**ITEC 630**

*Information Systems Analysis, Modeling, and Design*

***Lecture Notes***

**User Interface Design**

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**Learning objectives**

1. Describe several fundamental user interface design principles.
2. Explain the process of user interface design.
3. Discuss how to design the user interface structure.
4. Explain how to design the user interface standards.
5. Be able to design a user interface.

**Overview**

In general, interface design is the process of defining how the system will interact with external entities such as users or other systems. Therefore, there are user interfaces and system interfaces but this week lecture focuses on the design of user interfaces. A user includes the screen displays, the screens and forms that capture data, and the reports that the system produces. This week lecture presents the basic principles and processes of interface design and discusses how to design the interface structure and standards.

The user interface includes the input mechanism, the output mechanism, and the navigation mechanism. The input mechanism is the way in which the system captures information from users. The output mechanism is the way in which the system provides information to the user. The navigation mechanism is the way in which the user gives instructions to the system and tells it what to do.

This week lecture describes several fundamental user interface design principles and an overview of the user interface design process. It then provides an overview of the input mechanism, the output mechanism, and the navigation mechanism of user interface. This lecture focuses on the design of Web-based interfaces and graphical user interfaces (GUI) that use windows, menus, icons, and a mouse (e.g., Windows, Macintosh).

***Note #1: All links provided in this lecture can be activated with a "Ctrl + Click"; however, you can also activate these links by copy and paste the link content to the Web browser address bar, just in case.***

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**PRINCIPLES FOR USER INTERFACE DESIGN**

User interface design is an art and its goal is to make the interface visually appealing and simple to use. Several fundamental interface design principles that are common for navigation design, input design, and output design should be considered are layout, content awareness, aesthetics, user experience, consistency, and minimize user effort.

* ***Principles for User Interface Design***

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**USER INTERFACE DESIGN PROCESS**

The user interface design consists of a five-step process as follows:

1. Use Scenario Development
2. Interface Structure Design
3. Interface Standards Design
4. Interface Design Prototyping
5. Interface Evaluation

This process is iterative where systems analysts often move back and forth between steps. For the last step “interface evaluation”, it can be conducted by heuristic evaluation, walk-through evaluation, interactive evaluation, or formal usability testing.

* ***User Interface Design Process***

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**NAVIGATION DESIGN**

The goal of the navigation design is to make the system easy to use for users and to communicate to users with meaningful messages and/or recommended actions regarding the system conditions and statuses. The design should help prevent users from making mistakes, simplify the recovery from mistakes, and use consistent grammar order.

Menus (such as menu bar, drop-down menu, hyper-link menu, embedded hyperlinks, pop-up menu, tab menu, buttons and toolbars, and image maps), command languages, natural languages, and direct manipulation are used in navigation.

Error messages, confirmation messages, acknowledgment messages, delay messages, and help messages are common types of messages that the system responds to users.

* ***Navigation Design***

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**INPUT DESIGN**

The input design means designing a mechanism (screens, forms, etc.) to capture data into the system by using online or batch processing, capturing data at the source, and minimizing keystrokes. The goal of input design is to simply and easily capture accurate information for the system.

There are many different types of inputs including text fields, number fields, check boxes, radio buttons, on-screen list boxes, drop-down list boxes, and sliders. All data entered into the system should be validated by some combination of validation checks for minimizing users’ mistakes, reducing invalid information, and ensuring accuracy. There are six different types of validation checks: completeness check, format check, range check, check digit check, consistency check, and database check.

* **Input Design**

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**OUTPUT DESIGN**

Outputs are the most visible part of a system and they can be presented on the screen, on paper, or in other media, such as the World Wide Web. The goal of output design is to let system users accurately understand presented information with the least effort.

There are many types of reports: detail reports, summary reports, exception reports, turnaround documents, and graphs.

* **Output Design**

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**References**

1. Alan Dennis, Barbara Haley Wixom, and **Roberta M. Roth** (2012). **System Analysis and Design, Fifth Edition, John Wiley & Sons.**

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