User-Centered Website Development: A Human-Computer Interaction Approach
Chapter 1: Introduction to HCI

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Chapter 1: Introduction to HCI

1. Human-Computer Interaction: An Overview

In this chapter you will learn about:

- The benefits of making a website more usable
- The history and goals of Human-Computer Interaction
- The methodology of User-Centered Development
1.1 Introduction

- Have you ever been unable to find something in a website that you know is there?
- Have you ever been enraged by a useless or misleading error message?
- Have you ever wondered why a website needs to know your e-mail address, and left the site for fear it might be misused?
It doesn’t have to be that way

- You can design websites that
  - Are pleasant and convenient for your users
  - Let them accomplish their goals
- The key: think about your users
  - Learn about them
  - Watch them work, in their workplace
  - Interview them, also in their workplace
1.2 Benefits of Usable Web sites

- Gaining a competitive edge
- Reducing development and maintenance costs
- Improving productivity
- Lowering support costs
Gaining a competitive edge, continued

- *Conversion rate* is the percentage of visitors who take an action you want them to take, such as making a purchase.
- Increasing the conversion rate lowers the cost of individual sales.
- Ease of use is the most important driver of high conversion rates.
- And there is gold in improving the conversion rate, which was 3.2% in May, 2003.
Reducing development and maintenance costs

- Learn about users first, and you will avoid
  - Implementing features users don’t want
  - Creating features that are annoying or inefficient
  - High cost of making changes late in the development cycle
Improving productivity

- For e-commerce, productivity means that users find what they want—and succeed in buying it.
- For a company intranet, productivity means employees become more efficient.
Lower support costs

- Calls to customer support are very expensive for the vendor: estimates range from $12 to $250 per call
- A website that reduces support calls can save major dollars
1.3 What is HCI?

“Human Computer Interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of the major phenomena surrounding them.”

As defined by the Special Interest Group on Human-Computer Interaction (SIGCHI) of the Association for Computing Machinery (ACM)
How do we make computers easy to use?

- By applying the principles of Human-Computer Interaction
- By being, as an HCI practitioner, the advocate for the user
1.4 Goals of HCI

To develop or improve the
- Safety
- Utility
- Effectiveness
- Efficiency
- Usability
- Appeal

... of systems that include computers
Safety

Safety of Users—think of
- Air traffic control
- Hospital intensive care

Safety of Data—think of
- Protection of files from tampering
- Privacy and security
Utility and effectiveness

- **Utility**: what services a system provides; examples:
  - Information
  - Instruction
  - Purchases

- **Effectiveness**: user’s ability to achieve goals; examples:
  - Find desired information
  - Enter credit card data
Utility and effectiveness are distinct

- A web site might provide all necessary services, but if users can’t find the items they want to buy, the site lacks effectiveness.
Efficiency

- A measure of how quickly users can accomplish their goals or finish their work using the system.
Usability

- Ease of learning
- Ease of use
- Can be an entire graduate course!
Appeal

- How well users like the system
  - First impressions
  - Long-term satisfaction
1.5 User-Centered Development Methodology

- User-centric, not data-centric
  - Involves users in the design process
  - Usability can be quantified and measured
- Highly Iterative
  - Involves testing and revision
- Interdisciplinary and eclectic, building on a dozen different disciplines
The stages of user-centered development

- Needs analysis
- User and task analysis
- Functional analysis
- Requirements analysis
- Setting usability specifications
- Design
- Prototyping
- Evaluation
Needs analysis

- Summarizes the nature and purpose of the system
  - Type of system (website, video game, spreadsheet)
  - People it will serve
  - Benefits it will provide
User and task analysis

- User analysis - characterizes the people who will use the site:
  - General considerations (age, education, experience with computers)

- Task analysis - what users will do
  - User’s goals - what they want to accomplish
  - Tasks or activities carried out to achieve the goals

- See Chapter 3
Functional analysis

- Functionality or computer services that users will need and what will be automated
  - Close correspondence between functions and tasks
- Examples: travel site task: “find all flights to xyz, ordered by price”
  - Needs search function and sorting capability
- Music CD site: task “buy a CD”
  - Needs secure on-line transaction functionality
Requirements analysis

- Describes the formal specifications required to implement the system:
  - Data dictionaries
  - Entity-relationship diagrams
  - Object oriented modeling

- Similar to software engineering
Setting usability specifications

- Answers question “How good is your site?”
- Performance measures (such as number of tasks completed, number of errors, etc.)
- Preference measures (such as first impression, overall satisfaction)
Design

- Organization
  - Visual organization to create clarity and consistency
  - Layout
- Appearance
  - “Look and feel”

Now you can begin to sketch layout of pages—because you know your users and what they want to do

See Chapters 4, 5, and 6
Prototyping

- Greek “proto” = first
- Prototype is an original model or pattern
  - Global: entire site
  - Local: selected parts of the site

- Prototypes
  - Evolutionary: becomes the final project
  - Throw-away: serves as a pattern
  - High fidelity: resembles final product
  - Low fidelity: just rough sketch - not close to final

- See Chapter 7
A low-fidelity prototype
A high-fidelity prototype
Evaluation

- Expert-based evaluation
  - Bring in a usability expert
- User-based evaluation
  - Test the website or other interface with users
- In this book we emphasize user-based evaluation
- See Chapter 8
1.6 Characteristics of User-Centered Development

- Highly iterative

流程图展示了一个迭代过程，包括设计（Design）、原型（Prototype）、评估（Evaluate）等步骤。如果用户规格不满足，流程会返回设计阶段；如果满足，流程继续到准备实施（Ready to Implement）阶段。