

# LESSON 2:

## USER INTERFACE DESIGN

OBJECTIVES:

#### At the end of this lesson, the student will be able to:

* + Explain the concepts of user experience and user interface;
  + Enumerate essential principles of user interface design;
  + Identify important guidelines in user-interface design for mobile devices, desktop applications, and web-based systems;
  + Name the different types of user interface; and
  + Discuss the process of designing a good dialog.

##### Duration: 2 hours

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**UNIT 4:** *Systems Design*

What is User Interface?

User interface refers to the overall design of the software's human-computer interaction, which describes how users interact with computer systems. It involves hardware, software, screens, menus functions, and features that affect two-way communications between the user and the computer (Shelly & Rosenblatt, 2012).

User interface design is part of a field of study called Human-Computer Interaction (HCI). According to Galitz (2007), “*Human-computer interaction is the study, planning, and designing of how people and computers work together so that a person's needs are satisfied most effectively*.”

According to (Satzinger, Burd, & Jackson, 2016), "User interface design must include the entire user experience. The User Experience (UX) refers to all aspects of a person's interaction with a software application, including actions, responses, perceptions, and feelings".

Principles of User Interface Design

The basic principles of a user interface are discussed below. These principles are based on (Constantine & Lockwood, 1999).

##### Structure principle

* + Must be organized in a meaningful and useful way.
  + Put related things together.
  + Organization of the user interface should conform to the structure of the supported work and conform to the user’s understanding of the work.
  + Overuse of metaphors makes the user interface difficult to understand.
  + Left, right and centered text: Using vertical arrangement is an inappropriately visual metaphor.
  + Indentation and border alignment are related to the border of the text.

##### Principle of Simplicity

* + Make simple and commonly used functions simple and easy to implement.
  + Use the user's language for concise and understandable communication.
  + Provide semantic-related shortcuts for lengthy operations.

##### Visibility Principle

* + Make all the options and materials needed to complete a given user visible to the user.
  + Avoid additional or redundant information interfere with the user.
  + The design goal is to make all needs and related options visible and clear.
  + Don't let users be confused by unnecessary information.

##### Feedback principle

* + Successful feedback is to provide information in a way that can be noticed, read, and correctly understood by the user.
  + The feedback that appears in the center and top of the screen is easy to notice.
  + A good error message starts with a header that allows users to know what the problem is immediately.
  + Good error messages explain clearly and concisely what the problem is.
  + A good error message will give suggestions on how to solve the problem.

##### Principle of tolerance

* + Provide undo and redo functions to reduce user errors and improper operation, while maintaining a variety of input forms and sequences.
  + After checking, on the screen, returned to the user, set all illegal or invalid data fields to high brightness, place the cursor on the first error data field, and explain the status bar.

##### Principle of Reuse

* + The consistency of appearance, location, and behavior within the user interface makes the software easy to learn and remember how to use.
  + The higher the degree of reuse, the better the consistency. An inconsistent user interface will not only reduce the usability of the software but also increase the workload of programming.

### User Interface Design Guidelines

The design guidelines in the user interface are introduced below. These guidelines are derived from (Galitz, 2007). These are organized in the order of the development steps in creating a graphical system's web site's screens and pages for the interface design process.

Step 1: Know Your User or Client

* + Understand human characteristics and how people interact with computers.
  + Identify the user’s characteristics and the level of user’s knowledge and experience.

Step 2: Understand the Business Function

* + Perform a business definition and requirements analysis.
  + Describe current activities through task analysis.
  + Develop a conceptual model of the system.
  + Establish design standards.
  + Explain the appropriate training needs.
  + Establish system usability design goals.

Step 3: Understand the Good Screen Design Principles A well-designed screen:

* + Reflects on the needs and tasks of the users.
  + Develops within the physical constraints executed by the hardware on which it is displayed.
  + Utilizes the capabilities of its controlling software efficiently.
  + Achieves the system’s business objectives for which it is designed.

Step 4: Develop Menus and Navigation Schemes of the System

* + The system must be capable by some means to tell people about the information about the things it can do.
  + Menus are an effective form of navigation through a system.
  + Displaying listings such as *Menus* must be accomplished to provide the user's choices or alternatives while using the system.

Step 5: Select the Windows Proper Kinds

* + A display includes one, two, or more windows within its boundaries. Step 6: Select the Proper Device-Based Controls
  + Identify the characteristics and capabilities of a mouse, trackball, joystick, graphic tablet, touch screen, light pen, etc. and provide the proper tools for users and their tasks.

Step 7: Choose the Proper Screen-Based Controls

* + Choose device-based controls to make the system a success. A proper fit between user and control is essential to produce an accurate and precise performance. On the other hand, a poor fit has lower productivity, more errors, and often user dissatisfaction outcome.

Step 8: Write Clear Text and Messages

* + To make the system a success, creating text and messages in a form the user wants and understands is essential.
  + Available rules for writing text and messages for systems and Web sites should be presented.

Step 9: Provide Effective Feedback

* + Useful feedback and guidance and assistance are also necessary elements of good design.
  + Present the guidelines for submitting to the user feedback about the system processing status, and the system response times meet user needs.
  + Describe the kinds of guidance and assistance included in a system and present various types of essential design guidelines.

Step 10: Provide an Effective Internationalization and Accessibility

* + People from different cultures and speak other languages may use graphical systems and Web sites.
  + Provide guidelines for accommodating different cultures and languages and other types of users in the design.

Step 11: Create Meaningful Graphics such as Images and Icons

* + Graphics, such as icons and images, are an integral part of the design.
  + Present guidelines for various types of pictures.
  + Show a discussion of what kinds of icons exist, their usability function, and the design process, to make it more recognizable and meaningful.

Step 12: Choose the Proper Colors

* + Understand the proper use of color and how to use it effectively on statistical graphics screens, textual, and in web sites.

Step 13: Organize and Layout Windows and Pages

* + Must be organized and its elements presented clearly and meaningful.
  + Accurate comprehension of information and the fastest execution of user tasks. Step 14: Test, Test, and Retest
  + Interfaces and screens must be continually tested and refined as development proceeds.
  + Review the kinds of tests that can be performed.
  + Discuss creating, evaluating, and modifying prototypes in an iterative manner.
  + Reviews final system testing and ongoing evaluations of working systems.

### Types of User Interface

There are several types of user interfaces, including natural- language interfaces, question-and-answer interfaces, menus, form-fill interfaces, command- language interfaces, graphical user interfaces (GUIs), and various Web interfaces for use on the Internet (Kendall & Kendall, 2002).

1. Natural language interface
   * The dream and ideal of inexperienced users.
   * Interact with the computer in natural, language.
   * No special skills are required for the user.
2. Queries-and-Answer inquiries
   * The computer provides questions to the user on display, and to interact, the user enters an answer (via a keyboard stroke or a mouse click), and the computer then acts on that input information in a preprogrammed manner, typically by moving to the next question.
   * A dialog box is one of the many types of question-and-answer interface.
3. Menus
   * Provides user access with an on-screen list of available selections.
4. Form-fill interface
   * Also known as a form-based method and input/output form.
   * Consist of on-screen forms or Web-based forms displaying fields containing data items or parameters that need to be communicated to the user.
5. Command-line interface
   * Allows the user to control the application with a series of keystrokes, commands, phrases, or some of these three methods.
6. Graphical user interface (GUI)
   * An interface display format for communication between humans and computers, by using an input device (mouse) to manipulate icons or (menu options) to allow the users to select commands, call files, start programs, or perform other daily tasks.

### Designing Good Dialog

Dialog (Kendall & Kendall, 2002) is the communication between the computer and a person. Guidelines for designing good dialog includes the following:

1. **Meaningful Communication:** The system should only present clear information to the user.
2. **Minimal user action:** Keying code instead of the whole world and only enter unavailable data. As much as possible, try to use default values and provide shortcut keys.
3. **Standard operation and consistency:** Locating titles, information, message in the same place on all screens, and consistently using the same keystrokes for the same function. Also, standardize the color used for all screen.