HCI CAT 1 – BIT 4103

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QUESTION 1.

**(a) Factors to Consider When Choosing an HCI Interface**

When selecting an appropriate Human-Computer Interaction (HCI) interface, it is crucial to consider a variety of factors to ensure usability and effectiveness. Key considerations include:

**The User's Skill Level and Characteristics:** This involves understanding the target audience's technical proficiency, age, potential disabilities, and experience with similar systems

**The Nature of the Task:** The tasks the user needs to perform will heavily influence the choice of interface. For repetitive data entry, a form-based interface might be suitable.

**The Context of Use:** This refers to the environment in which the interaction takes place. Factors such as lighting, noise levels, and whether the user will be stationary or mobile are important.

**System Functionality and Constraints:** The capabilities and limitations of the hardware and software must be taken into account.

**Learnability and Memorability**: A good interface should be easy to learn for new users and easy to remember for occasional users.

**Efficiency and Productivity:** The interface should allow users to complete their tasks quickly and with a minimum number of steps.

**(b) Describe how designing systems and interface appropriate to disabled users (2marks)**

Designing systems and interfaces that are appropriate for disabled users, often referred to as inclusive design or accessibility, involves creating experiences that can be used by people with a wide range of abilities. The goal is to provide an equivalent user experience for everyone. This is achieved by adhering to key principles:

**Perceivable:** Information and user interface components must be presentable to users in ways they can perceive. This means providing text alternatives for non-text content (like images), offering captions for videos, and ensuring that content can be presented in different ways (e.g., with a screen reader) without losing information.

**Operable**: User interface components and navigation must be operable. This includes making all functionality available from a keyboard, giving users enough time to read and use content, and not designing content in a way that is known to cause seizures. It also means providing clear navigation and helping users find content.

**Understandable:** Information and the operation of the user interface must be understandable. This involves making text content readable and understandable, making web pages appear and operate in predictable ways, and helping users avoid and correct mistakes by providing clear error messages and instructions.

**Robust:** Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies. This means using standard-compliant code and ensuring that the interface can be used with current and future technologies.

**(c) Explain two disadvantages and two advantages of using forms for data entry (2marks)**

Forms are a common method for data entry in many applications. They offer several benefits but also have some drawbacks.

**Advantages**

**Simplicity and Ease of Use:** Forms provide a structured and familiar way for users to input data. The clear layout of fields, labels, and instructions guides the user through the data entry process, making it straightforward even for inexperienced users.

**Data Validation and Accuracy:** Forms can incorporate immediate validation checks to ensure that the data entered is in the correct format and within acceptable ranges. This helps to reduce input errors at the source, leading to higher quality data. For example, a form can check if an email address is in a valid format before submission.

**Disadvantages**

**Can Be Time-Consuming and Inflexible:** For large amounts of data, filling out a form can be a slow and tedious process, especially if it requires a lot of typing or navigation between fields. Poorly designed forms with illogical flow can exacerbate this issue and lead to user frustration.

**Consumption of Screen Real Estate:** Forms, particularly those with many fields, can take up a significant amount of screen space. This can be problematic on smaller screens, such as those on mobile devices, potentially requiring users to do a lot of scrolling and making the form feel overwhelming.

**QUESTION 2.**

**(a) Using practical example, describe how prototyping is almost mandatory in early design stage**

Prototyping is basically the art of trying things out before you go all-in on building them. It’s a way to test ideas, spot problems early, and avoid wasting time or money.

Real-World Example: Mobile Banking App in Kenya

Let’s say a design team is building a new mobile banking app for a Kenyan bank. Before a single line of code gets written, they start by sketching out ideas.

**Low-Fidelity Prototypes (a.k.a. Paper Sketches)**

The team grabs some paper and draws out basic screens including login, account balance, transaction history, and the "Send Money" flow. These sketches get shown to real people, maybe even some boda boda riders in Thika who rely on fast mobile payments. One rider might try to tap on a paper button that says “Pay Bill” but gets confused by its position. Others might instinctively look for “M-Pesa” on the home screen, a huge insight for that market. This kind of feedback is cheap, quick, and incredibly useful.

**High-Fidelity Prototypes (Interactive Mockups)**

Once they’ve made improvements based on paper feedback, the team moves to tools like Figma or Adobe XD to build clickable prototypes. These look and feel more like the real app. Users can tap, swipe, and explore, and this stage can uncover more subtle problems, like fonts being too small under bright sunlight, or color choices making account balances hard to read.

**(b) Describe sound in the interface**

Sound in a user interface refers to the use of audio cues to convey information, provide feedback, or enhance the user experience. These sounds can range from simple beeps and clicks to more complex musical tones and spoken instructions. When used effectively, sound can make an interface more intuitive and engaging.

**Key uses of sound in an interface include:**

**Feedback and Confirmation:** Sounds can confirm that an action has been successfully completed. **Alerts and Notifications:** Audio cues are effective for grabbing a user's attention, especially for important events that require immediate action.

**Enhancing Realism and Immersion:** In applications like games or simulations, sound effects can create a more immersive and realistic environment.

**Accessibility:** For users with visual impairments, sound is a critical component of the interface. Screen readers use synthesized speech to read out on-screen content, and auditory cues can help users navigate and understand the interface.

**(c) Language is rich and complex. Discuss speech and non-speech 3mks**

Language is an incredibly rich and complex system for communication. It extends far beyond just the words we use. In the context of HCI, understanding the nuances of both speech and non-speech is vital for creating natural and effective interactions.

**Speech**

Speech refers to the vocalized form of communication. It is a primary and highly efficient way for humans to convey information. The richness of speech comes from several layers:

**Lexical Content:** The actual words and vocabulary used to form sentences.

**Syntax and Grammar:** The rules that govern how words are combined to create meaningful phrases and sentences.

**Prosody:** The "melody" of speech, which includes intonation (the rise and fall of the voice), stress (emphasis on certain words or syllables), and rhythm. Prosody can completely change the meaning of a sentence. For example, "You're going to the store" can be a statement or, with a rising intonation at the end, a question. It can also convey emotion, such as sarcasm or excitement.

**Non-Speech**

Non-speech sounds, also known as para-linguistic cues, are vocalizations that accompany speech but are not words themselves. These sounds add another layer of meaning and are often subconscious. The complexity of communication is greatly enhanced by these non-speech elements:

**Auditory Cues:** Sounds like laughter, sighs, groans, and pauses can convey a wealth of emotional and cognitive information.

**Emotional Tone:** The timbre and quality of a person's voice can reveal their emotional state, such as anger, happiness, or fear, regardless of the words being spoken.

**Non-Verbal Communication (in face-to-face interaction**): While not sound, it's important to note that in a broader sense of language, non-verbal cues like facial expressions, gestures, and body language are intricately linked with speech and non-speech sounds to form a complete communicative act.