Unit 4.3 Designing Interfaces and Dialogues

Introduction; Designing Interfaces and Dialogues (Process, Deliverables and Outcomes); Interaction Methods and Devices (Methods of Interacting, Hardware Options for System Interaction);

Designing Interfaces (Designing Layouts, Structuring Data Entry, Controlling Data Input, Providing Feedback, Providing Help); Designing Dialogues; Designing Interfaces and Dialogues in

Graphical Environments

Process of Designing interfaces and Dialogues

- Similar to designing forms and reports, the process of designing interfaces and dialogues is a user-focused activity. This means that you follow a prototyping methodology of iteratively collecting information, constructing a prototype, assessing usability, and making refinements. To design usable interfaces and dialogues, you must answer the same who, what, when, where, and how questions used to guide the design of forms and reports.

Methods of interacting

- **Command Language Interaction** : In command language interaction, the user enters explicit statements to invoke operations within a system. This type of interaction requires users to remember command syntax and semantics
- **Menu interaction :** A human–computer interaction method in which a list of system options is provided and a specific command is invoked by user selection of a menu option.
- **Form interaction** : A highly intuitive human–computer interaction method whereby data fields are formatted in a manner similar to paper based forms.

Methods of interacting

- **Object-based interaction :** A human–computer interaction method in which symbols (**Icon**) are used to represent commands or functions. **Icon** is a Graphical picture that represents specific functions within a system.
- **Natural language interaction :** A human–computer interaction method whereby inputs to and outputs from a computer-based application are in a conventional spoken language such as English.

- **Pop-up menu**
  - A menu-positioning method that places a menu near the current cursor position.
- **Drop-down menu**
  - A menu-positioning method that places the access point of the menu near the top line of the display; when accessed, menus open by dropping down onto the display.

Guidelines for Menu Design

Wording	• Each menu should have a meaningful title • Command verbs should clearly and specifically describe operations • Menu items should be displayed in mixed uppercase and lowercase letters and have a clear, unambiguous interpretation
Organization	• A consistent organizing principle should be used that relates to the tasks the intended users perform; for example, related options should be grouped together, and the same option should have the same wording and codes each time it appears
Length	• The number of menu choices should not exceed the length of the screen • Submenus should be used to break up exceedingly long menus
Selection	• Selection and entry methods should be consistent and reflect the size of the application and sophistication of the users • How the user is to select each option and the consequences of each option should be clear (e.g., whether another menu will appear)
Highlighting	• Highlighting should be minimized and used only to convey selected options (e.g., a check mark) or unavailable options (e.g., dimmed text)

Hardware options for system interaction

Common Devices for Interacting with an Information System

Device	Description and Primary Characteristics or Usage
Keyboard	Users push an array of small buttons that represent symbols that are then translated into words and commands. Keyboards are widely understood and provide considerable flexibility for interaction.
Mouse	A small plastic box that users push across a flat surface and whose movements are translated into cursor movement on a computer display. Buttons on the mouse tell the system when an item is selected. A mouse works well on flat desks but may not be practical in dirty or busy environments, such as a shop floor or check-out area in a retail store. Newer pen-based mice provide the user with more of the feel of a writing implement.
Joystick	A small vertical lever mounted on a base that steers the cursor on a computer display. Provides similar functionality to a mouse.
Trackball	A sphere mounted on a fixed base that steers the cursor on a computer display. A suitable replacement for a mouse when work space for a mouse is not available.
Touch Screen	Selections are made by touching a computer display. This works well in dirty environments or for users with limited dexterity or expertise.
Light Pen	Selections are made by pressing a pen-like device against the screen. A light pen works well when the user needs to have a more direct interaction with the contents of the screen.
Graphics Tablet	Moving a pen-like device across a flat tablet steers the cursor on a computer display. Selections are made by pressing a button or by pressing the pen against the tablet. This device works well for drawing and graphical applications.
Voice	Spoken words are captured and translated by the computer into text and commands. This is most appropriate for users with physical challenges or when hands need to be free to do other tasks while interacting with the application.

Data Entry Screen Functional Capabilities

Cursor Control Capabilities:

Move the cursor forward to the next data field
Move the cursor backward to the previous data field
Move the cursor to the first, last, or some other designated data field
Move the cursor forward one character in a field
Move the cursor backward one character in a field

Editing Capabilities:

Delete the character to the left of the cursor
Delete the character under the cursor
Delete the whole field
Delete data from the whole form (empty the form)

Exit Capabilities:

Transmit the screen to the application program
Move to another screen/form
Confirm the saving of edits or go to another screen/form

Help Capabilities:

Get help on a data field
Get help on a full screen/form

Guidelines for Structuring Data Entry Fields

Entry	Never require data that are already online or that can be computed; for example, do not enter customer data on an order form if those data can be retrieved from the database, and do not enter extended prices that can be computed from quantity sold and unit prices.
Defaults	Always provide default values when appropriate; for example, assume today's date for a new sales invoice, or use the standard product price unless overridden.
Units	Make clear the type of data units requested for entry; for example, indicate quantity in tons, dozens, pounds, etc.
Replacement	Use character replacement when appropriate; for example, allow the user to look up the value in a table or automatically fill in the value once the user enters enough significant characters.
Captioning	Always place a caption adjacent to fields; see Table 11-7 for caption options.
Format	Provide formatting examples when appropriate; for example, automatically show standard embedded symbols, decimal points, credit symbol, or dollar sign.
Justify	Automatically justify data entries; numbers should be right justified and aligned on decimal points, and text should be left justified.
Help	Provide context-sensitive help when appropriate; for example, provide a hot key, such as the F1 key, that opens the help system on an entry that is most closely related to where the cursor is on the display.

TABLE 11-7 Options for Entering or Selecting Text

Options	Example
Line Caption	Phone Number ( ) - _____
Drop Caption	( ) - _____ Phone Number
Boxed Caption	Phone Number
Delimited Characters	(| | |) | | | - | | | | Phone Number
Check Boxes	Method of communication (check one or more) ❑ E-mail ❑ SMS (Text Message) ❑ Phone
Radio Buttons	Method of communication (check preferred method) ❍ E-mail ❍ SMS (Text Message) ◉ Phone

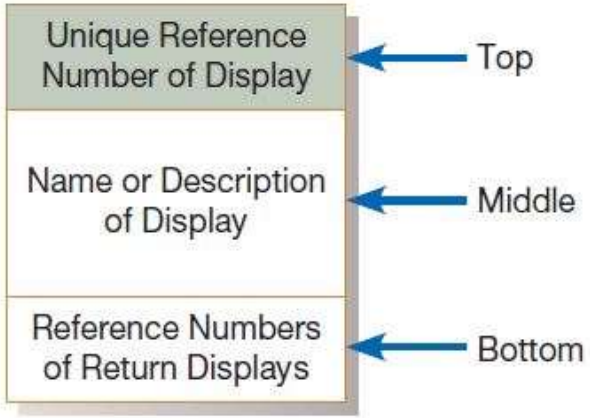
- **Dialogue :** The sequence of interaction between a user and a system.

Guidelines for the Design of Human–Computer Dialogues

Guideline	Explanation
Consistency	Dialogues should be consistent in sequence of actions, keystrokes, and terminology (e.g., the same labels should be used for the same operations on all screens, and the location of the same information should be the same on all displays).
Shortcuts and Sequence	Allow advanced users to take shortcuts using special keys (e.g., CTRL-C to copy highlighted text). A natural sequence of steps should be followed (e.g., enter first name before last name, if appropriate).
Feedback	Feedback should be provided for every user action (e.g., confirm that a record has been added, rather than simply putting another blank form on the screen).
Closure	Dialogues should be logically grouped and have a beginning, middle, and end (e.g., the last in the sequence of screens should indicate that there are no more screens).
Error Handling	All errors should be detected and reported; suggestions on how to proceed should be made (e.g., suggest why such errors occur and what user can do to correct the error). Synonyms for certain responses should be accepted (e.g., accept either "t," "T," or "TRUE").
Reversal	Dialogues should, when possible, allow the user to reverse actions (e.g., undo a deletion); data should not be deleted without confirmation (e.g., display all the data for a record the user has indicated is to be deleted).
Control	Dialogues should make the user (especially an experienced user) feel in control of the system (e.g., provide a consistent response time at a pace acceptable to the user).
Ease	It should be a simple process for users to enter information and navigate between screens (e.g., provide means to move forward, backward, and to specific screens, such as first and last).

(Source: Based on Shneiderman et al., 2009.)

- **Dialogue diagramming**
- A formal method for designing and representing human–computer dialogues using box and line diagrams.
- The three sections of the box are used as follows:
  - *Top: Contains a unique display reference number used by other displays for referencing* it.
  - *Middle: Contains the name or description of the display.*
  - *Bottom: Contains display reference numbers that can be accessed from the current* display.



Common Errors When Designing the Interface and Dialogues of Websites

Error	Description
Opening New Browser Window	Avoid opening a new browser window when a user clicks on a link unless it is clearly marked that a new window will be opened; users may not see that a new window has been opened, which will complicate navigation, especially moving backward.
Breaking or Slowing Down the Back Button	Make sure users can use the back button to return to prior pages. Avoid opening new browser windows, using an immediate redirect where, when users click the back button, they are pushed forward to an undesired location, or prevent caching such that each click of the back button requires a new trip to the server.
Complex URLs	Avoid overly long and complex URLs because it makes it more difficult for users to understand where they are and can cause problems if users want to e-mail page locations to colleagues.
Orphan Pages	Avoid having pages with no "parent" that can be reached by using a back button; requires users to "hack" the end of the URL to get back to some other prior page.
Scrolling Navigation Pages	Avoid placing navigational links below where a page opens because many users may miss these important options that are below the opening window.
Lack of Navigation Support	Make sure your pages conform to users' expectations by providing commonly used icon links such as a site logo at the top or other major elements. Also place these elements on pages in a consistent manner.
Hidden Links	Make sure you leave a border around images that are links, don't change link colors from normal defaults, and avoid embedding links within long blocks of text.
Links That Don't Provide Enough Information	Avoid not turning off link-marking borders so that links clearly show which links users have clicked and which they have not. Make sure users know which links are internal anchor points versus external links, and indicate if a link brings up a separate browser window from those that do not. Finally, make sure link images and text provide enough information to users so that they understand the meaning of the link.
Buttons That Provide No Click Feedback	Avoid using image buttons that don't clearly change when being clicked; use web GUI toolkit buttons, HTML form-submit buttons, or simple textual links.