UNIT 4: DEVICES TECHNOLOGICAL PERSPECTIVE INTERACTION STYLES AND DEVICES TECHNOLOGICAL PERSPECTIVE

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1.0 INTRODUCTION

An Interaction style can be described as an interaction technique that shares the same metaphor or design principle. Examples are command line and direct manipulation user interfaces.

Two major classes of interaction styles that will be considered are the dialogue style of Interaction between computer and user and the distinct styles of interaction

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Understand the various available interaction styles
- Distinguish among the interaction styles
- Understand elements of WIMP interface
- Understand and be able to choose Widgets

3.0 MAIN CONTENT

3.1 Interaction styles

Common Styles of Interaction are:
Command line interface Menus
Natural language
Question and answer, and query dialogue Form-fills and Spreadsheets
WIMP (Widows, Icons, Menus, Pointers) Interface Point and Click
Three—dimensional interfaces

Graphical user interface (GUI) Copy and paste, Cut and paste
Single Document Interface, Multiple Document Interface, Tabbed Document Interface Drag-and-drop
Cursor
Widgets (computing)
Direct manipulation interface Zooming User Interface (ZUI)

Interaction paradigms include Hypertext, hypermedia and hyperlinks
Speech recognition, Speech synthesis, Natural Language Processing, Non-speech audio input Mouse gestures and handwriting recognition
Haptics and Telehaptics Computer-mediated reality Virtual Reality (VR) Augmented Reality (AR)
CSCW: Computer Supported Collaborative (or Cooperative) Work, collaborative software Ubiquitous Computing ("ubicomp")
Wearable computers Brain-computer interface

Miscellaneous Handheld devices
Human Computer Information Retrieval Information retrieval
Internet and the World Wide Web Multimedia
Software agents Universal usability User experience design
Visual programming languages

Brief explanation will be given on each of the common interfaces:

Command line interface
This is the way of expressing instructions to the computer directly and it comprises the function keys, single characters, short abbreviations, whole words, or a combination of them.
The characteristics of command line interface are as follow:
It is suitable for repetitive tasks
It is more valuable for expert users than novices It offers direct access to system functionality
The command names and abbreviations should however be meaningful for an effective interface. A typical example is found in the Unix Operating System

Menus
These are set of options displayed on the screen Its characteristics include the following:
The Menu Options are visible, have less recall and it is easier to use because it relies on recognition the names should be meaningful.
Menu Selection is done by either clicking numbers, letters, using the arrow keys or mouse or combination (e.g. mouse plus accelerators)
Menu options are often hierarchically grouped in a sensible manner. It is a restricted form of full WIMP system

Natural language
This is a language that should be familiar to the user
It is in a form of speech recognition or typed natural language
Problems with the use of natural language are that it could be vague, ambiguous, and hard to use. Part of the solutions to this is for the user to try and to understand a subset of the language thereby picking on key words.

Query interfaces
This basically comprises Question and answer interfaces where the user is led through interaction via series of questions to be answered.
It is suitable for novice users but has restricted functionality It is often used in information systems
Some of these Query languages include the SQL used to retrieve information from database. This requires understanding of database structure and language syntax, hence requires some expertise

Form-fills
This is primarily used for data entry or data retrieval.
It is like a screen like paper form in which data is input in relevant place. It requires good design and obvious correction facilities
An example of a Form-fill:

Spreadsheets
The first spreadsheet was VISICALC followed by Lotus 1-2- 3. However MS Excel i the most common spreadsheet today having a sophisticated variation of form-filling.
It has grid of cells containing a value or a formula. The formula can involve values of other cells e.g. sum of all cells in this column. The user can nter and alter data in the spreadsheet with considerable consistency.

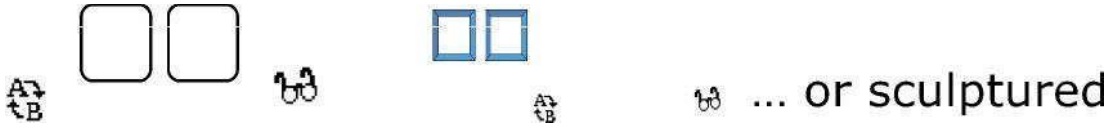
Point and click interfaces
This is used in multimedia ,web brow sers and hypertext. It is sometimes called 'j st click something'! using icons, text links or location on map.
It requires minimal typing

Three dimensional interfaces

This is made up of virtual reality, 'ord inary' window systems and 3D workplace

The 'ordinary' window systems com rises highlighting, visual affordance and indi scriminate use

The 3D workspaces have uses for ext ra virtual space, it is light and occlusion to gi ve depth and distance effects



WIMP Interface

'WIMP' stands for Windows, Icon s, Menus and Pointers (or Windows, Icons, Mice, and Pull-down menus!)

It is a default style interface for majority of interactive computer systems, especially PCs and desktop machines WIMP Interface Windows, Icons, Menus, Pointers

... or windows, icons, mice, an d pull-down menus!

Elements of WIMP interface:

The elements of the WIMP interface Windows, Icons, Menus and Pointers are:

Buttons, Toolbars, Palettes and Dialog boxes

Details are given below: Windows

These are areas of the screen that behave as if they were independent and can contain text or graphics which can be moved or resized. They can overlap and obscure each other, or can be laid out next to one another (tiled)

They are made up of

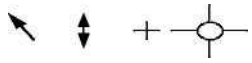
ii. scrollbars that allow the user to move the contents of the window up and down or from side to side

iii. title bars that describe the name of the window

Icons

Icons comprise small picture or image that represents some object in the interface. It often represents a window or action. The windows can be closed down or 'iconised'

A small representation may fit into many accessible windows. The icons can be many and various. They are highly stylized with realistic representations.



Pointers

These are important component WIMP style that relies on pointing and selecting things It uses mouse, trackpad, joystick, trackball, cursor keys or keyboard shortcuts to access wide variety of graphical images

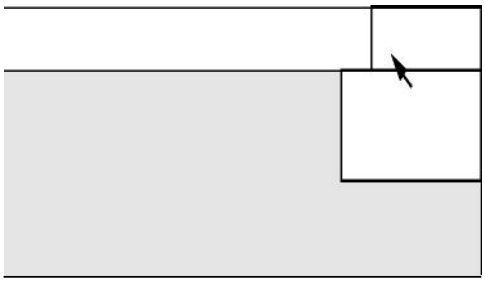
Menus

These are choice of operations or services offered on the screen

The required option is selected with pointer. However, this takes a lot of screen space This

problem is partly solved when a pop-up menu appears when needed

File Edit Options



Kinds of Menus
Menu Bar at top of screen (normally), menu drags down
i Pull-down menu - mouse hold and drag down me
ii Drop-down menu - mouse click reveals men
iv. Fall-down menus - mouse just moves over bar!

Font Typewriter
Screen
Times

Contextual menu appears where you are
Pop-up menus take actions for selected object Pie menus are arranged in a circle
This is easier to select item over larger target area
It is also quicker because it can move same distance to any option but this is not widely used!

Menus extras Cascading menus
This has a hierarchical menu structure in which a menu selection opens new menu and so in ad infinitum

Keyboard accelerators
This comprises key combinations with same effect as menu item. They are of two kinds:

— active when menu open
— usually first letter and
— active when menu closed
— usually Ctrl + letter

3.2 Menus design issues

In order to design an effective menu, the following issues should be considered:

- Which kind to use
- What to include in menus at all
- Words to use in action or description
- How to group items
- Choice of keyboard accelerators

Buttons
This is an individual and isolated region within a display that can be
selected to invoke an action The Special kinds that exist are
The radio buttons with a set of mutually exclusive choices and the check boxes with a set of non-exclusive choices.

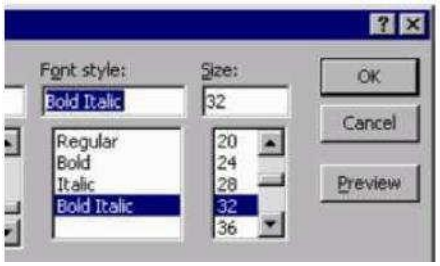
Toolbars
These are long lines of icons with fast access to common actions and are often customizable: You can choose *which* toolbars to see and choose *what* options are on it

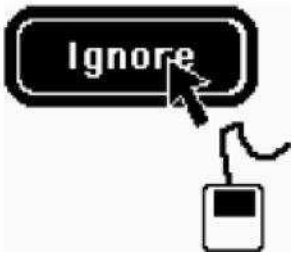
Palettes and tear-off menus
Palettes are little windows of actions shown or hidden via menu option in available shapes in drawing package
In tear-off and pin-up menus, menu 'tears off' to become palette

Dialogue boxes
These are information windows that pop up to inform of an important event or request information, for example when saving a file, a dialogue box is displayed to allow the user to specify the filename and location. Once the file is saved, the box disappears.

. 3 UNDERSTANDING AND CHOOSING WIDGETS

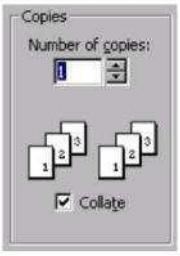
Widgets are bits that make the Graphical User Interface. They are the individual items on a Graphical User Interface (GUI). They can also be called the elements of the WIMP interface. Examples of widgets include the check boxes, the tool bars, the buttons, etc. See the pictorial illustration below.

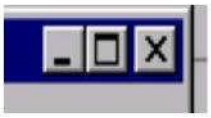




Three aspects of widgets can be identified in the following ways: By appearance in the way they look like
By the nature of their interaction as to how they behave and By their semantics as regards their meaning

By appearance:
Appearance includes words that are verbs that represent some action such as qu it, exit, embolden, and italicize.

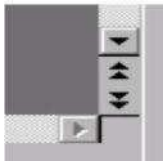




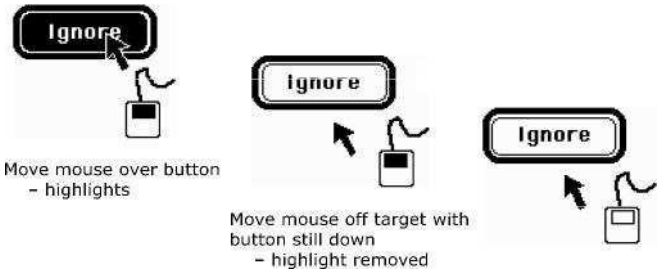
They could also be adjectives that de

scribe the state of those words such as bold, italic etc.

They could be nouns that represent the name of the appearance such as Times New Roman, etc.
They could be combination of verbs nd adjectives e.g. embolden + italic



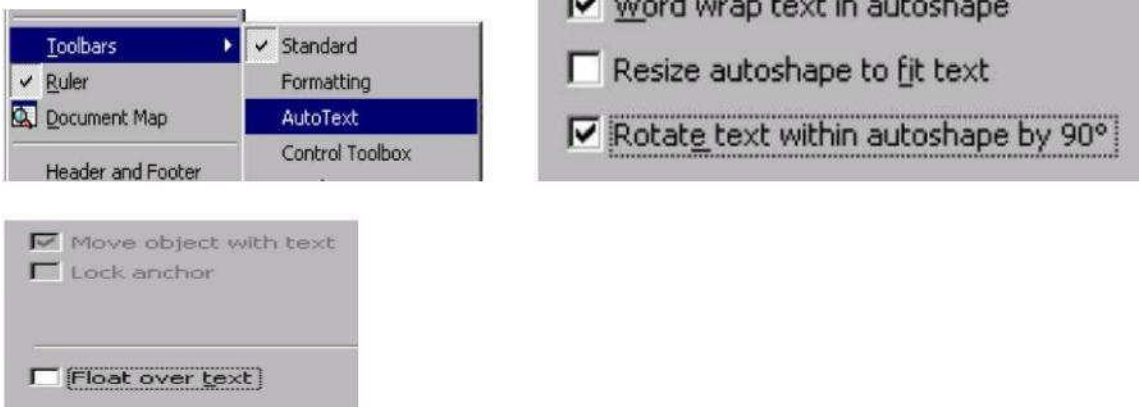
By behavior
This describes the action the toolkit arries out on your behalf and this can be co ntrolled. Examples are drawing and such interactions betwe en the widgets themselves. But timing issues of this behavior should be watched such as the large selections under Windows applications.
See the pictorial example below.



By semantics
Semantics are menus, buttons, etc th at do things as desired by the user..

An example is '... lets make it *bold italic*'

The semantics assignment is determined by the designer or user; YOU say what it means. The semantics is usually up to you.
Although widgets may link direct to database, even then, you say what links to the database. So to choose the widget for the job, assign meaning first on what you want it to do, followed by appearance and then how you want it done.
You may for example want actions carried out through menu, buttons, or toolbar or you want to set the status of options using checkbox, radio button, or combi-box.



4.0 Conclusion

Designing interaction styles should be based on the following criteria:
Domain— this considers the area of work under study e.g. graphic design
Goal — what the designer wants to achieve e.g. create a solid red triangle
Task — how you go wish to present the style ultimately in terms of operations or actions, e.g. select fill tool, click over triangle
The style should be easy to focus on look and feel because if you want someone to do something, make it easy for them and understand their values.

5.0 Summary

Interaction styles are the nature of dialogs between the user and the system.
A graphical user interface (GUI) is a type of user interface which allows people to interact with electronic devices like computers, hand-held devices through graphical icons, and visual indicators by direct manipulation of the graphical elements.
In WIMP Interface, 'WIMP' stands for Windows, Icons, Menus and Pointers (or Windows, Icons, Mice, and Pull-down menus!)
It is a default style interface for majority of interactive computer systems, especially PCs and desktop machines
Widgets are bits that make the Graphical User Interface. They are the individual items on a Graphical User Interface (GUI). They can also be called the elements of the WIMP interface.
Menus are choice of operations or services offered on the screen
A button is an individual and isolated region within a display that can be selected to invoke an action Toolbars are icons with fast access to common actions and are often customizable:
Palettes are little windows of actions shown or hidden via menu option in available shapes in drawing package
Dialogue boxes are information windows that pop up to inform of an important event or request information such as saving a file.

6.0 Tutor Marked Assignment

1. Mention 8 of the interaction styles available in HCI
2. Distinguish between the following pairs of interfaces

(i) Widgets and Graphical User Interface
(ii) Menus and Dialogue boxes
(iii) Drag — and- Drop and Copy or Cut and paste
(iv) Speech Recognition and Natural Language
(v) Command Line Interface and Direct manipulation Interface
(vi) Query Dialogue and Form- fills
(vii) Mouse gestures and handwriting recognition
(viii) Buttons and Palettes

3. Differentiate between the following types of widgets

(i) Widgets by appearance, (ii) Widgets by behavior, (iii) Widgets by semantics

4. What are keyboard accelerators?
5. In designing menus, what are the issues that should be considered?

7.0 Further Readings / References

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