**ITEC 630**

*Information Systems Analysis, Modeling, and Design*

***Lecture Notes***

**Human Computer Interaction**

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**Learning objectives**

1. Understand human-computer interaction
2. Design a variety of user interfaces
3. Learn two methods of usability inspections
4. Recognize human factor in HCI Design
5. Design effective onscreen dialog for HCI
6. Understand the importance of user feedback
7. Understand guidelines for usability in both GUIs and Web interface design

**Overview**

The human-computer interaction (HCI) is a very important aspect in computer information technology. It is considered as a layer of communications and interactions between humans and the computer. The study of HCI focuses on improving the interactions between users and computers by making computers more usable and receptive to the user's needs. Some organizations employ professional HCI designers, who specialize in applying design processes to the creation of graphical user interfaces and Web interfaces. In this lecture, we will learn about the history of HCI and the design of user interface, usability applicable to both GUIs and Web design, human factors, types of user interfaces, dialog design, feedback for users and some considerations in Web interface design.

***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.***

***Note #2: To access links associated with "http://library.books24x7.com.ezproxy.umuc.edu", you might have to log into UMUC Library and activate the link "Books24x7" first.***

**UNDERSTANDING HUMAN-COMPUTER INTERACTION**

Human-computer interaction (HCI) is an interaction between a human user and a computer system to perform tasks. The study of HCI focuses on making this interaction work better and its goal is to offer users with a high degree of usability.

Usability covers the effectiveness and efficiency of the user interface and the satisfaction of users in using that interface. As a result, two main factors are considered in measuring of usability are “ease of learning” and “ease of use”. Regarding the World Wide Web, even though there are some differences between graphic user interfaces and the Web, the HCI usability principles apply equally to both GUIs and Web interface design.

### From Human Factors to Usability: A Short History of HCI

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/human-computer-interaction-for-the-web/ch01lev1sec1**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/human-computer-interaction-for-the-web/ch01lev1sec1)

### HCI Principles for the Web

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/human-computer-interaction-for-the-web/ch01#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTAtMjAxLTcyOTkzLTglMkZjaDAxbGV2MXNlYzImcXVlcnk9**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/human-computer-interaction-for-the-web/ch01#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTAtMjAxLTcyOTkzLTglMkZjaDAxbGV2MXNlYzImcXVlcnk9)

### Guidelines Book

[**https://www.usability.gov/sites/default/files/documents/guidelines\_book.pdf**](https://www.usability.gov/sites/default/files/documents/guidelines_book.pdf)

**USABILITY INSPECTIONS**

Two inspection methods for evaluating the usability are heuristic evaluation and walkthroughs. The first one uses a set of usability principles known as heuristics to evaluate whether user-interface elements conform to the principles. The second one “walks through a task with the system and noting problematic usability features.”

## Inspections: Heuristic Evaluation and Walkthroughs

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/9780470665763/chapter-15-evaluation-inspections-analytics-and-models/chapter\_15\_evaluation\_inspecti#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODA0NzA2NjU3NjMlMkZuYXZwb2ludC0xMTImcXVlcnk9**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/9780470665763/chapter-15-evaluation-inspections-analytics-and-models/chapter_15_evaluation_inspecti#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODA0NzA2NjU3NjMlMkZuYXZwb2ludC0xMTImcXVlcnk9)

**HUMAN FACTOR IN HCI DESIGN**

One of the important factors to consider in the design of HCI is the human factor, which includes sensors (vision, hearing, taste, smell, and touch), responders, and a brain. The variability humans bring a big challenge when creating a GUI system that is expected to work well for everyone. As a result, it would help GUI designers to overcome this challenge by understanding aspects of the human that affect HCI.

## The Human Factor

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=51038&chunkid=993258153&rowid=81**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=51038&chunkid=993258153&rowid=81)

**TYPES OF USER INTERFACES**

The user interface is the system that allows users to communicate with the computer systems. There are quite a few of interface types covering about 20 interface types, starting with command-based and ending with brain–computer. Therefore, GUI designers need to know how to apply particular interfaces to different environments, people, places, and activities.

## Types of User Interfaces

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/9780470665763/chapter-6-interfaces/chapter\_6\_interfaces**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/9780470665763/chapter-6-interfaces/chapter_6_interfaces)

**PRINCIPLES AND GUIDELINES FOR DIALOG DESIGN**

Dialogs describe the conversation between the user and the computer and two main components of dialog design are dialog outline and dialog control. The first one is for representation of on-line screen activities and the second one is for representation of execution sequence. There are several types of dialogs including command, menu, form-fill-in, direct manipulation, or a combination of these.

### The Dialog

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=78420&chunkid=470211579&rowid=300&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=78420&chunkid=470211579&rowid=300&noteMenuToggle=0&leftMenuState=1)

**FEEDBACK FOR USERS**

Use feedback to indicate that an action is happening and was either successful or unsuccessful. Provide feedback responsively so that users remain confident and know what is going on. There are many ways to provide feedback, so choose the least intrusive form that communicates well.

### Feedback for Users

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=54051&chunkid=523979845**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=54051&chunkid=523979845)

**WORLD WIDE WEB DESIGN CONSIDERATIONS**

As mentioned in the above, the HCI usability principles apply equally to both GUIs and Web interface design regardless their differences. However, in addition to differences, usability designers should take into account to the predominant and recurring usability problems in the Web. Therefore, extra considerations are needed when developing Web interfaces by paying particular attention to Web usability and strategy, learning to avoid mistakes, and taking advantages of new available technologies.

* ***Web Usability***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/web-usability-strategy/ch02#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTAtMjAxLTcyOTkzLTglMkZjaDAxbGV2MXNlYzMmcXVlcnk9**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/web-usability-strategy/ch02#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTAtMjAxLTcyOTkzLTglMkZjaDAxbGV2MXNlYzMmcXVlcnk9)

* ***Web Usability Strategy***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/web-usability-strategy/ch02#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTAtMjAxLTcyOTkzLTglMkZjaDAyJnF1ZXJ5PQ==**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/web-development/usability/0201729938/web-usability-strategy/ch02%23X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTAtMjAxLTcyOTkzLTglMkZjaDAyJnF1ZXJ5PQ==)

* ***15 Common Mistakes in E-Commerce Design***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=73348&chunkid=141647632&rowid=161**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=73348&chunkid=141647632&rowid=161)

**Mashups**

A mashup is a web page or a web application created by combining or integrating information from different application programming interfaces (API).

* ***User Interface Mashups***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=77032&chunkid=167664771**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=77032&chunkid=167664771)

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1. <https://www.usability.gov/sites/default/files/documents/guidelines_book.pdf>

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