# yz709-FHCI-sup1

Question 1
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# Question 1

## 1. Theories of visual representation - analysis

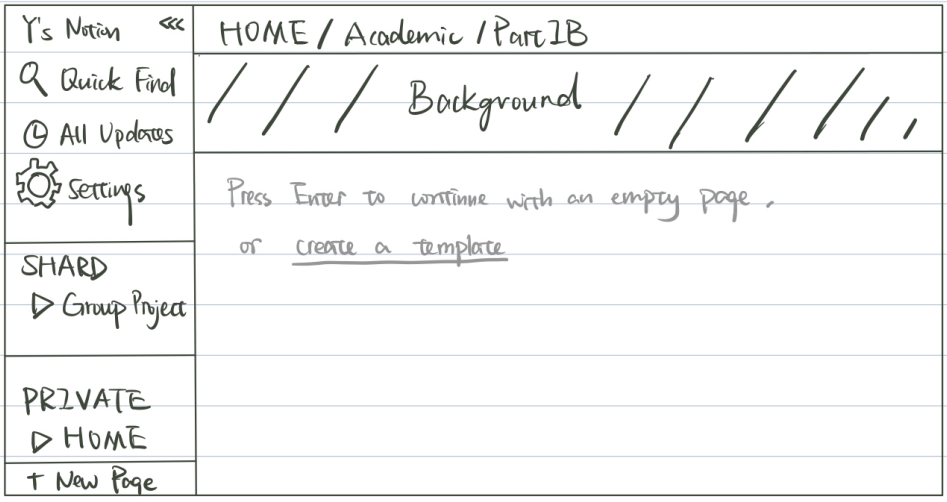
Think of one human-computer interface you have used and which you think was well designed *and* one interface you used which you think was poorly designed. For *each* of these two interfaces:

- Sketch the interface (hand-drawn sketch, not screenshot).
- Explain the nature of the information structure that the user creates and/or interacts with when using the site/application.
- Describe some aspects that make it an enjoyable/efficient/clear (or an unenjoyable/inefficient/confusing) interaction experience by using the *unified theories of visual representation*. For each selected aspect, explain the nature of the correspondence between the graphical resource and its meaning or purpose within the design. Aim to describe at least three relevant aspects across the 4 granularity levels (ie. marks, symbols, regions, surfaces).

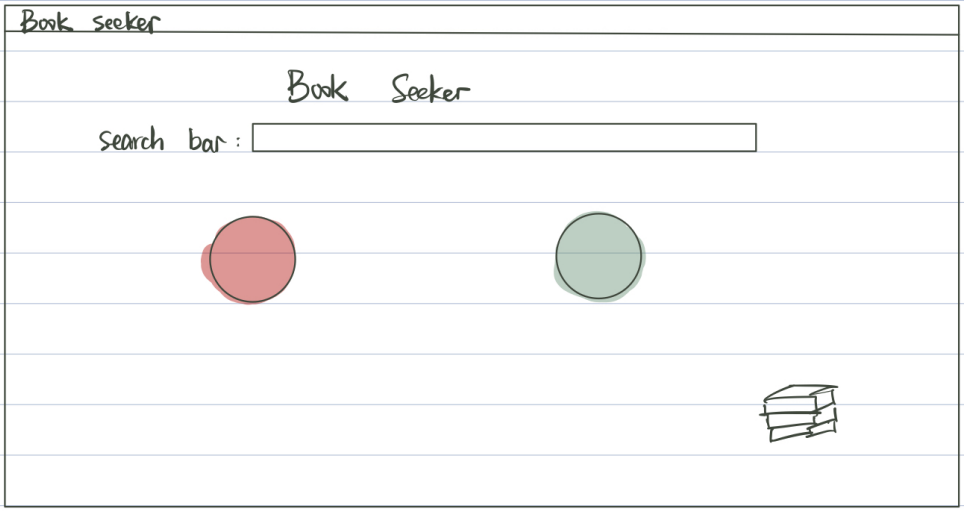
| | Well-designed | Poorly-designed |
|---|---|---|
| Nature of information structure | - users use it as a notebook with unlimited pages - users can create, edit, delete and share nested pages | - users use it as an ebook finder but the website doesn't provide any information on the kind of books it has |
| Marks | - the colour of the text "Please enter to ..." is grey, it is a user instruction the first time user opens a new page, it follows the convention that these texts should be coloured as grey to distinguish them from the page title. | - the two circles on the screen have ambiguous meanings because circles can be metaphors for a lot of different objects (e.g., planets, traffic lights and buttons) |

| | Well-designed | Poorly-designed |
|---|---|---|
| Symbols | - each of the three functions “quick find, all updates, settings” has a corresponding icon attached to the left, each of the icons corresponds to its figurative/visual meaning to give users an idea about the function | - on the bottom-right of the screen, there is a picture of a set of books, it is a piece of redundant information because the title of the website (book seeker) always indicates the service is about finding books |
| Regions | - the screen is split into two regions with borders laid out, and in the sidebar, the area is filled with a different colour (light grey, didn’t show on the sketch), these correspond to the idea of separation, which makes it clear which region users should look at when doing a specific task (e.g., when typing texts, users should concentrate on the main workspace region, not the sidebar) - the idea of layering is shown in the nested pages `HOME/Academic/PartIB`, it accommodates the page structure appropriately. | - the screen has no borders or frames within it, so it is not clear what is the purpose of each section - there are two circles filled with red and green, respectively, but users may be confused about the meanings and functions of the two circles |

well-designed: Notion interface




Poorly-designed:




Comments:

# Question 2

## 2. Theories of visual representation - design

Redesign the second interface in order to address the poorly designed aspects you identified:

- By using divergent design strategies, create 3-5 sketches that improve some of the aspects discussed above. For each sketch, comment on how and which of the deficiencies you noted above are specifically addressed and any tradeoffs that you had to make.
- By using convergent design, generate a final sketch that aims to improve on all of the sketches from the previous divergent design step. Comment on how the deficiencies you noted above are specifically addressed and any tradeoffs that you had to make.

1. Add texts into the buttons to indicate - red for clear, green for go to search. However, some users may find it intuitive without the texts.
2. Delete the text “search bar” because it is not very helpful, add a help instruction in the search bar and use grey colour to adhere to the convention so that users know they need to type a book name or author inside the search bar.
3. Adding an explanation of the service Book Seeker provides, rather than a low-quality picture of a stack of books. t helps present its functionality to clients; however, adding these explanations makes the screen less neat, and users may be annoyed by the texts if they already know the website functionality.
4. The text “Book seeker” appears in two places, one in the tab and one as the title of the webpage, we can replace the title using the logo of the service; replace the picture of books with an information icon, hover onto it would give an explanation of the service; however, the Book Seeker icon is less informative than texts “Book Seeker”, and information icon may not be that attractive than a line of texts.

- The final design combines all four sketches, instead of showing the functionality statically on the webpage, I choose to use an information icon so that users who would be interested in knowing the functionality can hover onto the information icon; at other times, it is hidden from users to keep the webpage clear. However, there is a risk that users may not notice the small icon and cannot get the information directly.

Comments:

# Question 3

### 3. Three waves of HCI

Write a short essay describing how the three waves of HCI may have contributed and impacted the design of your mobile phone (max 1500 words).

To get you started, think about which were the HCI theories that dominated/were developed in each of the waves, and how those might have been applied by the multiple design & engineering teams in the design of today's mobile phones (e.g. physical form and functionality, OS design, app design etc.). Feel free to also draw on your own use: how/why you chose your current phone, which apps you use most frequently, how you make choices between apps, how you use your phone to communicate with others, how it influences your social relationships, what its role is in the context of your work/study, any idiosyncratic uses you've found for it etc.

The first wave focuses on the efficiency of a human operator, that is, how could we design a user interface that speeds up the operation and ensure accuracy at the same time. Researchers used cognitive science to understand the user's perception, decision, and action process to match the design to improve usability. The number of app icons on one page is limited on a mobile phone because users have problems remembering app names once the number reaches a certain threshold number.

Some utility apps such as timer, calendar, calculator and weather apps can be helpful under certain circumstances and help people be more productive. For example, a student might need to get up early for an exam, but he hasn't bought any physical alarm clocks; the timer app on his mobile phone comes in handy. Moreover, the physical shape of the mobile phone is designed to fit most people's hand sizes and optimised to be as light as possible so that people can easily hold them and would be suitable to be used as a portable device.

The second wave focuses on the social-technical content where people work; designs consider other sources and channels of information, including the physical environment. Social platforms are developed to connect people and enrich lives. Cameras and video recording gadgets on a mobile phone have been regularly updated to reach an outstanding quality. People use them to document their lives and surroundings; that being said, the mobile phone becomes a repository of people's memory, a bridge between different cultures. However, by the nature of a portable device, the mobile operating system paid a lot of effort to save battery power rather than provide extraordinary service. In addition, by bringing users into the design process, developers realised the importance of data protection and user privacy.

The third wave pays attention to improving user experience when using the device, based on Art, Philosophy and design theory. The icon and the name of an application are designed to help users memorise and recall its functionality without extra effort. For instance, calendar apps usually have icons related to dates or a physical calendar so that users can remember its functionality easily. Seamless scrolling experience and 3D interactive feedback from the device help make the interaction more realistic and interesting.

Comments:
First wave - (1) app number, (2) physical shape of the mobile phone, (3) some utility apps can be useful and improve efficiency
Second wave - (1) social media platform to relate people and enrich lives, (2) the operating system focuses on saving power rather than providing extraordinary service, (3) data protection and user privacy
Third wave - (1) icons and names to distinguish apps, (2) scrolling the screens seamlessly

# Question 4(y2018p7q6)

(a) Explain in general how the actions that a user takes are related to the user's goals. Your answer should make reference to the function of perception, and to the nature of the cognitive processing that must occur. [8 marks]

- Users take actions in order to move closer and closer to the goals, their brains would process the feedback the system outputs and take corresponding actions based on the feedback, if the feedback is further away from the goal, then backtrack.
- Perception is the way to get feedback from the system, it could be visual perception where icons and graphical representations enable users to distinguish their meanings or voice perception where in some systems the sound output of an error would tell the users that the action taken is not the right one to achieve the goa . Another example is tactile feedback used in a virtual environment, which should allow users to recognise the meaning of the various touch sensations being emulated.

(b) Describe a class of problems for which it is not possible to formulate goals. Give a specific example of a problem in this class, and with reference to that example, explain how it illustrates *two* significant attributes of the class. [6 marks]

- The wicked problem can not formulate goals because they do not have a stopping rule; its solution would not be a true-or-false type; there is no immediate and ultimate test for the solution, and we do not have opportunities to learn by trial-and-error, in other words, we have a one-shot solution.
- Every wicked problem is unique, one example could be colonising Mars.
    - The final stopping condition is hard to define because the word colonising is ambiguous, it could be when a certain number of human beings are living on Mars, or it could be when human beings have explored the full of Mars.
    - The solution is a one-shot chance and has no immediate test because there is only one planet called Mars in our solar system, all activities we carried out on Mars would later influence it in some ways, we cannot undo any events if it caused some catastrophe later on.

(c) If an interactive system has several alternative models to describe the user's goal, how can Bayes' theorem be used to improve the system usability? [6 marks]

- Bayes’s theorem is based on statistical analysis, we could use Bayes’ theorem to order the alternative model . Each alternative model would have a prior probability, based on the current user action observation, we can calculate the posterior probability for each alternative mode . After ordering the posterior probability, we could find the model with the highest probability, thus improving the system usability as this model might be the one the user most likely attempt to achieve.

Comments: