

CSE463 – Introduction to Human Computer Interaction

Midterm Exam

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1. There is an assumption that UX designers often make when trying on improving the usability of a software product, one that can lead to poor design choices. What is the name of this assumption? Please describe it and explain what designers should do to help counter its effect.

The Fundamental Attribution Error of Design is when the designer does not think fundamentally for the novice user. So, the user may not do what the designer intended for the user. This assumption is that these designers assume that all users are just as capable in using their software as them, whereas this may not be the case. To counter this issue designers should avoid making this assumption and should investigate into their user base.

2. The Information-Processing Model created by Atkinson-Shiffron has some clear implications for HCI. These include very specific ways to design a system to maximize a human's information processing capability. Please describe at least three implications that follow from this model and justify your answer.

For users to be able to process information UX designers must be able to grab the user's attention. This is done by exploiting the users visual or auditory senses. After the designer gains the users attention, the user will try process this information. Designers know that human's have a limited processing capacity so they will design a system that maximizes the user's potential. Since some users cannot handle too much information at once designers should create a system where the amount information that the user needs to process is small enough for them to process. Also including features such as autosave and bookmarks will help to offload information from the user's cognitive load. Since the user now has fewer information to process this will maximize the user's information processing capability.

3. A small startup company has hired you to help them create a new mobile application that will compete with Duolingo. You have been tasked with helping to ensure that the users will invest a lot of effort and, more importantly, time into the application. Please describe what specific features you would incorporate into the application to accomplish this and justify your answer.

UX designers can use tools that exploit the use with audio and visual aspects to gain the users attention. Such as with commercial use they with increase the audio or have flashy visuals to gain the users attention. To keep the user using the software the designer could implement something that rewards the user for their efforts. For informational software it could be as simple as the knowledge the user gains from using their software.

4. Please identify at least one heuristics that is missing from each of following prototypes from the "Story of the Ribbon" lack and justify your answer:
 - a. The Configurator

The configurator is a conceptual prototype where you users can configure the way they use Microsoft Word. Users can select different options on how the user is going to use the document and to who the document is for. Selecting these options limits the number of features from each menu and only the ones that are related to the options you chose earlier would appear. And hovering over the menu items will show the relationship of each menu item to other menu items.

This prototype is missing the heuristic for recognition rather than recall because this design is featured as more of a filter. To apply this, feature the user must click the menu to apply it and can modify it later once they click the menu for that feature. But this design does not show the options the user selected in the main screen only when they are choosing the filters. So, the user must be able to recall the information of when they selected those options or to click on the menu again to visit those options.

b. The Strawman

Added parking space to the top panel of Microsoft Word that allows you to navigate between the different menus. The different menus are added to the parking space when the user uses a different feature this allows the user to quickly navigate to those menus and make any alterations if necessary. Also allows you to sort the different menus alphabetically or highlight any unused menu which is helpful to discover any new menu that the user might not have known before.

This prototype is missing the heuristic for flexibility and efficiency of use. When the user filters the menus in alphabetical order this causes an issue when the user is trying to find certain menus when it may correspond to several letters. The help menu for example might be in the “h” section for help or the “m” for Microsoft Office Help. This design does not make it easy to use for the novice user.

c. Ring Task Guide

The ring task guide is a design where there is a ring in the top left menu that allows you to navigate to a different location which allows you to manage your features. This management screen allows you to see various things on the usage of Microsoft Word, such as your history, most used feature, a calendar showing when you used such feature etc.

This prototype is missing the heuristic for help and documentation. There is not a help option or any documentation to help the user to make sense of this ring feature. The user will be able to navigate and customize however they want but understanding the uses and purpose is still lacking. Without proper documentation the user will not know how to use it to its fullest potential.

5. Please explain how Cognitive Load Theory is used to justify design decisions in HCI. Provide at least two concrete examples of how can help UX designers and justify your answers.

Cognitive Load Theory is the idea of considering users working memory when designing a system, so the user’s memory is not overloaded. Users have two channels to store memory

which are visual and auditory stores. By combining these two channels a user could retain more information compared to information that is presented using one channel. If more UX designers knew about this theory, then more users could retain more information from the system. For example, systems that teach foreign languages make users use both channels by hearing/pronouncing the word and by reading the word. If UX designers used this more in schooling by providing some animation that has both the visual and auditory channels and text that has the visual channels will help the students retain more information. As well as in commercial use by providing different techniques that use the combination of both channels would help the user base retain more information as well as staying attentive.

6. You are designing a website for your new e-commerce business. At the moment, it exists only in pencil-paper prototype. What approach would you use to evaluate its usability? Please justify your answer.

To evaluate this prototype that is on pencil-paper the UX designer will use a cognitive walkthrough. This inspection method helps to identify any issues the user may face as they go through the user interface. Using the cognitive walkthrough, the designer will break down a task into several sub-tasks and make an evaluation on them. For this e-commerce business the UX designer will make this evaluation to help with the usability of the user interface.

7. Please describe how Maslow's Hierarchy of Needs can explain at least three things that you are aware have occurred since the beginning of Covid. Specifically, how can this theory explain the human behavior observed in these situations? Please justify your answer.

Maslow's Hierarchy of Needs has 5 stages that motivate human behavior. Stage one through five are physiological, safety, love, esteem, self-actualization. Regarding COVID-19, during the beginning of the pandemic there have been clear signs of this hierarchy. In stage one, there has been many outbreaks of toilet paper shortages because of the panic, as well as everyone stocking up on the necessities. In stage two, most people were in fear of catching the virus, so they quarantined themselves as well as wearing masks whenever they went outdoors. In stage three, being quarantined has made a lot of people feel lonely and are missing their friends, family, and loved ones.

8. A well-established company has hired you on to help them make their product more engaging to their users. Select an appropriate framework to accomplish this task and justify your selection. Explain how you would use it to achieve this goal.

The ICAP framework is used to help gauge user's engagement by assessing how technology interacts with people. To make a product more engaging a designer would need to maximize interactive experiences and minimize passive ones. The learning outcome of passive experiences is at its minimal and interactive is at the deepest level by using this framework. For example, if you were watching a movie your level of engagement would be passive, you are not doing any deep level learning you are just receiving information to process. But if you had to engage with the movie for example by every 20 min there was a questionnaire you had to answer this would increase your level of engagement and be more at a constructive level. So, adding a level of engagement by inferring, transferring, co-inferring, or co-creating would make the product more engaging to the user.

9. Please select three Laws of UX and explain what you would do to implement them in a computer-based environment. Justify your answers.

Humans have a limited working memory and can only keep up to 7 ± 2 items at a given time. Miller's Law is the principle of this idea and encourages designers to keep their website simple. If the user interface was simple by grouping items, the user will be able to process more by adhering to this design.

The processing time is also dependent on the number of choices the user has as mentioned by Hick's Law. A designer could use this idea to design a simple website where the number of choices is limited to the user, so the user will make a choice quicker. A fast-food joint such as McDonalds or In N Out adhere to this principle by designing a simple menu with limited choices.

Users generally familiarize themselves with the websites they mostly use so designing a website that uses familiar patterns would make the learner process shorter. So, following Jakob's Law would make the user base more satisfied.

10. A company with a rapidly expanding user base has hired you on to help them get a handle on the users' characteristics before a planned redesign. They are hoping that you can help them distill their 500,000 users to a more manageable set of prototype users that can be used to guide design decisions. Would process would you recommend using? Why? Justify your answers.

Knowing your user base is something all designers must consider. Personas are used to group the user base into something more manageable. Identifying the user's needs and expectations while getting a clear picture of the users will help to identify the user's personas. For example, a website that provides course learning material will have personas based on the users need for this website and will help you to identify the user base. Some personas could be based on occupation or categorizing the interests of the user of what courses they enroll in. If you had a company of 500,000 users, you will need to categorize your user base by using personas and using their interests as a good assessment for which persona they would lie under.

11. The Nissan Motor Company Ltd. believes the single-pedal system is the shape of things to come. That is, they propose to replace the traditional two-pedal (gas and brake) used in today's car with the single-pedal system where the vehicle accelerates with your foot on the pedal and decelerates when you ease off the pedal. Taking your foot completely off the pedal stops the car. What is the danger of making such a fundamental change given what we've discussed in class? Justify your answer.

There are two models that should be taken into consideration. The system and interaction model: the system describes how the vehicle will work and the interaction describes how the user will use the vehicle. The physics and engineering need to be taken into consideration for the system model. The engineer will need to create a mechanism such that the user can apply pressure for acceleration and release pressure for deceleration on a single pedal system.

For the interaction model, the user will need to learn to use the vehicle. The vehicle includes the mechanism to apply pressure for acceleration and release pressure for deceleration on a single pedal system. The user will need to adjust and learn how to react in situations of emergency when the driver needs to make an emergency stop as well as

having to re-learn to use the pedal system from what user is used to. The design will need to include methods to make it easier for the user as well as to help prevent accidents, but at its current state it is more of a safety hazard. Because everyone is a learner, and the design does not include ways to make it easier for the user it could increase the number of accidents.

12. What is skeuomorphism and how is it used in HCI?

Skeuomorphism is the idea how using real world items into applications will make us familiarize ourselves with it. When designing something new and using items we are familiar with we tend to look for patterns or something we can relate to. Using real world items such as the trash bin for delete or a floppy disk for saving we will instinctively know the purpose of that and will be able to draw conclusions.