Design Evaluation

Introduction

Definition of Evaluation
Evaluate: to assess or appraise. Evaluation: process of examining instructional materials and rating it based on its value and effectiveness.

Method
Uses assessment and validation tools to provide data for the evaluation. Assessment: measurement of the practical results of the instruction; Validation: determines if the objectives of the instructional goal were met.

Model for Design Evaluation

- Evaluate Conceptual Design
  - Steps in Design
  - Theoretical Foundation
  - Conceptual Design of Instruct. Strategies
- Usability
  - Ease of Use, Ease of Learning
  - User Acceptance
- Learning Outcome
  - Effectiveness

Definition Human-Computer Interface

- Interface design is the process of selecting interface elements and features based on their ability to deliver support for the cognitive processes involved in the instructional activities facilitated by the application. (Plass, 1998, p. 39).
Design Evaluation

Interface Design Model

Definition Human-Computer Interface
- Interface not merely in charge of communication with the user, but is an
- Expression of the deliberate decisions by the instructional designer to include features in the conceptual model of the application that support different cognitive processes of learning

Design Evaluation

Analysis

Analyze End-User Requirements
- Problem Identification
- Identify Target Audience
- Needs Assessment
- Determine Learner Characteristics
- Define Goals
- Define Objectives

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Information Architecture

Definition
- Defines the content and features to fulfill objectives of a web site and how they are structured

Purpose
- Conceptual Design of Web Site for Programmers to implement: Flow chart

Information Architecture

Components
- Conceptual Design: Features
- Content: Organization of Information
- Navigation/Orientation Systems

Design Process for Information Architecture
- Map Objectives -> Features
- Map Features -> Content
- Structure Features
- Organize Content
- Design Navigational System based on Structure
Design Evaluation

Interaction Design
Definition
• Specifies the interactions between users and each feature of the application, including
  – Type and format of input
  – Logic of processing
  – Type and format of output
Purpose
• Specify the detailed functioning of each feature of the system

Information Design
Definition
• Specifies the appearance of the interface and the information contained in the system, such as
  – Presentation mode of information
  – Color scheme for interface
  – Type faces and their forms (attributes)
Purpose
• Specify the appearance of each feature of the system

Implement Prototype
• Programming (Coding)
• Produce media elements (graphics, video, etc.)
• Design and develop database back end (tables)

Evaluate
• Each phase of the design process
• Usability of the system
• Learning outcome
• Using living system capabilities

CIAO! Evaluation Framework
CIAO!
• Context
• Interactions
• Outcomes

Interface Design Evaluation Approach
• Evaluate conceptual design
  – Steps in design
  – Theoretical foundation
  – Conceptual design of instruct. strategies
• Usability
  – Ease of use, Ease of Learning
  – User Acceptance
• Learning outcome
  – Effectiveness
**Design Evaluation**

**Analysis**

**Evaluation**
- Expert review of the goals, objectives and target audience specifications
- Review user logs

**Information Architecture**

**Evaluation**
- Verify that instructional theories/frameworks and epistemological/philosophical beliefs used for the design of the features are appropriate for learners and content
- Verify that features sufficiently support the intended type of learning
- Review of the mapping process of features onto objectives and content onto features
- Review appropriateness of navigation

**Interaction Design**

**Evaluation**
- Review design of instructional strategies and how they support learner’s cognitive processes
- Review if the required conditions for the application of a particular design principle were met and if this design principle or theory was applied in an appropriately way
- Review if instructional strategies support the chosen learning theory/approach

**Instructional Strategies**

- **Taxonomy**
  - Social Setting
  - Presentation Modes of Information
  - Learning Mode
  - View Information
  - Acquire Knowledge
  - Construct Meaning

**Information Design**

**Evaluation**
- Review design of instructional strategies and how they support learner’s cognitive processes (function of multimedia elements)
- Review if the required conditions for the application of a particular design principle were met and if this design principle or theory was applied in an appropriate way (Dual Coding Theory, Cognitive Load Theory, Cognitive Theory of Multimedia Learning, …)

**Application of Pattern Language**
- Articulates and communicates the design of the entire system in a coherent, formal way (Alexander, Ishikawa & Silverstein, 1977; Tidwell, 1999)
- Units of language: design rules, or patterns, that capture the solutions to specific issues or problems in the design process in a particular context, and are therefore neither too abstract nor too specific

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**Design Evaluation**

**Implement System**

**Evaluation**
- Evaluate Prototype
- Usability
- User Acceptance
- Effectiveness

**Interface Design Evaluation Approach**
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**Design Evaluation**

**Usability Testing**

**Purpose**
- Assess the ease of use and ease of learning in the system as well as subjective acceptance by users

**Criteria**
- Content Quality, Clarity & Accuracy
- Ease of use
- Emotional Response
- Medium-Specific/Appropriate content
- Navigation

**Methods**
- Surveys
- Interviews
- Think-aloud protocols
- Walkthrough techniques
- Videotaping
- Recording log files of user actions
- Heuristic Evaluation/Expert Evaluation
- Experimental/Quasi-Experimental Designs

**Design Evaluation**

**Ease-of-Use/Learning**

**Criteria**
- Time needed to learn specific system functions
- User retention of commands over time
- Speed of task performance
- Number of clicks/steps for task performance
- Error rate in task performance
- Ease of Navigation
- Usefulness of Features (actual)

**Inspection**
- Cognitive Walkthroughs
- Heuristic Evaluation/Expert Evaluation
- Feature Inspection
- Perspective-based inspection

**Inquiry**
- Field Observation
- Focus Groups
- Recording log files of user actions
- Proactive Field Study
- Surveys
Design Evaluation

User Acceptance

Definition
- Subjective Usefulness of System Features

Criteria
- Navigation
- Screen design and layout
- Terminology
- Consistency and match with the user's tasks

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Learning Outcome

Purpose
- Determine effectiveness for learning

Criteria
- Recognition
- Production

Levels (Bloom)
- Recall
- Comprehension
- Transfer

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Design Evaluation

Methods
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- Interviews
- Focus Groups

Design Evaluation

Methods
- Multiple choice tests
- Matching tests
- Concept Mapping techniques
- Transfer tests
- In-game assessment

Cognitive Science

Group Activity (groups of 4)

Evaluate an instructional Web Site:
- Specify an objective for the Evaluation
- Select a Method for the Evaluation
- Decide on Evaluation Criteria
- Prepare Evaluation Plan
- Add your evaluation plan to your project’s design document.