Addis Ababa Science and Technology University

Department of Software Engineering

Introduction to HCI

Individual Assignment

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Catalog

Evaluation

Evaluation techniques in Human-Computer Interaction (HCI) are used to assess the usability and user experience of interactive systems. Common methods include usability testing, heuristic evaluation, cognitive walk-through, expert reviews, surveys, A/B testing, eye tracking, contextual inquiry, field studies, and analytics/log analysis. These techniques help identify usability issues, gather user feedback, assess system performance, and inform design improvements. By employing a combination of these evaluation methods, HCI practitioners can gain valuable insights into user interactions, behaviors, preferences, and overall satisfaction with the system.

The main goals of evaluation

- To assess the usability, accessibility, and effectiveness of a software, website, or system to determine how well it meets the needs of its users.
- To identify any usability issues, errors or opportunities for improvement that may exist within the system.
- To gather feedback from users to inform the design process and improve the overall user experience.
- To measure the efficiency and accuracy of a system's performance.
- To ensure that the system is safe and secure for users to interact with

Types of evaluation techniques

Evaluation techniques in HCI can be broadly categorized into two main types: expert analysis and user participation. These approaches involve different methods and perspectives for evaluating interactive systems. Here's a summary of each type:

1. Expert Analysis:

Expert analysis techniques rely on the expertise and knowledge of HCI professionals to evaluate the usability and user experience of a system. These techniques include:

- Heuristic Evaluation: Experts apply a set of predefined usability principles or heuristics to assess the system's interface and identify potential usability issues.

- Cognitive Walkthrough: Experts simulate user thinking and evaluate the system's design based on how well users can accomplish tasks.

- Expert Review: HCI experts use their knowledge and experience to evaluate the system's usability and provide recommendations for improvement.

2. User Participation:

User participation techniques involve involving actual users in the evaluation process. These techniques focus on gathering user feedback and insights to understand their experiences and preferences. Some common user participation techniques are:

- Usability Testing: Users perform specific tasks on the system while their interactions are observed and recorded. This provides direct feedback on usability and identifies areas for improvement.

- Surveys and Questionnaires: Users provide subjective feedback through surveys and questionnaires, expressing their opinions, satisfaction, and preferences regarding the system.

- Field Studies: Observing users in their natural environment over an extended period helps understand their real-world interactions and challenges with the system.

- A/B Testing: Users are randomly assigned to different versions of a system, and their interactions and responses are compared to determine which version performs better.

classify or leveled Evaluation Method as:

Design vs implementation:

Design and implementation are two interconnected aspects of Human-Computer Interaction (HCI). Design involves creating user-centered and intuitive interfaces through activities such as user research, interaction design, information architecture, and usability testing. Its focus is on meeting user needs and enhancing the user experience. Implementation, on the other hand, involves translating the design specifications into a functional system by writing code, testing, optimizing performance, and deploying the system. Collaboration and communication between designers and developers are essential for effectively translating the design vision into a working interface. Both design and implementation contribute to the success of interactive systems by creating usable, visually appealing interfaces that meet user needs and goals.

Laboratory vs. field subjective:

In Human-Computer Interaction (HCI), subjective evaluation methods can be conducted in laboratory or field settings. Laboratory subjective evaluation involves controlled experiments, questionnaires/surveys, and think-aloud protocols in controlled environments to gather subjective feedback. Field subjective evaluation, on the other hand, focuses on studying users' experiences in real-world settings through methods like contextual inquiry, long-term studies, and experience sampling. While laboratory methods provide controlled conditions for precise data collection, field methods offer insights into real-world contexts. The choice between laboratory and field subjective evaluation depends on research goals and the need for controlled environments versus ecologically valid insights. Combining both approaches can provide a comprehensive understanding of the user experience.

Objective qualitative vs. Quantitative:

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High level vs. low level:

In Human-Computer Interaction (HCI), high-level and low-level perspectives refer to different levels of abstraction and detail in the analysis and design of interactive systems. High-level HCI focuses on broader concepts, principles, and user goals, taking a more holistic approach. It involves understanding user needs, task flows, and overall system behavior to create intuitive and user-centered designs. Low-level HCI, on the other hand, deals with specific details and interactions within the interface, focusing on individual elements, interactions, and visual design. It involves fine-tuning the user interface, considering layout, typography, color schemes, and interaction patterns. Both high-level and low-level perspectives are crucial in HCI, as high-level considerations inform the overall design direction and user experience, while low-level considerations ensure the interface is visually appealing, functional, and supports efficient interactions. A balance between the two is necessary for creating effective and engaging interactive systems.

Obtrusive vs. Unobtrusive:

In Human-Computer Interaction (HCI), the concepts of obtrusive and unobtrusive design refer to the degree of impact or interference that a system or technology has on the user's attention, focus, and overall experience. Obtrusive design refers to interfaces or technologies that are noticeable, attention-grabbing, or intrusive, often demanding a significant amount of user attention. These designs may have a strong

presence, employ intrusive notifications, or disrupt the user's workflow. On the other hand, unobtrusive design aims to minimize interference and seamlessly integrate with the user's tasks and context. Unobtrusive interfaces and technologies are subtle, less distracting, and aim to support the user's goals without demanding excessive attention. Balancing obtrusiveness and unobtrusiveness in HCI is crucial to ensure that the user's attention and focus are appropriately directed while still achieving the desired functionality and usability of the system.

Time, subjects, equipment, expertise:

In Human-Computer Interaction (HCI), time, subjects, equipment, and expertise are essential factors in conducting effective research and evaluation. Time plays a crucial role in planning and executing studies, allowing for adequate data collection, analysis, and interpretation. Subjects, referring to the participants or users involved, are critical as they provide valuable insights and feedback on the interactive system being evaluated. Proper selection and recruitment of subjects ensure representative samples and diverse perspectives. Equipment, including hardware and software tools, are necessary for data collection, such as eye-tracking devices, usability testing setups, or specialized software. Lastly, expertise in HCI is vital to design and conduct studies, interpret findings, and apply appropriate methodologies and evaluation techniques. Expertise ensures accurate data collection, analysis, and the ability to draw meaningful conclusions for improving the user experience. Considering and managing these factors effectively in HCI research and evaluation are key to obtaining reliable and insightful results.

Universal Design and its principles

Universal Design is an approach in Human-Computer Interaction (HCI) that aims to create inclusive and accessible interactive systems that can be used by a wide range of individuals, including those with disabilities or diverse needs. It involves designing products, services, and environments that are usable, functional, and enjoyable for everyone, regardless of their abilities or limitations. The principles of Universal Design include equitable use, flexibility in use, simple and intuitive operation,

perceptible information, tolerance for error, low physical effort, size and space for approach and use, and appropriate sensory characteristics. These principles guide the design process to ensure that interactive systems are accessible, accommodating, and enhance the user experience for all individuals, promoting inclusivity and usability.

Multi-modal systems

Multi-modal systems in Human-Computer Interaction (HCI) refer to interactive systems that support input and output through multiple sensory modalities, such as voice, gestures, touch, and vision. These systems enable users to interact with technology using various modes of communication, providing flexibility and enhancing the user experience. By combining different modalities, users can choose the most convenient and natural way to interact with the system based on their preferences, abilities, and context. Multi-modal systems often employ techniques such as speech recognition, gesture recognition, touchscreens, and haptic feedback to enable seamless and intuitive interactions. The integration of multiple modalities in HCI allows for more inclusive, efficient, and engaging user experiences, accommodating a diverse range of users and their varying interaction styles.

System systems that use: Speech, non-speech sound, touch and handwriting etc.

In Human-Computer Interaction (HCI), systems that utilize multiple modes of interaction, such as speech, non-speech sound, touch, and handwriting, offer versatile and inclusive user experiences. These systems leverage speech recognition technology to enable users to interact with the system through spoken commands or queries, providing a hands-free and intuitive interaction method. Non-speech sound, including auditory feedback and alerts, enhances the user experience by conveying information or feedback through sound cues. Touch-based interactions, facilitated by touchscreens or touch-sensitive surfaces, allow users to directly manipulate objects or navigate interfaces using their fingers, providing a tactile and interactive experience. Handwriting recognition technology allows users to input text or draw directly on touch-enabled devices, mimicking the natural pen and paper interaction. By incorporating these various modes of interaction, HCI systems empower users to

choose the most convenient and effective method of engagement based on their preferences, abilities, and the context of use, leading to enhanced usability and engagement.

User support and its type

User support in Human-Computer Interaction (HCI) refers to the assistance and resources provided to users to help them effectively and efficiently use interactive systems. It aims to guide users, resolve their issues, and enhance their overall experience. User support can take various forms, including:

1. Documentation: This includes user manuals, online help guides, tutorials, and FAQs that provide information on system functionalities, usage instructions, troubleshooting tips, and frequently encountered issues.

2. Contextual Help: Integrated within the interface, contextual help offers on-screen prompts, tooltips, and interactive guides that provide real-time assistance and explanations for specific tasks or features.

3. Online Communities and Forums: These platforms facilitate user-to-user support where users can seek guidance, ask questions, and share their experiences with other system users, fostering a collaborative support environment.

4. Help Desk or Customer Support: Dedicated support channels, such as email, phone, or chat, provide direct assistance from support representatives who address user queries, provide technical support, and troubleshoot issues.

5. Training and Education: User training programs, workshops, or online courses help users acquire the necessary skills and knowledge to effectively utilize the system, empowering them to make the most of its features and functionalities.

By providing comprehensive user support, HCI systems ensure that users can overcome challenges, find answers to their questions, and feel confident in using the system, ultimately enhancing their satisfaction and productivity.