website address "www.onlinevarsity.com".

OnlineVarsity
your e-way to learning

TechnoWise

Are you a
TECHIE GEEK
looking for updates?

Logon to

www.onlinevarsity.com

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Session 1

Introduction to User Interface Design

Learning Objectives

In this session, you will learn to:

- Define User Interface (UI) and User Interface design
- List and explain the different elements of User Interface Design
- Describe the principles of User Interface Design
- Describe the types of User Interface Design
- Explain the User Interface Design process
- Describe the models in User Interface Design

The user interface is a vital part of any computer system. It determines how easily an end user can interact with the program. One of the achievements of a system depends on how well a user interface is designed and whether it creates a seamless experience for end users.

This session begins with explaining the meaning of User Interface (UI) and UI design. It provides an overview of the fundamental parts of the UI and different types of UI designs. The session also covers the UI design principles that can be utilized to improve the quality of user interface design. Further, the session outlines the user interface design process and the different UI models.

1.1 Definition of UI and UI Design

What is User Interface?

The UI of an application, also known as an 'interface', is the means by which a user and a computer system interact. It can comprise both software and hardware components.

In particular, UI includes:

- The textual, graphical, and auditory information that the program presents to the user.
- The control sequences that a user employs to control the program. For example, mouse movements, keystrokes with the computer keyboard, and selections through the touchscreen.

A simple example of a UI in the real world is an Automatic Teller Machine (ATM). As shown in figure 1.1, it consists of a keypad, a display window, a selection of choice options, and a help screen that displays instructions for completing an ATM transaction.

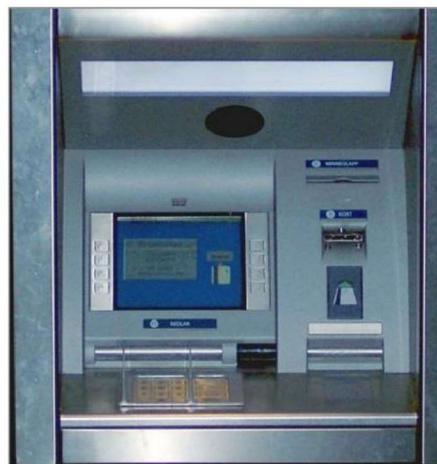


Figure 1.1: ATM User Interface

What is User Interface Design?

User Interface Design is the process of designing user interfaces for Websites, appliances, computers, and software applications. It focuses on anticipating an end user's requirement, that is, what the users might need to do and then, ensuring that the UI has all elements to facilitate those actions. The goal of UI design is to maximize user's experience and interaction.

UI design brings together the following concepts:

- **Information Architecture** focuses on organizing, structuring, and labelling content in an effective and sustainable way.
- **Interaction Design** concentrates on setting up an engaging interface with logical behaviors.
- **Visual Design** concentrates on the style of a site and its related materials through pictures, hues, text styles, and different components.

The overall goal of UI design is to make the user's experience and interaction as simple and efficient as possible.

1.2 Parts of User Interface Design

The fundamental parts or elements of most UIs are as follows:

- Input Controls
- Navigational Components
- Informational Components
- Containers
- **Input Controls**

An input control defines the way in which the system captures information and it is the most interactive component of the UI. Some common interface input controls consist of elements such as buttons, radio buttons, check boxes, drop-down lists, drop-down buttons, list boxes, and text fields.

Table 1.1 lists the input control elements and their descriptions along with examples.

Element	Description	Example
Button	A button can be pressed or clicked by the user to perform an action. It is typically labelled using text, an icon, or both.	  New tweet by you Send an email
Radio button	Radio buttons present a set of choices from which the user can choose one.	Can you tell us why you were visiting? <input checked="" type="radio"/> Just browsing <input type="radio"/> Wanted general information <input type="radio"/> Wanted specific information
Check box	Check boxes also present a set of choices but allow the user to select one or more options from the set.	Shopping Items (Multiple Checkbox): <input checked="" type="checkbox"/> Banana <input checked="" type="checkbox"/> Apple <input type="checkbox"/> Coke <input type="checkbox"/> Pineapple
Drop-down list	Drop-down list comprise a list of items that are displayed upon clicking the arrow and enable one item at a time to be selected. They are preferred when many items in a set need to be presented to the user.	
Drop-down button	Drop-down buttons when clicked display a drop-down list of items that are mutually exclusive.	
List box	List box contains a list of options. It allows the user to select one or more items from a list.	 <i>Image Courtesy: http://www.usability.gov/how-to-and-tools/methods/user-interface-elements.html</i>
Text field	Text field is a basic text control that allows the user to enter a small amount of text. When a user indicates that text entry is complete usually by pressing Enter, the text field fires an action event.	

Table 1.1: Description of Input Control Elements

- Navigational Components**

Navigational Components provide a way for the users to tell the system what to do. Some of these include search fields, breadcrumbs, pagination, tags, icons, and image carousel.

Table 1.2 lists the navigational components and their descriptions along with examples.

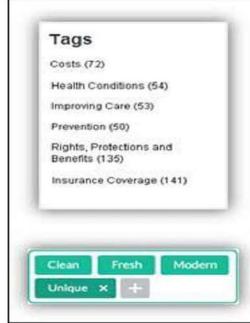
Element	Description	Example
Search Field	Search field enable users to enter a keyword or phrase and submit it with the objective of getting back the most significant results. It is generally a single-line content box that can accept user input to be searched within a database.	
Breadcrumb	Breadcrumb is a navigation aid that allows the user to keep track of user's location within programs. Breadcrumbs show up on a level plane over the highest point of a Web page, below the title bars or headers. They show links for previous page the user navigated through to get to the present page or in hierarchical site structures, the parent pages of the current one.	
Pagination	Pagination enables you to divide content into distinct pages. It allows the user to skip between pages or go in sequential order through the content.	
Tags	Tags allow users to identify content in the same classification. Some tagging framework also allows users to apply their own tags to content by entering them into the framework.	
Icon	An icon acts as a natural symbol to represent some functionality of the system, such as save or open, and so on. Icons are often hyperlinked.	
Image Carousel	An Image carousel allows users to browse through a set of items and choose one. Typically, the images are hyperlinked.	

Table 1.2: Description of Navigational Components

- Informational Components

Some common interface information components are tooltips, notifications, progress bars, message boxes, and modal window.

Table 1.3 lists the informational components and their descriptions along with examples.

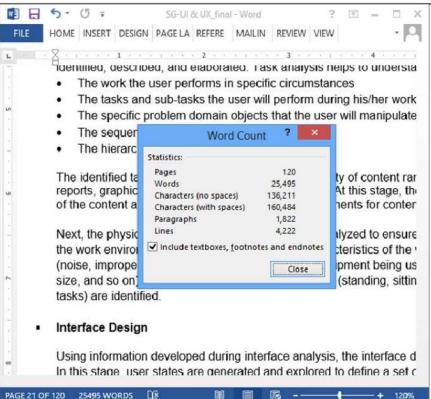
Element	Description	Example
Tooltip	A tooltip is a common UI element used in conjunction with a cursor, usually a pointer. Tooltips allow the user to see clues when they hover over an item demonstrating the name or reason of the item.	
Notification	Notifications are update messages that announce something new for the user to see. Notifications are typically used to show items such as, the successful completion of a task, or an error, or warning message.	
Progress Bar	Progress bar shows where a user is as they progress through a series of steps in a process.	
Message Box	Message box is a small window that gives information to users or gets a confirmation from the user. A message box requires users to take an action before they can move forward.	
Modal Window (pop-up)	Modal window is a child window that requires users to associate it before it can return to operating the parent application, thus, ensuring the user will perform the operation it is intended for.	

Table 1.3: Description of Information Components

- **Containers**

Containers are designed to contain page elements to a reasonable maximum width based on the size of a user's screen. The most common interface container includes Accordion.

Table 1.4 lists the most common type of container and its description along with an example.

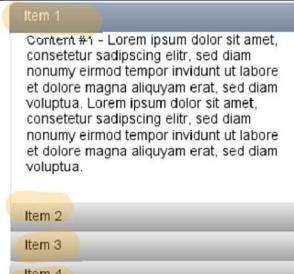
Element	Description	Example
Accordion	An accordion is a component that show/hides a vertical list of items and content based on user action. When a label is clicked, it expands the section showing the content within.	 <p>Item 1 Content #1 - Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua.</p> <p>Item 2</p> <p>Item 3</p> <p>Item 4</p>

Table 1.4: Containers

1.3 Principles and Attributes of User Interface Design

UI design principles focus on improving the quality of user interface design. Some of these include:

- **The Structure Principle**

This principle is concerned with overall UI architecture.

The design of the interface should be visually, theoretically, and linguistically clear. It should provide clear and user-specific paths to useful and relevant information.

Tips/Techniques to support the Structure Principle

The techniques that help to support this principle are as follows:

- You should group the logically connected items to communicate and separate unrelated items to achieve visual organization.
- Ensure good cross-linkages and quick jumps to important sections of the Websites.
- Design page-specific navigation and access to information.
- Keep the screen less cluttered and easier to understand.
- Present the flow of actions, information, responses, and visual preparations in a sensible order that is easy to remember and place in context.

Refer to figure 1.2 to view an example of a clearly structured UI.



Figure 1.2: Example of a Clearly Structured UI

Image Courtesy: <https://www.amazon.com>

Amazon.com is a perfect example of a clearly structured UI. It has a clean interface, less clutter, and a clear hierarchy of the content.

▪ **Simplicity Principle**

The design should be simple to learn and use. It should include only the elements that are most important for communication. It should also make common tasks easy to perform and provide good shortcuts that are meaningfully related to longer procedures.

Tips/Techniques to support the Simplicity Principle

The techniques that help to support this principle are as follows:

- Ensure that you create natural designs, which can be easily understood by the users based on their past experiences
- Make use of colors and fonts carefully
- Avoid acronyms and terminology with no clear explanation, which are likely to confuse the users
- Ensure that the messages and labels are written in a clear manner
- Use direct icons that are consistent with Web terminology and use less space on screen
- Make use of familiar concepts and use a language that is known to the user
- Use consistent layout, navigation, messages, labels, and representation of the information
- Do not use jarring animations and advertisements
- Use white/blank space effectively
- Avoid elements that may cause compatibility or support issues across different environments

Refer to figure 1.3 to view an example of a simple UI.

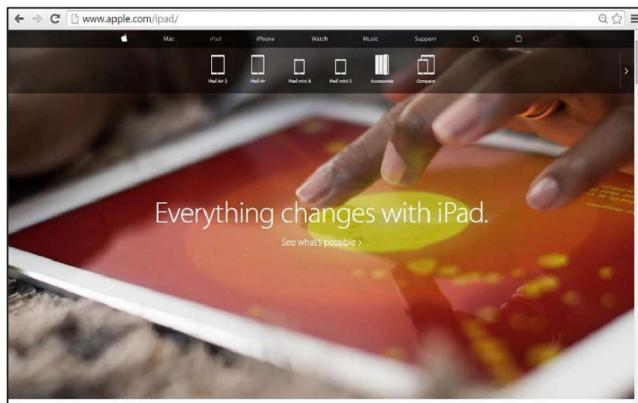


Figure 1.3: Example of a Simple UI

Image Courtesy: <http://www.apple.com/ipad/>

The Website of Apple.com is a great example to explain the simplicity principle.

The UI of Apple.com is very simple. To avoid any distraction, only the relevant content is presented in a clean and straightforward way. The clear UI design makes the Website intuitive to use.

▪ **Visibility Principle**

Visibility ensures that the user clearly sees the interface and all the possible actions. The UI design should make all required options for a given task visible without confusing the user with superfluous or redundant information. It needs to be straightforward to let users easily comprehend the interface and navigate through it more efficiently.

Tips/Techniques to support the Visibility Principle

The techniques that help to support this principle are as follows:

- Have limited entry points on the interface
- Make the entry points descriptive and 'task-oriented'
- Avoid creating UIs that will always be busy and unresponsive to users
- Do not overwhelm users with too many alternatives or confuse with unnecessary information
- Do not direct users into pages that have no navigational options
- Create levels of importance. Elements that are mission critical to the Website or application should be designed to be more visible. However, the less important elements can be designed for less visibility
- Use colors appropriately. Do not use too many colors as it may distract users

Refer to figure 1.4 to view an example of a clearly visible UI.

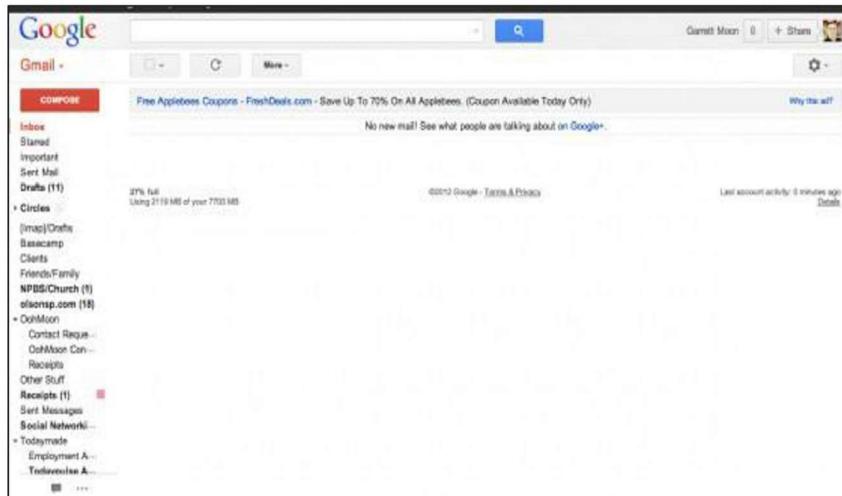


Figure 1.4: Example of a Clearly Visible UI

Image Courtesy: <http://todaymade.com/blog/wp-content/uploads/2012/04/Gmail-Inbox-garrett.t.moon@gmail.com-1-560x283.jpg>

The Website of Gmail is a great case to explain the Visibility principle.

The design of the interface is very straightforward. All the options are clearly visible. Users can quite effortlessly, and perhaps, instinctively distinguish different section and guess what their functions are, such as Inbox, Sent items, Deleted items, Important mails, and so on. By making the button large, placing it in a noticeable position and giving it a distinct color, it stands out in the design.

Feedback Principle

Feedback means to give information to the user based on some action. The UI design should clearly inform users what is going on and show them the result of their actions such as connecting, waiting to download, processing, or downloading. It should also inform users about the actions and changes of state or condition. Further, it should also inform about errors or exceptions that users might face on performing particular actions by using a clear, concise, and understandable language.

Feedback can come in many forms, such as a color change of an interface element, sound alerts, pop-up windows with action buttons, notification bubbles, and so on.

Tips/Techniques to support the Feedback Principle

The techniques that help to support this principle are as follows:

- Write your messages and labels clearly
- Respond to user action as close as possible to the point of interaction (that is, within a reasonable amount of time)
- Use colors appropriately

Refer to figures 1.5 (a) and 1.5 (b) to view an example of a UI displaying feedback.

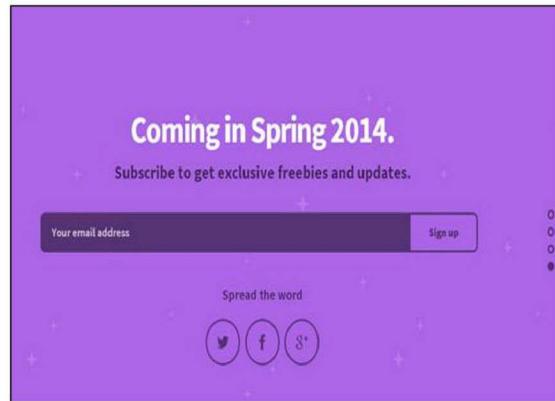


Figure 1.5 (a): UI of 'Coming Soon' Page from Kickdrop.me

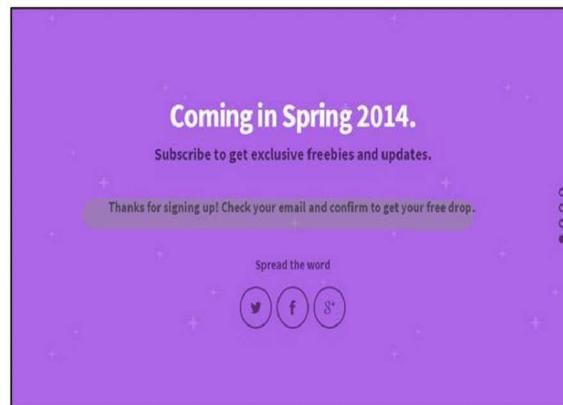


Figure 1.5 (b): Example of UI Displaying Feedback

Images Courtesy: <http://www.howdesign.com/web-design-resources-technology/donald-normans-design-principles-modern-web-design/>

The 'Coming Soon' page with the **Thanks** message from Kickdrop.me is a great example to explain the Feedback principle. To subscribe, the user has to enter the required details (in this case, an email ID) and then click the Sign-up button. When a user clicks the button, the email form slides out and a confirmation message slides into view. This grabs the user's attention and emphasizes that clicking the button has produced a result. In response to the signing up, a Thank you message is displayed.

Tolerance Principle

The Tolerance UI design principle emphasizes the importance of designing the UI to prevent users from making errors. It allows the user to learn how to use the site and informs them of errors.

Tips/Techniques to support the Tolerance Principle

The techniques that help to support this principle are as follows:

- Display error messages that provide the information necessary for recovery
- Use clear and familiar language that can be easily understood by the user
- Use specific and constructive terms to avoid any ambiguity
- If the user requests, provide additional explanation during error connection

- Ensure that users never lose their work as a result of an error on their part or system or communication problems

Refer to figure 1.6 to view an example of a tolerant UI.

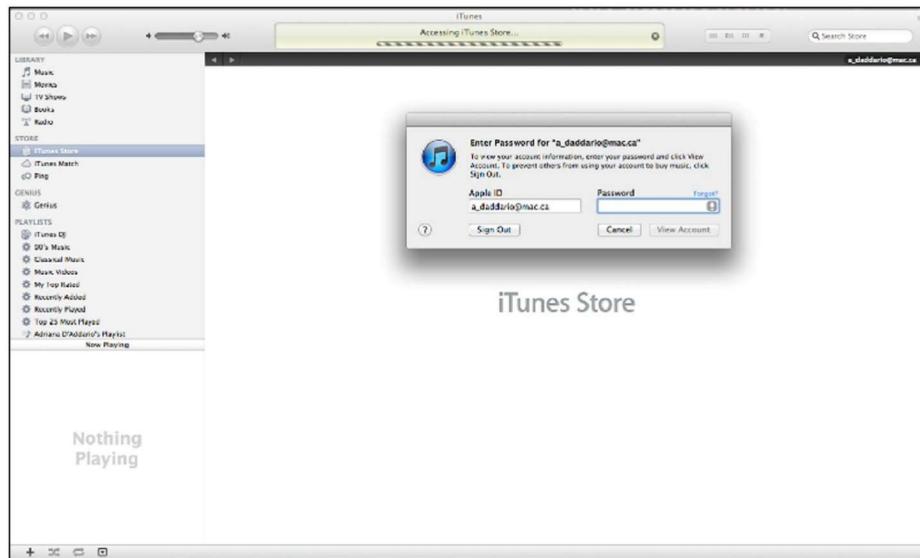


Figure 1.6: Example of a Tolerant UI

Image Courtesy: <https://adaddario16.wordpress.com/2012/06/07/principles-and-techniques-of-user-interface-design/>

The iTunes interface is an example to explain the Tolerance principle.

The iTunes interface allows the user to be notified of certain aspects. For example, when the user is keying in their password in capital letters, it notifies the user with a simple symbol. When the user is missing an attachment, another symbol such as an exclamation point comes up, that explains which file is missing or lost. Each feature tells the user that something needs to be done to fix the issue and the interface assists by offering recommendations.

▪ Reuse Principle

The UI design should reuse internal and external components and behaviors to maintain consistency with purpose. This reduces the need for users to rethink and remember. A simple example of this is the keyboard shortcuts.

The techniques that help to support this principle are as follows:

- Group elements effectively
- Ensure that the same action should always yield the same result
- Do not change the function of the elements
- Do not change the position of standard elements
- Set UI design standards and then stick to them

Refer to figure 1.7 to view an example of a reusable UI.

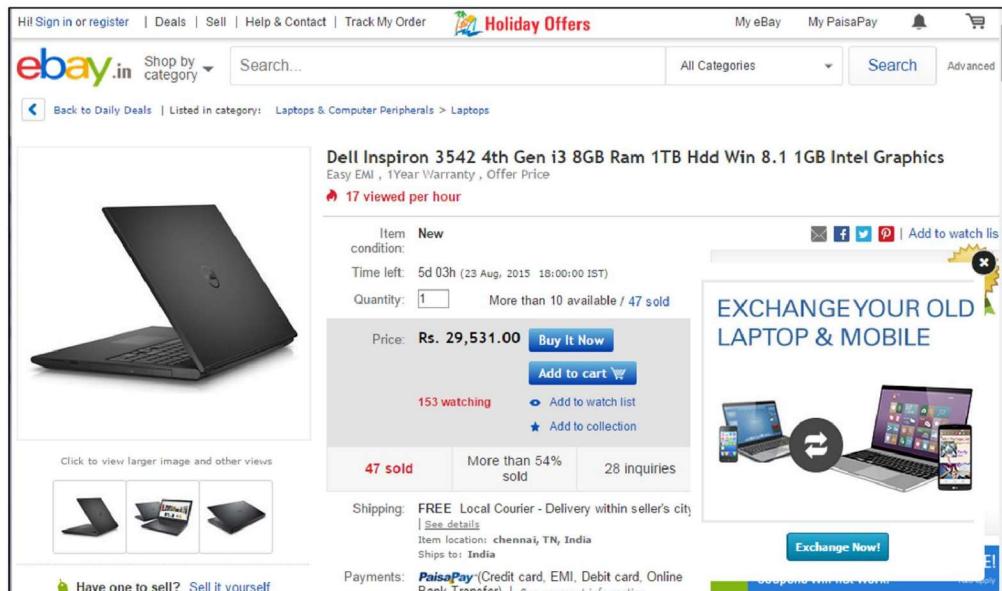


Figure 1.7: Example of a Reusable UI

Image Courtesy: <http://www.ebay.in/>

An example of the Reuse principle is ebay.in. The process in which a user goes through to purchase a product is very simple and organized. In addition, once the user goes through it, he/ she is able to repeat the actions easily.

Quick Test 1.1

1. Input controls define the way the system captures the information. Input controls are the interactive components of the user interface.
 - a. True
 - b. False

2. Interaction Design avoid on creating engaging interfaces with well-thought-out behaviors.
 - a. True
 - b. False

1.4 Types of UIs

UIs can be classified into six categories:

- **Command Language-Based Interface**

A command language-based interface is a means of interacting with a computer program where the user issues commands to the program in the form of successive lines of text. The computer displays a prompt, the user keys in the command, and presses Enter key. After receiving the command, the command language-based interface processes it accordingly and shows the output/result on the same screen. The most common example of the command language-based interface is MS-DOS.

- **Menu-Based Interface**

A menu-driven UI allows the user to access command through the menu. The computer displays a menu, the user makes a choice, and then, the next menu appears. The process continues until the user selects the desired option. The most common examples of a menu-based interface include ATMs, iPods, and mobile phones.

- **Natural Language Interface**

A natural language interface allows the user to speak in normal everyday language in order to interact with the system. The most common example of the natural language interface is the speech recognition software. It accepts spoken words and converts them into the text on the computer.

- **Touch Sensitive Interface**

A touch sensitive interface utilizes a touchscreen display as a combined input and output device. The most common examples of the touch sensitive interface are smartphones and the POS machines.

- **Web-Based Interface**

A Web-based interface accepts the input from the keyboard and mouse and provides output by generating Web pages, which are transmitted via the Internet. These Web pages are viewed by the user using a Web browser program.

- **Graphic User Interface (GUI)**

The most widely used type of UI in use today is the Graphical User Interface (GUI). It accepts input through the keyboard and mouse and displays the output on the user's computer screen. The actions in a GUI are usually performed through direct manipulation of the graphical elements.

The most common elements of a GUI include:

- **Window:** It is an area on the screen that displays information. Contents in a window are displayed in the form of icons or lists. According to the size of the screen, windows can be minimized, resized, or maximized. They can be moved anywhere on the screen. A window may have one or more windows as its children. These child windows are drawn within the client area of the parent window.
- **Icon:** It is a small picture that represents a software application or a hardware device. An application window opens on clicking or double-clicking these icons.
- **Menu:** It is a list of choices presented to the user. A menu is placed at a visible (generally top) inside the application.
- **Pointer/Cursor:** It is an onscreen symbol that represents movement of a device that the user controls to select windows, icons, and menus.

Refer to figure 1.8 to view the most common elements of a GUI.



Figure 1.8: Elements of a Graphical User Interface (GUI)

Image Courtesy: <http://www.intel.com/content/www/us/en/company-overview/company-overview.html>

1.5 Processes in User Interface Design

The User interface development process is repetitive and can be represented using a spiral model.

The process encompasses four distinct framework activities:

- Interface analysis
- Interface design
- Interface construction/implementation
- Interface validation

Refer to figure 1.9.

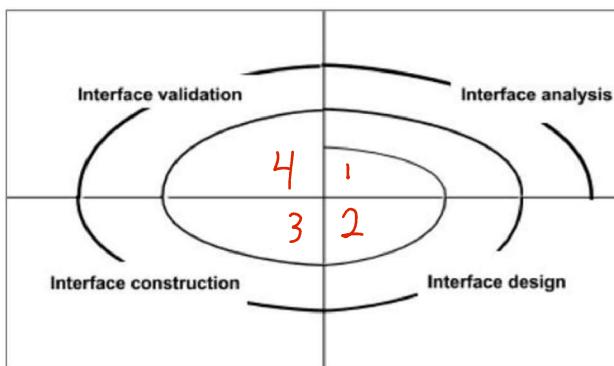


Figure 1.9: User Interface Design Process

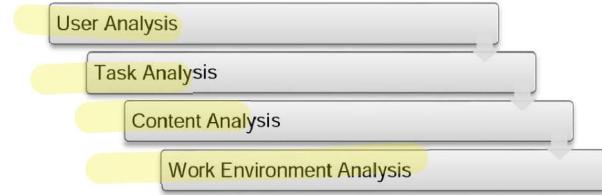
Image Courtesy: <http://csis.pace.edu/~marchese/cs615sp/L6New/Sel6new.html>

The spiral design shown in figure 1.9 implies that each UI development task will happen more than once. Each task passes around the spiral representing added requirements and the resultant design. The construction phase involves UI prototyping, which is the only practical way to validate what has been designed.

▪ Interface Analysis

The first activity of the UI development is Interface analysis.

It involves understanding the end users who will interact with the system through the interface, the tasks that end users would need to perform to do their work, the content that will be presented as a part of the interface, and the environment in which these tasks will be conducted.



The initial analysis activity centers on the profile of the users who will work with the system. It identifies user's skills and capabilities, and level of business understanding, business process understanding and his/her role in the process. Information from a wide range of sources such as user interviews, sales input, marketing input, and support input can be used to analyze the user profile.

Once general requirements have been defined, a more comprehensive task analysis is conducted. Those tasks that the user performs to accomplish the goals of the system are identified, described, and elaborated. Task analysis helps to understand:

- The work the user performs in specific circumstances
- The tasks and sub-tasks the user will perform during his/her work
- The specific problem domain objects that the user will manipulate during his/her work
- The sequence of work tasks
- The hierarchy of tasks

The identified tasks lead to the presentation of a variety of content ranging from character-based reports, graphical displays to multimedia information. At this stage, the format and the aesthetics of the content are considered to establish the requirements for content presentation.

Next, the physical work environment of the user is analyzed to ensure that the UI products fits into the work environment. In this step, the physical characteristics of the workplace, constraints (noise, improper lightning, and so on), the type of equipment being used (mouse type, keyboard size, and so on), and how the user will execute the UI (standing, sitting, or while doing other tasks) are identified.

▪ **Interface Design**

Using information developed during interface analysis, the interface design activity commences. In this stage, user states are generated and explored to define a set of interface objects and actions. These objects then serve as the basis for the creation of screen layout that illustrates graphical design and placement of icons, specification and tilting for menus and specification of menu items, and so on. As the design model is refined, design issues such as error handling, system response time in terms of length and variability, user help facilities and menu and command labelling are also considered at this stage.

▪ **Interface Construction/Implementation**

Once a design model is created, it is implemented as a prototype. The prototype enables usage scenarios to be evaluated and continue with development tools to complete the construction.

▪ **Interface Evaluation**

Once an operational UI prototype is created, it is evaluated to determine whether it meets the needs of the user. It can range from an informal test drive to a formally designed study using statistical methods. The UI evaluation cycle takes the form as shown in figure 1.10. It consists of prototype creation followed by user evaluation. The user directly informs the designer through comments about the effectiveness of the UI. Based on the user inputs, design modifications are made as required, and the next level prototype is created. The evaluation cycle continues until all user issues are resolved.

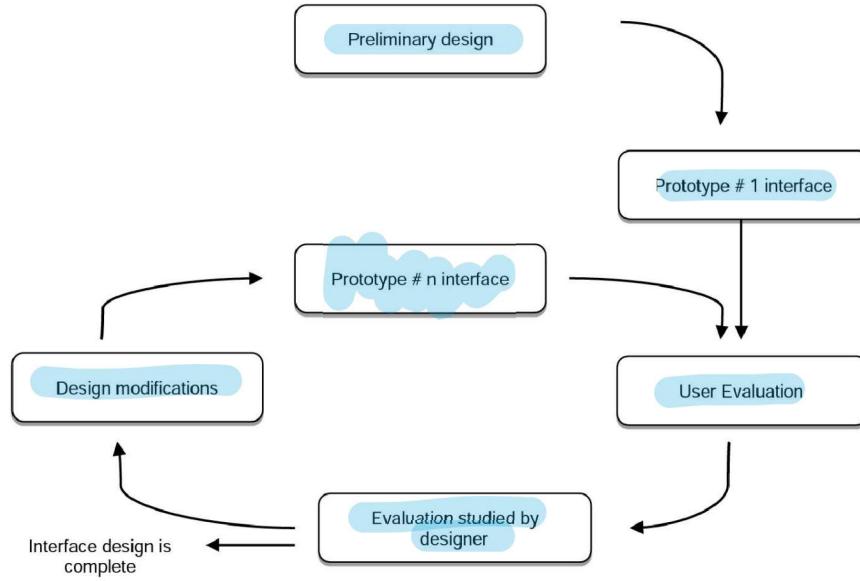
**Figure 1.10: Design Evaluation Cycle**

Image Courtesy: <http://csis.pace.edu/~marchese/cs615sp/L5/Sel5.html>

Quick Test 1.2

1. The most widely used type of user interface in use today is the Graphical User Interface (GUI).
 - a. True
 - b. False
2. The first activity of the UI development is Interface Design.
 - a. True
 - b. False

1.6 Models in User Interface Design

In designing a UI, the following four model types are especially important:

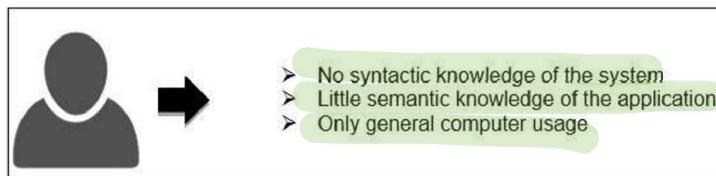
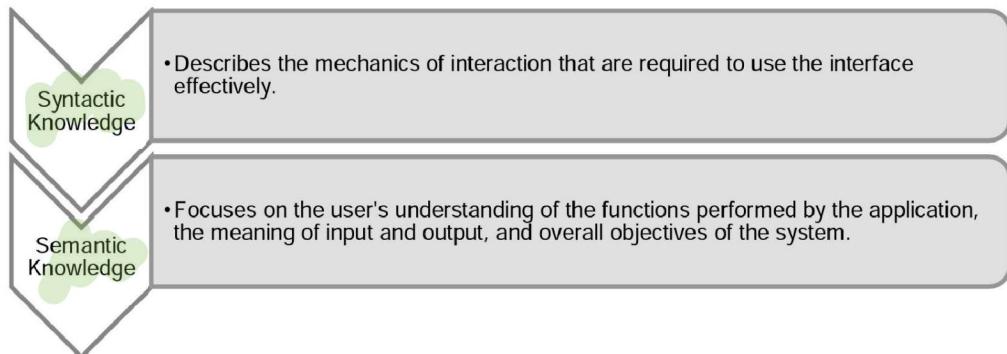
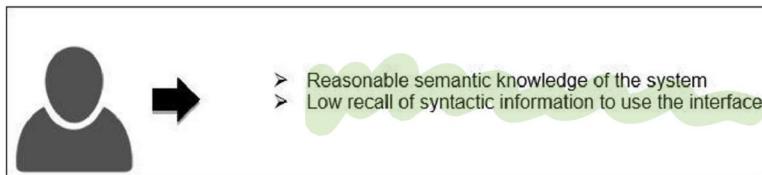
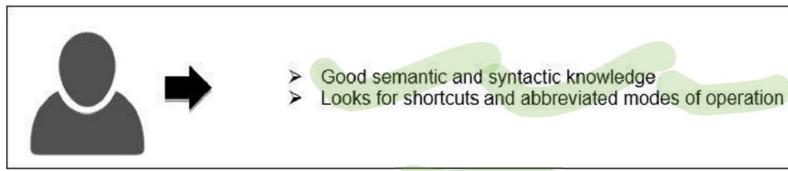
- User model
- Design model
- Mental model
- Implementation model

▪ **User Model**

The user model is established by a software engineer.

It describes the profile of the end users of the system. The user model is based on the age, gender, physical abilities, education, cultural, or ethnic background, motivation, goals, and personality of the end user.

The user model focuses on the syntactic and semantic knowledge of the end user.

**Figure 1.11: Novice****Figure 1.12: Intermittent User****Figure 1.13: Frequent User**

▪ **Mental Model**

The mental model is developed by the user while interacting with the system.

It is a representation of user's system perception - 'How do users think this works?' based on past experiences, knowledge, or common sense. The accuracy of the description depends upon the user's profile and overall familiarity with the system.

▪ **Design Model**

The Design model is created by a software engineer.

It results from the analysis phase of the requirements and takes into account the data and architectural, interface, and procedural aspects of the system. The design model must be developed to accommodate the information contained in the user's mental model.

- **Implementation Model**

The Implementation model is created by the software implementers.

An implementation model is a representation of how a system actually works. It consists of the look and feel of the interface along with all supporting information such as resources, tutorials, help files, and videos that describe system syntax and semantics.

Basically, it serves as a translation of the design model by providing an insight of the information contained in the user profile model and the user's mental model.

Note

All these models may differ significantly. However, the interface designer resolves these differences and develops a consistent representation of the user interface.

1.7 Summary

In this session, **Introduction to User Interface Design**, you learned that:

- A User Interface is the means by which a user and a computer system interact.
- User Interface Design is the design of Websites, computers, and software applications focusing on maximizing user experience and interaction.
- The fundamental parts of most UIs include Input Controls, Navigational Components, Informational Components, and Containers.
- The UI design principles focus on improving the quality of user interface design.
- The six important UI design principles are the Structure principle, Simplicity principle, Visibility principle, Feedback principle, Tolerance principle, and Reusability principle.
- The UI development process is repetitive and can be represented using a spiral model.
- The UI development process encompasses four distinct framework activities including Interface analysis, Interface design, Interface construction/implementation, and Interface validation.
- The four model types in designing a UI are User model, Design model, Mental model, and Implementation model.
- The most widely used type of UI in use today is the GUI.
- Common elements of a GUI include Window, Menu, Icons, and a Pointer.

1.8 Exercise

1. Which of the following is not a user interface design process?
 - a. User, task, and environment analysis
 - b. Interface design
 - c. Interface collaboration
 - d. Interface evaluation
2. Which of the following UI model incorporates data, architectural, interface, and procedural representations of the system?
 - a. User model
 - b. Design model
 - c. Implementation model
 - d. Testing model
3. Which model depicts the image of a system that an end user creates in his or her head?
 - a. User model
 - b. Design model
 - c. Implementation model
 - d. Mental model
4. Which of the following UI design principles emphasizes the importance of designing the user interface to prevent users from making errors?
 - a. Simplicity
 - b. Visibility
 - c. Tolerance
 - d. Reuse
5. Which user interface allows the user to interact with the computer by typing instructions?
 - a. Command line interface
 - b. Menu interface
 - c. Natural language interface
 - d. GUI
6. A small picture on a computer screen that represents a software application or a hardware device is called _____.
 - a. Menu
 - b. Button
 - c. Icon
 - d. Window

Answers to Exercise

1. Interface collaboration
2. Design model
3. Mental model
4. Tolerance
5. Command line interface
6. Icon

Answers to Quick Test

Quick Test 1.1

- a. True
- b. False

Quick Test 1.2

- a. False
- b. False

The advertisement features a central graphic with a large white circle containing a dense word cloud related to digital communication and social media. The words include 'media', 'content', 'post', 'network', 'follow', 'like', 'comment', 'share', 'message', 'instant', 'rank', 'forum', 'social', 'web', 'site', 'media', 'wall', 'video', 'blog', 'podcast', 'internet', 'network', 'message', 'learning', 'learner', 'guide', 'enriched', 'available', and 'learner'. To the left of the circle is a large, bold, white 'BI' logo. To the right is a large, bold, white 'g' logo. Above the word cloud, the 'Onlinevaristy' logo is displayed with the tagline 'your e-way to learning'. Below the word cloud, the text 'Balanced Learner-Oriented Guide' and 'for enriched learning available' is written. At the bottom, the website address 'www.onlinevaristy.com' is provided, preceded by an '@' symbol.

BI

g

Onlinevaristy
your e-way to learning

Balanced Learner-Oriented Guide

for enriched learning available

@

www.onlinevaristy.com

Session 2

Introduction to User Experience Design

Learning Objectives

In this session, you will learn to:

- Define User Experience (UX) and User Experience Design
- Describe the difference between UI and UX
- Describe the different elements of UX Design
- Explain the significance of UX
- List and explain the principles of User Experience Design
- Describe the best practices in User Experience Design

The success of a Website or an application depends on how users perceive it. 'Does it give me value? Is it easy to learn and use? Is it a pleasant experience? These are the basic questions that run through the users mind while interacting with any system and form the basis of their decisions on whether or not to become regular users. User experience design strives to make them answer 'Yes' to all of these questions. It focuses on providing rich and interactive experience to the users.

This session begins with defining User Experience (UX) and UX design. It explains the significant difference between UI and UX. The session also provides an overview of the different elements of UX design and explains its significance. Further, the session describes the principles and best practices of UX design.

2.1 Definition of UX and UX Design

What is User Experience?

User Experience, often abbreviated as 'UX', is the overall experience and satisfaction that a user has when interacting with a product such as a Website or computer application. Simply stated, the UX is how the user is emotionally affected by the product. For a satisfying user experience, it is important that the product is easy to use and fits the user expectations. Refer to figure 2.1.

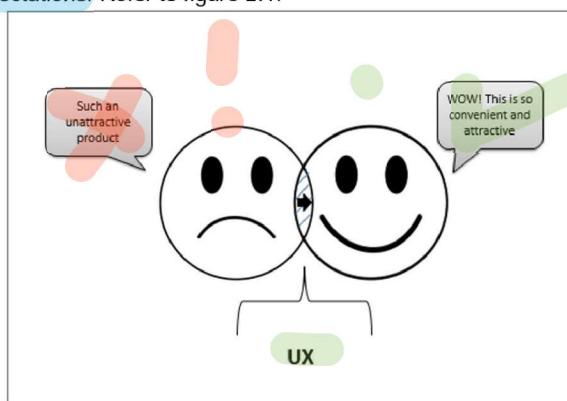


Figure 2.1: User Experience

What is User Experience Design?

User experience design, often abbreviated as 'UXD' or 'UED', is the process of understanding the needs of a user and intuitively addressing those needs by improving the product's (such as, Website or computer application) information architecture, interaction design, and visual design. The core focus of the UXD is to create a simple yet engaging experience for the user.

2.2 Difference Between UI and UX

UI and UX are often used interchangeably but these are two separate entities with completely different meanings.

User Interface (UI): UI is simply a collection of elements such as text fields, buttons, search field, layout, and links by which a user and a computer system interacts. It does not address details such as how the user remembers the system, responds to the system, and re-uses it.

User Experience (UX): It is the overall experience of using the interface - 'how it makes the user feel while interfacing with a system'. UX answers the 'why' questions behind the design layout and user interaction. The focus of the UX is to identify the users who will utilize the system and determine how exactly to meet their needs.

Here are a few examples from the real world to understand the differences between UI and UX:

- A knife is the UI, a cake is the product, and cutting the cake using the knife is the UX.
- A door knob is the UI and turning the knob to open door is the UX.
- iTunes is the UI. It helps create playlists using drag and drop feature. In turn, it makes the user experience better by allowing them to listen to playlists as per their mood.

Now, let us apply the concept to a Website. Refer to figures 2.2 (a), 2.2 (b), and 2.2 (c).

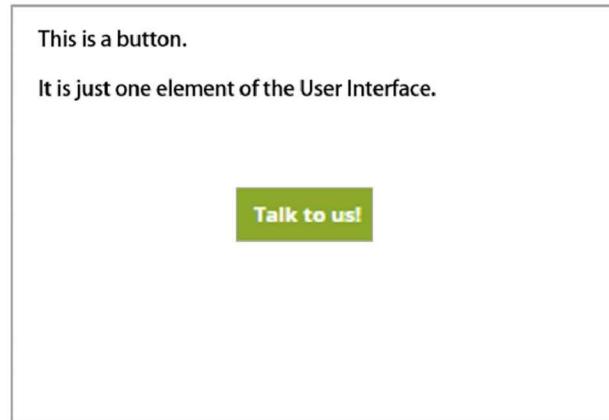


Figure 2.2 (a): Interface Element

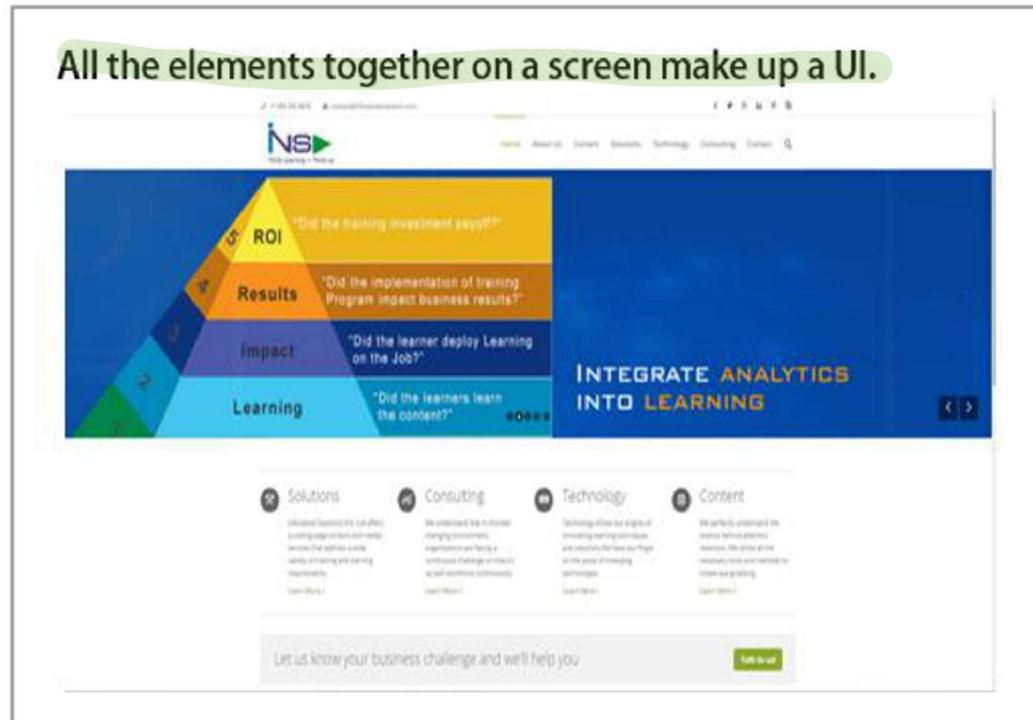


Figure 2.2 (b): User Interface

Image Courtesy: <http://infonativesolutions.com/>

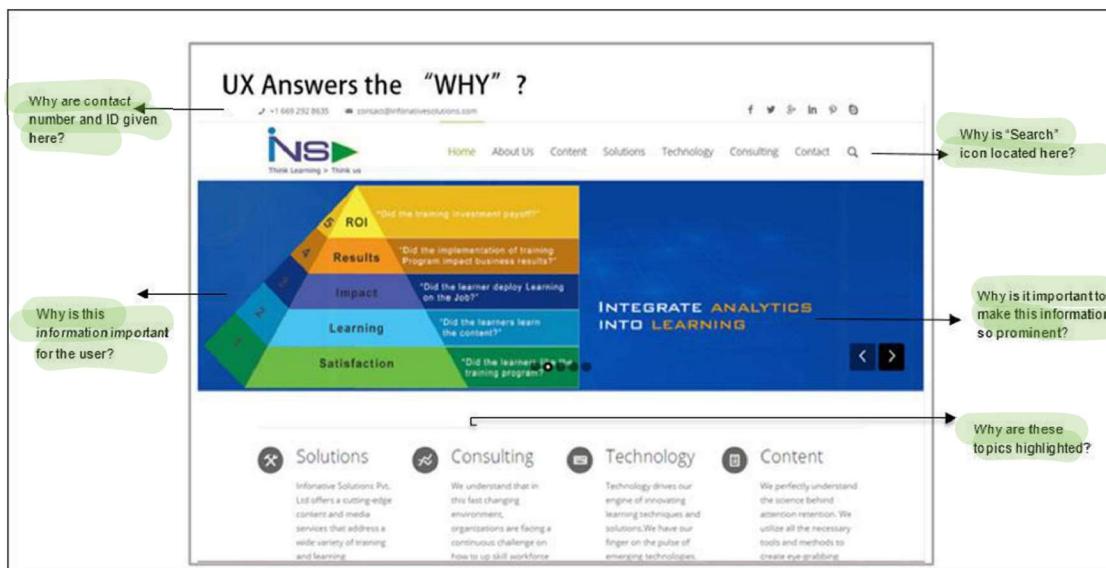


Figure 2.2 (c): User Experience

Image Courtesy: <http://infonativesolutions.com/>

Refer to table 2.1 to understand the differences between UI and UX.

User Interface (UI)	User Experience (UX)
It is a means by which a user can interact with the system. It serves as a point of interaction between user and the system.	It is the experience resulting from using a system. It is the interaction itself.
UI is only a component of the overall UX.	UX is the big picture that includes the entire process from concept to completion.
UI is tangible and can be defined easily.	UX is subjective in nature and sometimes difficult to measure.
It focuses on the visual design (look and feel) and the interaction design (how it works) of the system.	It focuses on human behavior and tries to obtain a better understanding of what the user wants to use.
It requires creative and convergent design.	It requires creative and critical design.
It focuses on the presentation the content so that it becomes easier for the user to obtain information.	It focuses on the context and provides users with the solution to their problems.
UI is the determining factor of the UX. It defines the real limits of what a user can do with the system. For example, a user can only interact with the Website through the buttons, forms, and links provided on the screen.	The UX determines the future use of the system. It indicates how helpful it is for the user and what modifications will be required in the future versions of the system.
The UI process involves determining the initial requirements and objectives for the system, organizing the information space, and selecting and applying colors and style of the UI elements. The main purpose of UI work is to clearly inform users what they need to do and how to do it.	UX design is more comprehensive. It begins with a thorough understanding of the users - what drives them and what their limitations are. Typically, the UX process involves pre-planning (data analysis, user stories, user flows), prototyping, designing, testing, and design modification to match the user expectations.

Table 2.1: Difference between UI and UX**Note**

UI and UX signify different things, but they both work hand in hand to build an effective product.

2.3 Elements of UX Design

UX Design is based around the end user's overall experience with the system. The critical elements of a good UX Design are as follows:

- Visual design
- Usability
- Information Architecture
- Interaction Design
- User Research

Refer to figure 2.3.

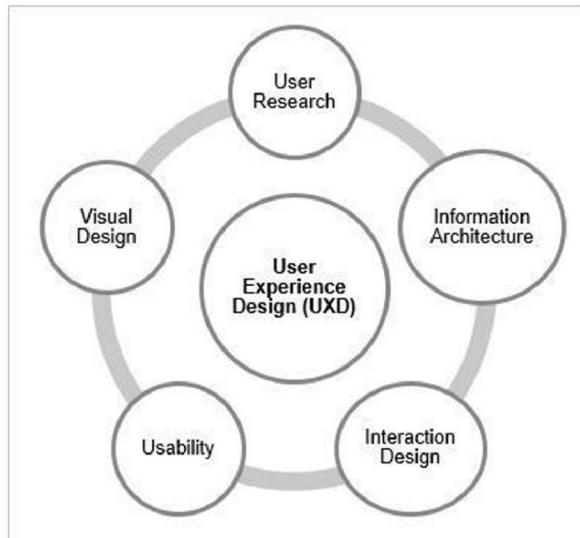


Figure 2.3: Elements of UX Design

➤ Visual Design

Visual design represents the aesthetics (look-and-feel) of a Website and its associated components. It utilizes the visual elements such as shapes, colors, and images to deliver a clear message to the users and thus, improve their experience with the system.

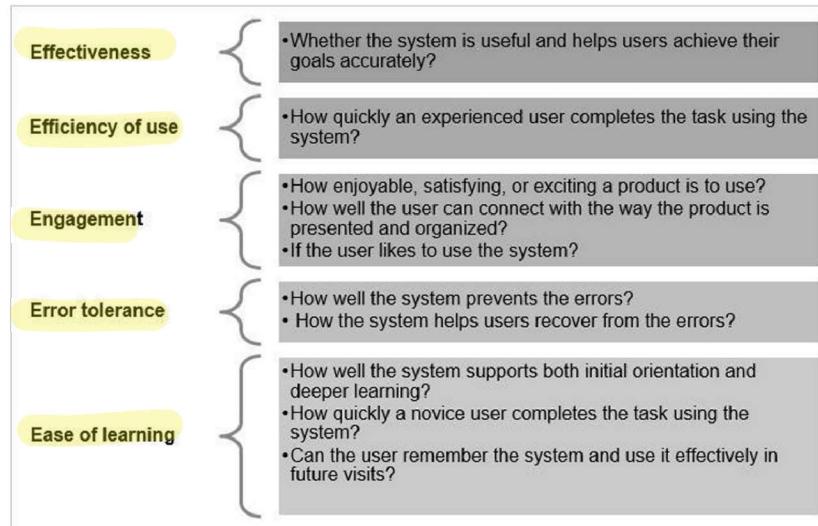
Guidelines for creating a positive visual design:

- Maintain visual consistency through the use of colors, typography, and persona
- Build hierarchies through different colors, font sizes, and placement on the page
- Incorporate white space into the layout design to increase readability
- Emphasize differences in colors, size, and direction to make the important items stand out
- Create continuity throughout the design so that the users can quickly learn the interface
- Optimally size and place the elements so that they are easy to use and indicate the importance and connection between actions
- Use metaphors to support communicating a message

➤ Usability

Usability is about how easily a product can be used by specified users to accomplish their goals.

It is important to understand that ‘Usability’ is not a single property of a system or a product. It is a combination of various factors including effectiveness, efficiency of use, engagement, error tolerance, and ease of learning. Refer to figure 2.4.

**Figure 2.4: Five Es of Usability****Guidelines for creating a usable design:**

- **To make the UI effective:**
 - Provide response/feedback on all critical activities
 - Remove error opportunities.
 - Provide adequate information for user to make decisions.
- **To make the UI efficient:**
 - Design navigation for ideal and alternate workflows
 - Provide shortcuts
 - Employ design and interaction styles that are faster to execute
 - Minimize unnecessary elements on the screen
- **To make the UI engaging:**
 - Use clear and familiar language that can be easily understood by the user
 - Avoid confusing set of acronyms and terminology with no clear explanation
 - Use consistent layout, navigation, messages, labels, and representation of the information
 - Use colors and fonts carefully. Do not use too many colors as it may distract users
 - Set a suitable conversational tone to help users to understand the content better
 - Make the screen less cluttered and easier to understand
 - Present the flow of actions, information, responses and visual preparations in a sensible order that is easy to recollect and place in context
 - Have good cross-linkages and quick jumps to important sections of the Websites
- **To make the UI error tolerant:**
 - Use controls that help in correct selection
 - Ensure that actions are easily reversible and the user never loses his/her work as a result of an error on their part or system or communication problems
 - Display error messages that provide the information necessary for recovery
 - If the user requests, provide additional explanation during error connection
- **To make the UI easy to learn:**
 - Create a helpful interface. Provide minimalist prompts and instructions wherever required
 - Set UI design standards and then stick to them
 - Construct 'guided/directed' interfaces for challenging or uncommon tasks.
 - Ensure that the same action should always yield the same result.
 - Do not change the function and position of the standard elements.

➤ Information Architecture

Information architecture focuses on organizing, structuring, and labelling content in an effective and sustainable way, so that the users can find the relevant information and complete their tasks easily.

Guidelines for creating effective information architecture:

- Design information architecture from end users' perspective - keeping user's requirements and preferences in mind
- Use consistent layouts to help users easily navigate through the site
- Organize the content in a structured manner
- Use concise, clear, consistent, and descriptive labels for navigation items and links
- Maximize findability through proper navigation logic and detail in the descriptions
- Provide navigational hints to let users know their location within the site, how to get back, and how to jump back to the start
- Enable users to navigate to the most important content and functionality in as few clicks as possible
- Present links to the main features and content on the landing page, prioritized according to the user's needs

➤ Interaction Design

Interaction design is a user-centric approach of designing an interactive system focused around end users - their goals, experiences, what they need, and how they expect the system to work.

Guidelines for designing interactions:

- Try to match user's previous experiences and expectations by using common conventions or UI patterns
- Use consistent layout, navigation, terminology, labels, and representation of the information to help users learn the system more quickly
- Avoid excessive features and functions. Also, divide difficult tasks into manageable sub-tasks
- Offer visual hints or text messages to users about when to start an interaction
- Provide text messages or visual clues while a request is being processed to let the user know what is happening within the system
- Use clear and easily distinguishable icons to improve perceptibility of interaction
- Group the logically connected items to communicate and separate unrelated items to achieve visual organization
- Design generic interactions so that user can replicate the experience across multiple interactions
- Make the interactions intuitive so that the user can easily predict how to use it

➤ User Research

User research is the most critical component in any UXD initiative. It focuses on understanding user needs, behaviors, expectations and motivations through one-on-one interviews, research, surveys, user observation, and other feedback methodologies.

Through user research, you can design a UI that supports and helps user behavior in a way that users will feel it natural and effective.

Guidelines for carrying out user research:

- Allow users to organize the information into different categories. This helps to understand their expectations and thus, enables to create the site structure in the way users think
- Observe the users in their natural work environment and ask questions as they navigate the site. This helps to understand the way they perform their tasks and accomplish their intended goals
- Develop user personas to identify and prioritize their specific goals
- Conduct a moderated discussion to learn about users' attitudes, views, needs, and responses to concepts
- Build prototypes and gather feedback from users while still at design stage
- Carry out online surveys to collect information from a broad audience
- Evaluate a product by testing it with representative users

Quick Test 2.1

1. UI and UX are not interchangeably and these are two separate entities with completely different meanings.
 - a. True
 - b. False
2. UX is the big picture that includes the entire process from concept to completion.
 - a. True
 - b. False

2.4 Significance of UX

A good user experience plays a crucial role in the effectiveness of a Website design. It helps the user to easily navigate the site and understand how to use it. A useful, pleasurable, comprehensive, desirable, and quick UX develops an interaction-rich experience that drives the users back to the site.

On the other hand, poor user experiences create a negative emotional connection to the site for users.

Simply stating, without an effective UX, products such as Websites, apps, or software are likely to fail.

2.5 Principles and Guidelines of UX Design

The key principles for creating engaging user experiences are as follows:

➤ **Familiarity**

A user should be able to recognize the UI components and view the interaction as similar to the ones they have interacted before. Note that users do not spend time in exploring or admiring the UI. They prefer a familiar design where they can easily identify the features based on their past experiences and can directly locate the ones they require. Refer to figure 2.5.



Figure 2.5: Example to Demonstrate Familiarity Principle

Image Courtesy: <http://www.8164.org/familiarity-learnability/>

News/blog sites are a great example to explain Familiarity principle.

These sites share the same layout and navigation. Layout is typically such as a newspaper, and navigation is generally placed on the left or top. To improve the readability, article headers are usually written in bigger font size. The familiarity with the design helps the users to access the Website easily without having to think too much about the functionality.

➤ Clarity

Clarity plays an important role in creating seamless UX design. It focuses on arranging various elements on the Web page to maximize the user's chance of using the site effectively.

A clear design provides answer to three basic questions:

- What is it?
- What can I do here?
- Why should I do it/how it is useful for me?

Refer to figure 2.6.



Figure 2.6: Example to Demonstrate Clarity Principle

Image Courtesy: <http://conversionxl.com/5-principles-of-persuasive-web-design/>

Square reader Website is a great example to demonstrate the clarity principle.

It answers all the three basic questions:

- **What is it?** : It is a credit card that starts accepting credit cards on the very first day of purchase. A clear and relevant image supports the context.
- **What can I do here?** : A user can get a credit card reader here.
- **Why should I do it/how it is useful for me?** : The card reader is free. A user just has to pay 2.75% per swipe for Visa, MasterCard, Discover, and American Express.

➤ **Recoverability**

Recoverability emphasizes that the user actions should be reversible. The design should allow the users to undo the wrong actions without any other negative repercussions. In addition, when a user makes a mistake, the design should guide the users about how to proceed further. The user should never be left at a 'dead-end' in the Website or app, where their next step is not clear and they have to figure out what to do next. Refer to figure 2.7.

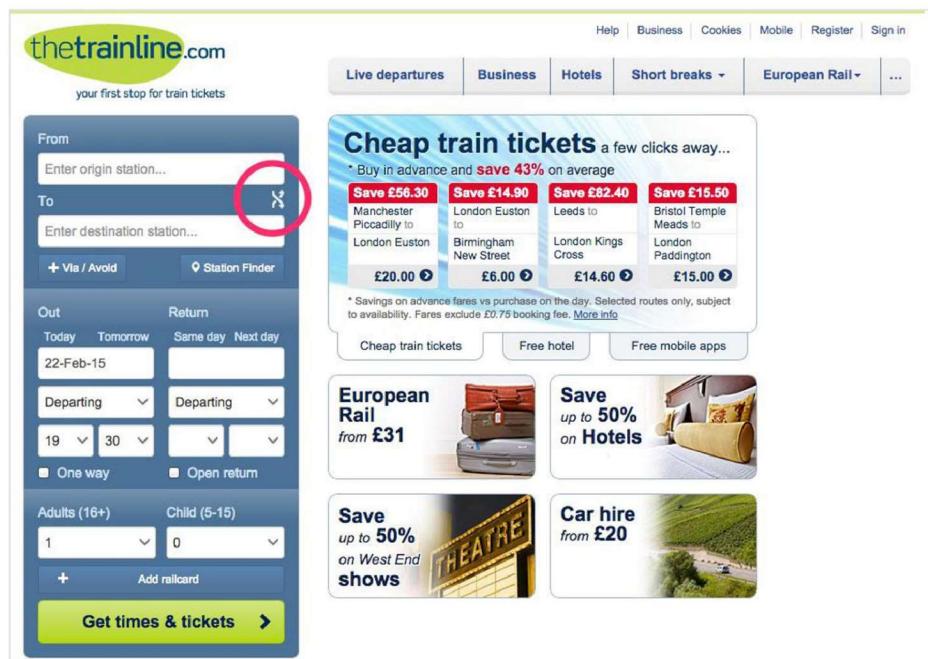


Figure 2.7: Example to Demonstrate Recoverability Principle

Image Courtesy: thetrainline.com

The trainline.com site is a good example to demonstrate recoverability principle. It offers a useful button (highlighted in figure 2.7) to allow users to change the direction of their journey.

➤ **Responsiveness and Feedback**

The UI design should be quick to respond and there should be no lag time in loading. It should provide helpful information to the user about the task in hand. Also, the UI needs to provide appropriate and timely feedback to specify that the action is happening and whether it is successful or unsuccessful.

Refer to figure 2.8.

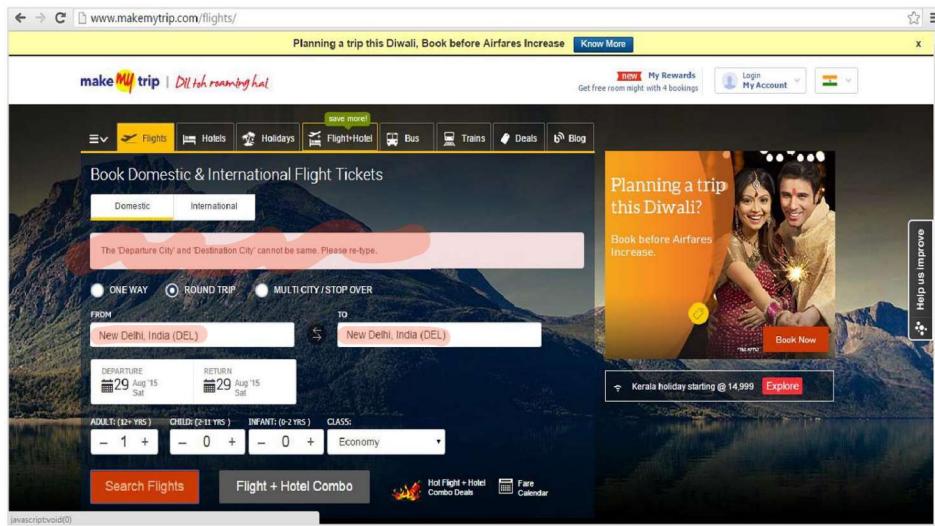


Figure 2.8: Example to Demonstrate Responsiveness and Feedback Principle

Image Courtesy: <http://www.makemytrip.com/>

Make my trip (travel site) is a good example to explain responsiveness and feedback principle. A clear and immediate feedback is shown to users in case they select any wrong option in the form. This helps them to easily rectify the problem and move onto the next step.

➤ Simplicity

The design should be simple to understand and simple to use irrespective of the user's experience, verbal skills, knowledge, or current concentration level. It incorporates only the components that are most important for communication. It should also make common tasks simple to perform and provide good shortcuts that are meaningfully related to longer procedures.

Refer to figure 2.9.

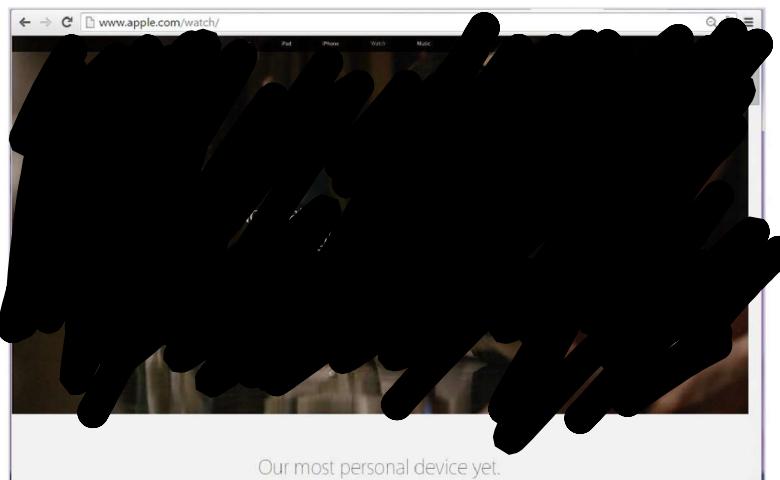


Figure 2.9: Example to Demonstrate Simplicity Principle

Image Courtesy: <http://www.apple.com/watch/>

Apple.com is a great case to explain the Simplicity principle.

The UI of Apple.com is extremely simple. Only the relevant content is presented in a clean and straightforward way to avoid any distractions. The clear UI design makes the Website just as intuitive to use as all other Apple products.

➤ Content Delivery

The UI should provide a well-timed and relevant content to the users. This helps to increase in a tangible manner the user's satisfaction. Refer to figure 2.10.



Figure 2.10: Example to Demonstrate 'Content Delivery' Principle

Image Courtesy: <https://www.amazon.com>

'Customers Who Bought This Item Also Bought' function on Amazon.com is a perfect example of providing immediate and relevant information to the users.

➤ Delight

The UI design should be intuitive, simple, and attractive to delight the user and make an emotional connect with them. It should be thorough and accurate. Also, the fonts, color palette, graphics, and animation should be used wisely to provide a better and more usable experience. Refer to figure 2.11.

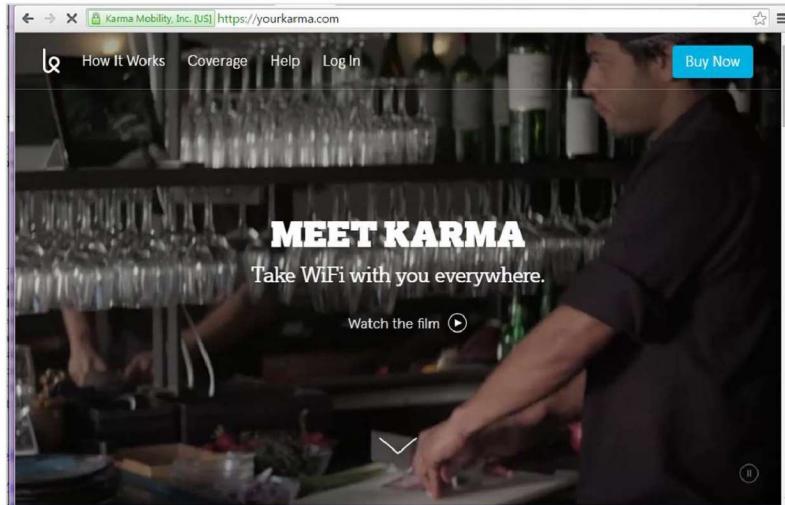


Figure 2.11: Example to Demonstrate 'Delight' Principle

Image Courtesy: <https://yourkarma.com/>

The Website for the Your Karma mobile Wi-Fi device is the perfect example of captivating user experiences. The mixture of great fonts, delicate shading palette, smart illustrations, and profound animation makes for a really nice UI.

Quick Test 2.2

1. Without an effective user experience, products such as Websites, apps, or software are likely to fail.
 - a. True
 - b. False

2. Clarity focuses on arranging various elements on the Web page to maximize the user's chance of using the site effectively.
 - a. True
 - b. False

2.6 Best Practices in UX Design

Some of the best practices for designing and creating amazing user experiences are as follows:

➤ **Connect the Goals:**

Clearly identify business goals and user goals to understand their expectations. Then compare the goals to find any differences and build appropriate design solution.

➤ **Take Inputs:**

Take periodic inputs from the stakeholders to understand their perspective. Involve stakeholders at the kick off stage, wireframe rounds, usability testing and finally at the launch to take their feedback and incorporate suggestions to the design.

➤ **Design Collaboratively:**

Collaborate with other team members/designers to improve the overall design of the system.

➤ **Build Personas:**

Create personas by interviewing various individuals in the same position, and compiling their traits, desires, limitations, and beliefs into an imaginary user. This helps to identify the goals of the target users and prioritize features as per their requirements. Refer to figures 2.12a and 2.12b.



Figure 2.12a: Example of Personas

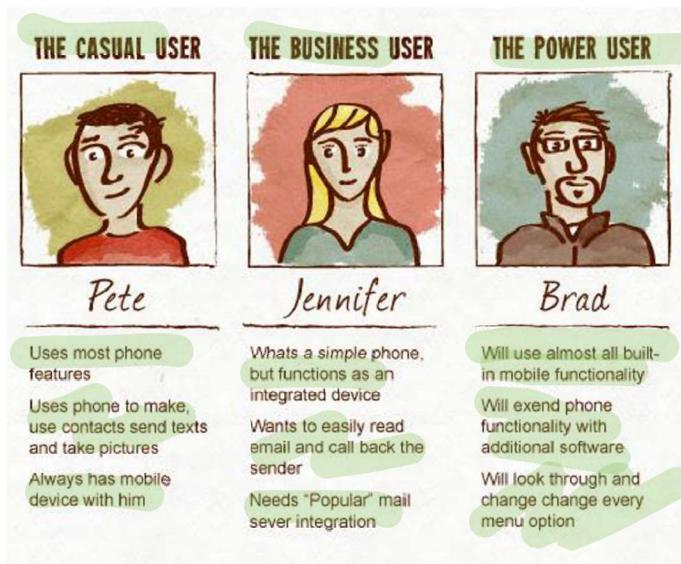


Figure 2.12b: Example of Personas

Image Courtesy: <http://www.smashingmagazine.com/2014/08/a-closer-look-at-personas-part-1/>

<http://frontdigital.com/category/user-experience-ux/>

➤ **Create Paper Prototypes:**

Create a rough prototype showing all interactive pieces on a paper. Now, ask a person (if possible, a person who fits the target end user) to act as the user and simulate actions and interactivities. Carefully notice his/her successes and struggles to get an immediate feedback. Refer to figure 2.13.

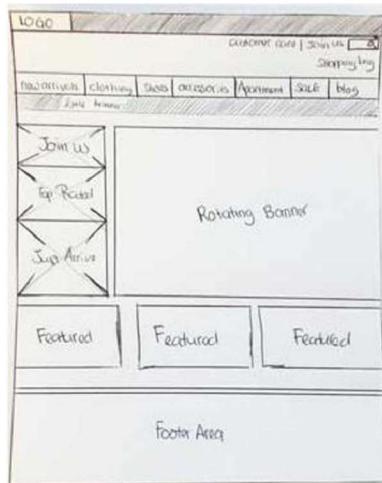
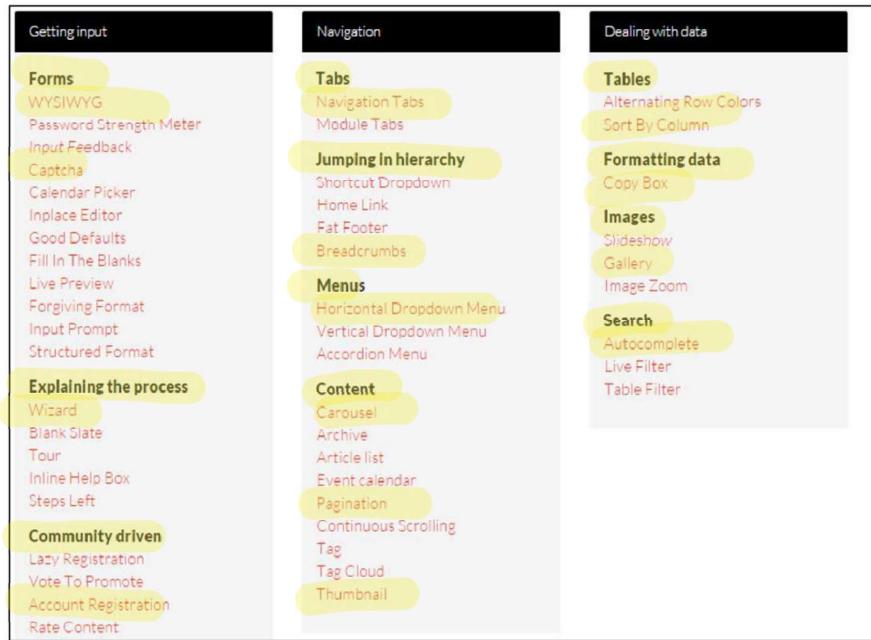


Figure 2.13: Example of a Paper Homepage of a Website

Image Courtesy: <http://www.leanenterprisetoronto.com/blog/paper-prototypes-and-discounting-value-usability-testing>

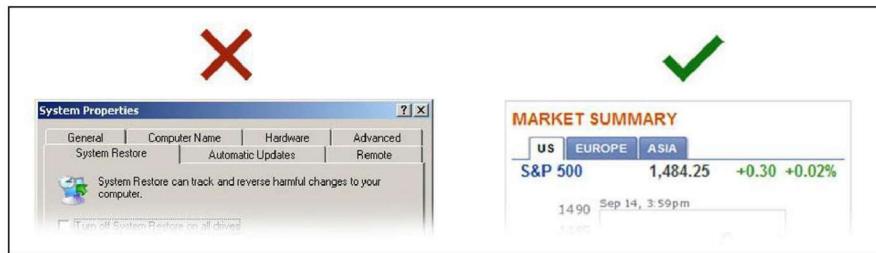
➤ **Research UI Patterns:**

Research UI design patterns for getting inputs, navigation, dealing with data and other activities and select the preferable pattern from the user's experience perspective. Refer to figure 2.14.

**Figure 2.14: Examples of UI Design Patterns***Image Courtesy: <http://ui-patterns.com/patterns>*

➤ **Use Tabs Effectively:**

Use tabs effectively to alternate between views within the same context and not to navigate to different areas. Refer to figure 2.15.

**Figure 2.15: Proper Usage of Tabs***Image Courtesy: <http://userexperiencedesigns.com/>*

➤ **Reduce Clutter:**

Make the screen less cluttered and easier to understand. Consider using tabs, drop-down menu, or another way of displaying only the most helpful information and tools at any one time.

➤ **Create Emotive Design:**

Create an emotive design to engage users in a focused way. Keep the design simple and aesthetically attractive. Also, make it highly functional, easy to comprehend, and intuitive to navigate.

➤ **Take Advantage of Web Typography:**

Consider using Web typography, such as Typekit and Google Web Fonts, to improve the aesthetics of the Website or application. Refer to figure 2.16.

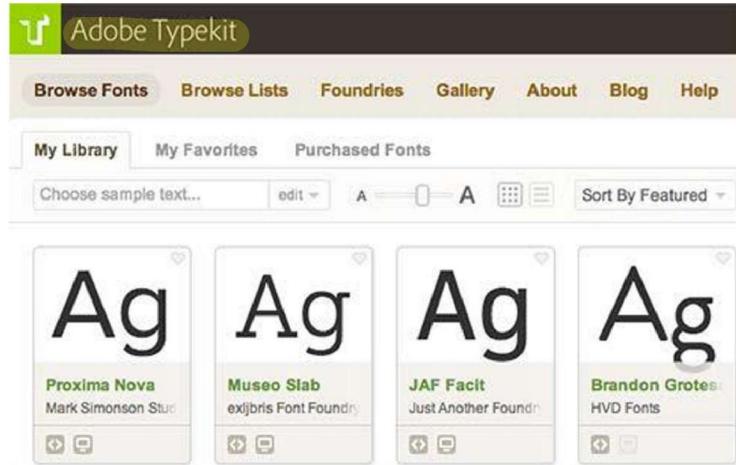


Figure 2.16: Example of Web Typography

Image Courtesy: <http://blogs.adobe.com/creativecloud/creative-cloud-for-desktop-bringing-the-best-fonts-to-your-desktop/>

➤ **Improve Readability:**

To improve the readability of the Website, do not use too much of text. Restrict text to maximum 50-60 characters per line. Use bullet points wherever possible to help users to get the main idea about the content while skimming through it. Also, use a bold interface to make text easily scannable.

➤ **Use Simple and Familiar Language:**

Employ familiar concepts and use a language that is known to the user.

➤ **Anticipate Errors:**

Consider the possible errors a user might encounter while navigating the site and then create a response for that error to help the user get back to normal.

➤ **Keep Menus and Navigation Simple:**

Avoid multi-level menus as much as possible. Use direct icons that are consistent with Web terminology and use less space on screen. Also, avoid elements that cause issues across different environments.

➤ **Highlight Real-time Changes:**

Provide visual cues to draw attention to the updated information. Consider changing the background color around the updated text, changing the font color or font size and/or adding in some animations to highlight the updated information.

➤ **Test and Optimize Usability:**

Continually test and improve UX throughout the design process. Keep the feedback loop open and continuous.

The image shows a screenshot of the Onlinevaristy website. At the top, there's a logo with the text "Onlinevaristy" and "your e-way to learning". Below the logo, there's a graphic featuring a hand holding a marker and writing "NEED SOLUTIONS?" inside a red circle. To the left of the hand, there's a vertical list of six questions: WHO, WHAT, WHERE, WHY, WHEN, and HOW, each with an arrow pointing towards the hand. To the right of the hand, the text "Visit Frequently Asked Questions" is displayed, followed by an '@' symbol. At the bottom of the screenshot, the website's URL "www.onlinevaristy.com" is shown in a large orange bar.