Usability Engineering Report

Module Code and Name: CS2003 - Usability Engineering

Project: Design a Book Recommendation System

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(https://youtu.be/AAgVm0phL-c)

Word Count: 2638

1. **Usability Engineering Lifecycle:** *(suggest ~800 words)*

The project that we were given to take on was to create a system that is able to recommend books to users of libraries and bookshops. As a group we have taken upon the task and have come together to find a way to tackle this task. The Start Life Cycle design (Hartson and Hix) was the method that we have chosen for this task. Star Life Cycle is based on the evaluation of the design where the users will be required to have an input throughout all of the stages of design. In Star Life Cycle there are 5 phases, Implementation, Prototyping, Requirements Specification, Task Analysis and Conceptual Design. Throughout our project we are able to evaluate our project using these phases as they are key to creating a successfully app.

Before we start designing the system we need to come together and decide on the user requirements that are needed for this system. We started with 'Task Analysis' as it was a good way to start getting requirements. The specifications that were given to use by the university helped us get us some of the requirements that are needed. Through analysing the specification we were able to find the target users that are going to be using this system. Finding the target users was an important step as it is able to help us better create a system that is usable for them. This took us to the next step to know what the users would like in this system if we were to create this. The next step is 'Specification Requirements' as we were able to identify our target user. That target user is going to University Students or people that use the library and bookshops often. Since our university has a library it was easy to collect the data. Since most of the students in the CS2003 module were using the library and were considered an expert at using a library we had caked them to give us feedback as to what they would want in this System. Using the CS2003 students will give us a more accurate feedback as they are people that are on our course and would know that kind of improvements that they would like when they are going around looking for book/books to read. The feedback that was provided was done through a survey. The next step was to look at other similar systems that are out there. Researching the key features and the requirements that other systems had when they were coming up with their system is able to help us see what else is needed within our system. The next step is called 'Conceptual Design' which is to create wireframes of the system that we are going to be building. This will include the design and how it would look for the users that are going to be using this system. Each of the member came up with their own conceptual designs and we evaluated each of the designs as a group to select some key features that some of the designs have that we can take forward into the "Prototyping". All of the members of the group had drawn out a prototype for users to try out and get feedback from. This was able to gain usability feedback as users would need to know how to use the app without much help and we were trying to address that with our prototyping. Through this prototyping we did not include the visual ascetic that could have made it more attractive for the user to be using it such as making it easier to navigate if there was an actual "Home" icon. Asking the users to test the Prototypes (Hyperlinkinfosystem, 2017) is a good way to find out key feature that the users may want when they have this system as part of their lives. We created a questionnaire that is able to gather feedback from the users. We include both open and closed ended questions that are able to give us a well-rounded feedback on what we may need to do to improve. Having asked a number of people to take part in the testing of the prototype we were able to get enough feedback to give us other idea of improvement that we needed in our system. This led us to the next step of "Implementation" where the changes that were needed were addressed and changed. We made a digital prototype instead of the hand-drawn ones as it created a more realistic and interactive approach to how an actual system would perform in our hands. We used 'AdobeXD' to refine our prototype. Using 'AdobeXD' we created 3 difference versions each having refined the previous one through the evaluation of users and the members of our group creating this system. (ComputingStudents, 2019)

The Gantt chart shows how we worked as a group and what was carried out through the designing of the system. We gathered the user requirements and then the prototypes where it went from wireframes to AdobeXD.

When selecting the evaluators, we took were only our course mates. We tried to get a more even sample of age and the genders that were taking part in this. This will create an unbiased collection of data that can create for a better result as the outcome. We assessed them with the question that we provided them. Since the questionnaire has open and closed ended questions, we were able to ask the evaluators what they wanted to include in the app.

2. **Application of usability engineering principles** *(suggest ~1100 words)*

We were provided some information in the brief that could get us started but with the requirements that was figured out as a group with specifications and funtional requirements that the users would like to see in the system that we are designing.

Below shows the main functional requirements that are needed for the system:

1	Sign into the Application (personal account)
2	Search for a Book
3	Leave text reviews of the books read
4	Check for availability of the book
5	Locate books in libraries and bookstore, show external (outside the bookstore and library) and internal (building floor plan) location
6	Checking books ratings
7	Logout

With main functional requirements listed above we kept conducting surveys and questionnaires to collect and refine them. Through the use of questionnaire and observations it has helped us create prototypes. Since the process of having prototypes we are able to see that were missing function that were fixed during the questionnaire and observation stage. This included features such as the search bar which was important for the user to be able to find the book that they are trying to look for. This allows for better user experience when they are using the system on their phones. This became a main feature for the system. Since the system is to create a book recommendation we thought it was fitting to create a page where it will display the most popular books that people are reading or books that are a must read. Books that are shown can be decided through the rating of the book that is left by the users that are using this system. Rating and reviews can decide if people would like to read that like of book or not. This are all data that we have gather through the use of questionnaire and observation.

'Perception' is one of the main principles that is used in prototyping. We had designed the app so that it looks similar to the ones that are on the existing market or similar apps that perform similarly with the one that we are creating. An example of this is the "Home" button where it will need to be in a place where it can be conveniently clicked. Upon looking at existing application they all had the "Home" button on far left on either the top or the bottom of the app. We had created prototypes that is follow this principle but eventually changed it so it was in the middle due to the questionnaire and the feedback that we were given. The search bar is also at the top of the app as it is where it can be clearly seen. Existing app also have this search bar at the top so we decided to move it to the top too. The feedback that was given gave a positive response for it to be there. (Wilbert Galitz)
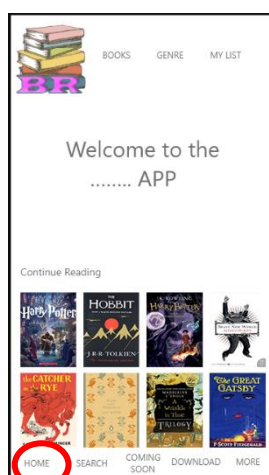

'Visibility' principle is used heavily in our design process. It is something that attracts the user that will be using the system. Visually it should be something that should appeal to the user. It will decide if the user wants to continue to use the system or not. It can also display if the system will be easy to use and access different parts of the app that we are designing. Having the buttons to be visual versions instead of text ones made a difference as visual ones are more appealing for the user to use as we have found in our questionnaires. This was later changed when we did the 3rd prototype that we created.
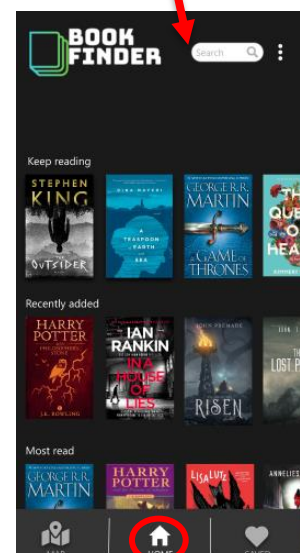
'Consistency' throughout the design process is what create a successfully system. We have kept going with the questionnaire and observation where we are able to compare the feedbacks to make small changes to the prototype to the user's needs. Having the "Home" button be on most of the pages so that they are able to navigate back to the main page with ease. Consistency also means for the button to be in the same place so that the user knows that it is going to be in that position and this could give them a better user experience.

A key feature that is needed in this system is the **'Feedback'**. We have included an alert box that is able to see for error prevention when they are logging out of their account. Error Prevention is very important as they are some small things that we make mistakes on such as clicking on the wrong button when you wanted to do something else. This tick box can stop that from happening and frustrating the person that is using the system. (Nielsen J, 2001).
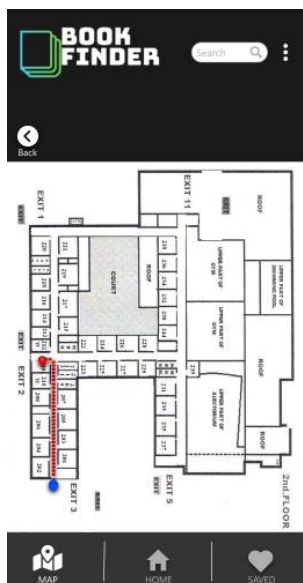
Knowing the location of the book is a requirement that is needed but creating and effective way to presenting where and how it map works took some difference approaches. We had a guide which would show them which building the book was in and then a live view of where on the shelves it would be so that it will be easy to find. With the questionnaire that we had been giving out it was show that the users had interest in know where the book location was as it makes it much more efficient in finding it. People that use the library don't always know how they layout the books or code the books to different locations and could spend a long time looking for them.

Attention is another principle that has been used in the design process. This is used in situations such as highlighting the page that we are on so that the user knows where in the system they are in. Having the button that was pressed brighten and stand out more can give this effect. The map indication is used in red so that they are able to show the path that is needed to be taken. Red is an easy colour to identify and focus on so to the user's eye it should make it easy to follow. Colours in the system can help indicate different elements of the system. (Lidwell, 2010)
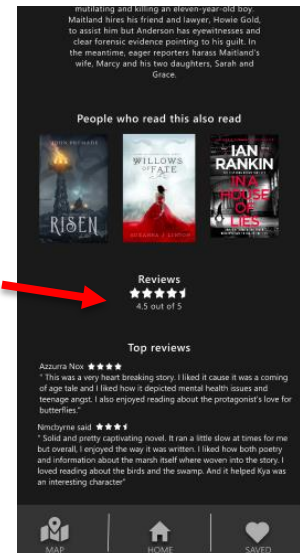
3. **Usability Evaluation** *(suggest ~1100 words)*

We used 3 different types of evaluation methods; **Heuristic Evaluation, Questionnaire and Observation.** As a group with came up with the questionnaire as the method that will be given to the evaluators. This is how we were able to come up with requirements that they would like to have in the system we are going to be creating for them. The questionnaire that we gave had open and closed-ended questions. This is able to give us both quantitative and qualitative data. (Classroom, 2020) The quantitative data was created through the use of the questionnaire and seeing the response on the questions. We are able to produce a graph that is able to show us where areas of improvement are needed with the questions that we have asked the users. In qualitative data we read through all the responses on the open-ended questions that are able to give use key features that the users can freely express for us to tackle. Having the two different kinds of responses we are able to gather a good variety of data needed to create the system. Qualitative data within the questionnaire takes much longer and the quantitative ones (close-ended) as they are needing to be writing a response whereas the other you will only need to tick or circle a box that fits their answer. The data that was eventually gathered we were able to produce a bar graph for the quantitative data. One of the data's "locating a book in libraries" had an average score of "4.5" which mean that the user would like for this feature to be implemented into the system we are creating.

The way that we have evaluated our prototypes/solutions that we have come up with to tackle the problem was through the use of creating a wireframe of the application that we are trying to come up with. Through this we are able to make a number of different types of prototypes so we can see what we have been doing throughout the process. Each improvement was accesses through discussion and evaluation of the team and then to ask people that are potential user of this application. These prototypes had been taken to the library where they will be an expert user as they will be borrowing book for their studies. We used the heuristics evaluation (Nielsen's Heuristic, 1994) as it will allow experts to look at the changes that were made to our prototype in the different iterations. A table was created in the Group 27 report of the 10 User Interface Design Heuristics-Evaluation by Nielsen and Malloch's. (Interaction Design Foundation, 2020) Things like Error Prevention was implemented throughout the iterations, these changes were like adding a back button so that if the user pressed on the wrong button they are able to go back or when they are logging out of their account they are able to cancel if they pressed it by accident. Heuristic evaluation is able to give us quick responses to the prototypes that we have worked on in the past. We were able to improve on the usability principles that were given to us.

An evaluation methodology that we worked with was a procedure for collecting relevant data, **'Observation'**, about the operation and usability of a computer system. Since we are developing an application that is going to help the users find the book that they want and it is able to find the location of where it is. The other function is also to leave a review so that other people that are going to read the book can see what kind of rating that the book has. When finding information about the users we are going to be looking into the ages where the users will be using a smartphone as it could be easier way to implement this kind of function into a library. Collecting this kind of data takes time as people will have to be willing to participate and there isn't a fixed time that they can spend on answering the question that are given to them. (Connectusfund, 2016)

4. References

Type	Reference	In-text citation
Website	ComputingStudents (n.d.). Computing Students - Notes - HCI / Star Life Cycle Design Approach. http://www.computingstudents.com/notes/interactive_systems/hci_star_life_cycle_design_approach.php	ComputingStudents, 2019
Book	Wilbert O. Galitz. The Essential guide to User Interface Design Second Edition by Wilbert O. Galitz	Wilbert Galitz
Website	Oza, Harnil. "Pros And Cons Of Prototyping In App Development: Hyperlink Infosystem." Hyperlink Infosystem - Mobile App Development Company New York, Usa and India, www.hyperlinkinfosystem.com/blog/pros-and-cons-of-prototyping-in-app-development.	Hyperlinkinfosystem, 2017
Book	Universal Principles of Desgin 2010 by William Lidwell, Kritina Holden and Jill Butler	Lidwell, 2010
Website	Sheragy, Kari. "Pros & Cons of Qualitative & Quantitative Research" classroom.synonym.com, https://classroom.synonym.com/pros-cons-qualitative-quantitative-research-8179604.html. 15 March 2020.	Classroom, 2020
Website	Nielsen J.1994 Heuristic Evaluations And Expert Reviews	Usability.Gov. [online] Usability.gov.https://connectusfund.org/disadvantages-and-advantages-of-naturalistic-observation	Nielsen J, 2001
Website	https://www.interaction-design.org/literature/article/heuristic-evaluation-how-to-conduct-a-heuristic-evaluation	Interaction Design Foundation, 2020
Website	Regoli, N. Disadvantages And Advantages Of Naturalistic Observation. [online] ConnectUS. https://connectusfund.org/disadvantages-and-advantages-of-naturalistic-observation	Connectusfund, 2016

5. Appendix: Programme of work

ID	Task Name	Start	Finish	Duration	Nov 2019		Dec 2019					Jan 2020				Feb 2020				
					17/11	24/11	1/12	8/12	15/12	22/12	29/12	5/1	12/1	19/1	26/1	2/2	9/2	16/2	23/2	1/3
1	Task Analysis																			
2	Listing methodologies to use	11/11/2019	11/11/2019	1d																
3	Gathering requirement from specification	12/11/2019	14/11/2019	3d																
4	Listing user requirements	14/11/2019	18/11/2019	3d																
5	Specification Requirements																			
6	Deciding on evaluation methods	18/11/2019	18/11/2019	1d																
7	Building Questionnaires	18/11/2019	20/11/2019	3d																
8	Surveying users and collecting feedback	20/11/2019	27/11/2019	6d																
9	Evaluating the users feedback	27/11/2019	02/12/2019	4d																
10	Building/Adding new requirements	02/12/2019	06/12/2019	5d																
11	Conceptual Design																			
12	Making app layout (Wireframe)	09/12/2019	10/12/2019	2d																
13	Surveying users and collecting feedback	10/12/2019	16/12/2019	5d																
14	Evaluating the users feedback	16/12/2019	18/12/2019	3d																
15	Building/Adding new requirements	18/12/2019	23/12/2019	4d																
16	Prototyping																			
17	Making new questionnaires	06/01/2020	07/01/2020	2d																
18	Initial Paper prototype building	07/01/2020	07/01/2020	1d																
19	Collecting and evaluating users feedback	08/01/2020	13/01/2020	4d																
20	AdobeXD prototype	13/01/2020	20/01/2020	6d																
21	Questionnaire and Observation used	20/01/2020	27/01/2020	6d																
22	Improved prototype	28/01/2020	07/02/2020	9d																
23	Surveyed and observed evaluator	10/02/2020	19/02/2020	8d																
24	Evaluating the users feedback	24/02/2020	02/03/2020	6d																