**CS2003 Usability Engineering --- Format of Coursework Report #2**

**GUIDANCE AND TEMPLATE DOCUMENT**

Please follow the format and style of the template document, and the guidance given here in writing your report.

There is an (absolute) maximum limit of 3,000 words for this section of the portfolio (*excluding the cover/title page, Gantt chart, or references*).

There are **no** exceptions to this: going over these word count limits **will** lead to a penalty. This limit is intended to help you to write concisely and professionally; you need not include all of your data or designs, but will be required to summarise, and highlight critical components to illustrate the detail of your work.

Please do not include additional appendices: these will not be marked (this is what the group report is for). Recommended word allocations for the sections of the report are given below – however, these are suggestions, not rules, so use your judgement on this.

Use a 10 point Ariel font (or nearest equivalent). Pages should be consecutively numbered.

Your report should be structured as follows; please use the titles given below in your report (but deleting the instructions).

In order for us to make any prototype we needed to know the user requirements, so we started by analysing the task given to use by the university, we wanted to identify key functional requirements that the system is going to have. After analysing the task, we were able to get the key functional requirements which helps us to understand the system functions.

**Introduction to the CS2003 Usability Engineering Report**

Be sure to include the following information:

Project topic, and application title (eg. “Designing the ‘inter@ion.app’: an app for everything”)

Module code and title

Your student number; name (optional)

The rest of your group’s student ID numbers

**Word count** (not including the cover page, Gantt chart or references)

Start the rest of the report on a new page.

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

Our project is to create a system that would recommend books to users of libraries and bookshops. We need to choose right method for this task and as a collective group we decided to use the Star Life Cycle design (*Hartson and Hix*) approach because it is more centred around the evaluation of the design as well as including users input at all the stages. This approach has 5 phases such as Implementation, Prototyping, Requirements Specification, Task Analysis and Conceptual Design, order of these phases is not important and any of the phases can be carried out at any time, however each of the phases needs to do an evaluation [1].

In order for us to start making any system, we need to gather user requirements, therefore, we decided to start with “Task Analysis” as a starting point as this would allow us to gather some requirements, here we used the specification given to us by the university, after analysing the specification we were able to find the functional requirements, which allowed us to better understand the situation as well allowed us to identify the target group for the system. We then evaluated the task and found we need more requirements and needed to know what the user wants. Therefore our next stage was “Specification Requirements”, due to our previous stage we were able to identify the target group, which were mostly university students, which made it easier for us to collect data, we decided to use CS2003 students as they would give us more accurate feedback. Along with the surveys we did secondary research by looking at other somewhat similar systems and gathering requirements and key features that they had. ‘Conceptual Design’ was the next set for us, we needed to make a wireframe of the system's design and how it might look visually, we also evaluated this task as a group because we need to refine the design for us to make a prototype for the users to test. ‘Prototyping’ was the next stage we carried out, we built a hand-drawn prototype for users to try it out and get feedback on, however it posed some limitations as the users would not have a good interaction with a low fidelity prototype, but on the other hand, it allowed us and the users to visualize how then end system may look like and gives us the basic interaction process the users might experience and outlined the key functions of the system at a lower cost than other methods (Oza, Harnil), after building the prototype we used questionnaires to gather feedback from the users and we were able to collect good enough feedback for the improvement of the system (Wilbert Galitz), and the key feature that needs to be improved on. The step for us was to ‘Implementation’ of the changes and improvement identified, however this time we decided to make a digital prototype instead of a paper/hand-drawn prototype because people would interact differently to a paper version than a digital one, therefore we used a system called “AdobeXD” for the refined prototyping tool as it provided a mobile-like experience for users, allowing them to get a feel like a mobile system and give more precise feedback, we carried two 2 more prototype refinement followed by evaluation.

The Gantt chart below shows the procedures carried out by us a group……

We were able to identify the target group fairly easy as we were only allowed to collect data from our fellow course members, however we did decided to make system for all age group and not just limit to certain group, we made questionnaires tailored to specific group, if we were to survey others we would have followed the same procedure we carried out for the fellow CS2003 student, such as briefing before and after and using the appropriate evaluation method.

The purpose of this section is to explain the planning and usability engineering process behind your design solution. You should identify and describe the Usability Engineering/UCD approach or methodology used, as well as the tools, techniques or methods you used for creating your prototype(s). For instance, did you draw the interfaces by hand or using software, get feedback from users, and iterate to a final design using a prototyping tool? You should also address the advantages, and any limitations that this set of methods and techniques imposed on your design process. Although you are not expected to collect real data for user requirements, you should describe how you would approach the process of requirements generation to ensure that your design would meet its users’ wants, needs and expectations, your reasons for planning these methods and any limitations that they might have. You will need to justify your decisions and use references to support the choices that you made. ***Note that your choice of user-centred design methods must be recognised usability engineering methods and you should provide references to support these methods.*** You are required to include a Gantt chart in a 1-page appendix (see below) to show when tasks were carried out, and their dependencies. Please use as much detail as you are able to; this chart need not be identical to your team members. This chart should be accompanied by a description in the main section explaining your plan, progress against your initial planning, and any decisions about your planning that you feel are appropriate to include.

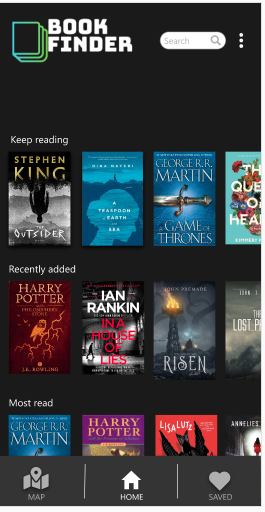
1. **Application of usability engineering principles** *(suggest ~1100 words)*

We used the brief given to us as a starting point as it has most of the requirements, so we analysed the specification and we found the functional requirement that allowed us to better understand the situation as well as allowed us to target specific group.

These are the main requirements for the app:

|  |  |
| --- | --- |
| 1 | Search for a Book |
| 2 | Leave text reviews of the books read |
| 3 | Locate books in libraries and bookstore, show external (outside the bookstore and library) and internal (building floor plan) location |
| 4 | Check books rating |
| 5 |  |
| 6 |  |

As described in above section, we collected basic requirement first from the brief and then used the surveys to gather and refine those requirements. Questionnaire and Observation allowed us to refine the user requirement (Wilbert Galitz) even more, such as the initial prototype did not have the search feature, which we found out through the survey, the users needed a search feature that allowed them to look for specific book. This turned into the main feature for the app. One requirement that we all decided to add was the review system as this would allow the app to display most poplar and most read books to the users, recommending the books that has been reviewed and has highest rating. The requirements in the table above has been refine from the feedback and data gathered.

Prototypes were created using the usability engineering principles. The main principle used was the **perception**, as we had design the app in the way that most similar items were close by, for example the main page when the user lands has all the books types, such as ‘Continue Reading’, ‘Recently Added’ and ‘Most Read’ this way it allows the user to navigate easily and find most relevant without any complexity, as all relevant information is shown on the page (Universal Principles of Design). Another place were perception used is at bottom navigation, where we have grouped most relevant functions for the user, such as ‘Home’ was centre of the navigation, giving the user the sense of ‘Home’ suggesting to go back to main page, as well we have the ‘Saved’ and ‘Map’ on the navigation, highlighting the key functions of the app.

Our prototype has consistent design, the app has ‘**consistency’** to allow the users to better interact with the system without getting lost or not knowing what to do, for example we have navigation on the bottom on mostly every single page which allows the user to return to one of the option at any time. It also allows the users to navigate through the app without any effort as the layout is similar to other pages/screens.

We have used the review ‘**feedback’** system, which is the usability engineering principle. We have the review system that allows the users to review the books that they have read, it allows the user to write what they thought of the book as well as the rating system, is where we take the feedback from the user. The rating system allows the user to see how poplar/interesting the book is. Also, we have used alert box for prevent errors, the alert box gives the feedback to the user if they would like to carry out that function such as when logging out the user would be shown the alert box asking for confirmation. The use of alert box minimises the errors created by user and helps them to recover (Nielsen J 2001).

We have also used **attention** as one of principle for the prototype design. This is shown mostly through the use of colours and highlights, for example one the login page we have the sign up button green, this would suggest the new users to register and the login button is blue because the existing users would know that is a login in button. The use of the colours allows the users to identity certain functions also it drawn attention of the user toward it. We have also used the highlight feature to allow the user visually to see where they are in the app, also it guides them thorough the app. One example of this is the bottom navigation where it highlights the icon of the current page i.e. when on the home page the ‘Home’ icon is highlighted. The use of these feature is to help the user know where the important things are located as well as guiding them through the app.

‘**Visibility’** principle has also been used in the design process. It helps the user continuously know what the system is doing at any given time, also it make the app more aesthetically pleasing to the eyes (), We were able to identify an issue in our second prototype, the main screen had text which was too big and was not very informative as the user need not need the huge text “welcoming them”, therefore the next iteration of the prototype the text was removed (Nielsen J, ConnectUs).

In this section, you will explain how you translated the user requirements into the design of the prototype solution that your group created. You will explain the rationale for the design solutions selected, connecting both your team’s requirements gathering/specification and the usability engineering principles that you have drawn from the literature for your prototype solutions. You may include images showing aspects of the interaction design for the prototype, using ‘callouts’ to show how the usability engineering principles you used guided particular design elements or other interactive features. ***Note that as this section assesses your******application of usability engineering principles, you will need to describe which principles you have applied, and show how they have driven your interaction design, using references where necessary to support these.*** Usability engineering principles covered in the lectures include topics relating to cognition, perception (eg. affordances, depth cues), attention, memory, and other design-relevant guidance (feedback, visibility, etc). Here, you are not expected to describe your design/s (this should be in the ‘reference’ report), but to explain your *reasons* for designing its form and interactivity in this way.

1. **Usability Evaluation** *(suggest ~1100 words)*

There 3 types of evaluation methods used, such as Heuristic Evaluation, Questionnaire and Observation. We used the questionnaire when we initially surveyed the evaluators for gathering the initial requirements. We had used two types of questionnaire open ended and closed end which gave use two types of data qualitative and quantitative. Qualitative data was coded by reading through all the response and assigning each keyword a code and stored into a table, which allowed us to see the key features needed to work on. Whereas quantitative data was easy to work with as we were able to produce a graph which clearly showed areas of improvement was needed. We had decided to use both types of questionnaire because, it allowed us to get mix response as qualitative allowed the evaluators to give a flexible response and the data gather from it had rich in detail, however it was time consuming as some responses too longer to record where as in quantitative data was quicker to record and analyse, but quantitative data didn’t have enough response to make a clear cut on the features, needing the work on. Therefore, using both types of questionnaire allowed us to counterbalance the data gather from each method (Kari Sheragy). The initial data gathered from the first survey were converted into a bar graph, it allows us to see what improvement were need, we found locating a look in libraries had an average of “4.5” which suggest us to have it as a requirement for the app.

For the 2 iteration of the prototype we had used all 3 of the evaluation methods. We decided to use heuristics evaluation (Nielsen’s Heuristic 1994) because it would allow experts to compare the results to the pre-existing list. We have formed the table in Group27 report of 10 User Interface Design Heuristics-Evaluation by Nielsen and Malloch’s, it identifies the issues the second prototype had for example the category “Visibility of System Status” found that the users didn’t have the indication of where the users were, this was not assessed by experts i.e. by us and the necessary improvements were implemented and in the final prototype the users were able to know the where they were by the use of highlight feature mentioned in the section 2. Heuristic evaluation provides some quick and inexpensive feedback for the prototype to be worked on, however one negative side of it is that it requires knowledge of the evaluation method before applying the method as the results that it produces can be inaccurate (Nielsen’s Heuristic 1994). We manage to do two iterations of the prototype, each improving the usability of the app also each time usability principles were incorporated (Nielsen’s Heuristic 1994).

We also decided to use Observation as another method of evaluation which could be refer as “Usability Testing” (Usability.gov) as the observer would watch the evaluators carry out the list of tasks. Observations are very useful in gather feedback from the user when they are in natural setting (Regoli N) as it would allow the users to give genuine feedback. Observations capture most genuine reactions of the users when the testing as it allows the observer to know how the users might react when carrying out certain task. One limitation of this method is that it is time consuming as the observation needs to take place at certain location and participations may take longer then excepted time to show the behaviours. However, data gathered from this method are mostly accurate and it allows to compare with other results.

In this section, you will show how you evaluated your prototype/s solutions to assess its usability and consider how it could be further improved. You should explain *why* you selected and *how* you applied the ***recognised usability engineering evaluation methods and techniques*** used, and any limitations that they might have or which impact on your findings. You may wish to show how you used different evaluation techniques at different phases of the design process. As with the previous sections, all decisions that you make should be supported with references or practical justifications. You do not need to repeat any content from the evaluation data in your group 'reference' report, but where you refer to this reference material in your discussion, this should be clearly identified.

1. **References**

In writing your report, you are expected to use appropriate literature regarding the relevant usability engineering issues, and to cite this literature appropriately. Please use as many as you need to show how you justified your answers above. You are **strongly** advised not to restrict yourself to just the references given at the end of each lecture and in the study guide, but to also investigate other literature. Although you are free to cite the module lectures, this is usually not the original source of the knowledge, and you should attempt to identify, locate, and cite this. Try to use the peer-reviewed literature of academic journals and conferences, as well as books and web-based resources. Limiting yourself to non-academic or practitioner web resources will limit your grades. Failure to cite references may constitute **plagiarism**, since the lack of citations implies that you are trying to pass off others’ work as your own. You only need to list references here that you actually cite in the report, not just papers that you have read. Please consult and familiarise yourself with the Referencing guidelines provided in the Computer Science Student Handbook. Note that you will need to list all of the references used in the report in the [Harvard style](http://www.brunel.ac.uk/__data/assets/pdf_file/0020/161471/Harvard-Guide.pdf), adding an appropriate in-text citation (e.g. Jones, 2005), and referencing these at the end of the report, for e.g.:

Blaxter, L., Hughes, C. and Tight, M. (2010) *How to research*. 4th Ed. Maidenhead: McGraw-Hill/Open University Press.

Greetham, B. (2001) *How to write better essays*. Basingstoke: Palgrave.

Huyton, J. (2007) *Critical thinking* [Lecture to BA Community Education Year 1], ED1234: Research Skills. Brunel University. 14 March.

Lillis, T. and Turner, J. (2001) ‘Student writing in higher education: contemporary confusion, traditional concerns’, *Teaching in Higher Education, 6*(1), pp. 57-68. doi: 10.1080/13562510020029608.

Belam, M. (2019) *How do I register to vote in the 12 December 2019 general election?*. Available at: https://www.theguardian.com/politics/2019/oct/29/how-do-i-register-to-vote-in-the-12-december-2019-general-election (Accessed: 08 November 2019).

National Literacy Trust (2011) *Policy*. Available at: http://www.literacytrust.org.uk/policy (Accessed: 7 January 2015).

**Appendix: Programme of work**

This appendix should provide details of the time scales in diagrammatic form using Gantt chart (see for e.g. <https://en.wikipedia.org/wiki/Gantt_chart)>. This will allow you to show when tasks were carried out, and their dependencies (i.e. the relationships between activities). Please use as much detail here as you are able to in this work breakdown (*hint: my suggestion is that 7 or 8 rows of sequential activities is* ***unlikely*** *to be sufficient*). No other materials are to be included in the appendix. If you wish, you might like to show what your initial planning looked like to compared to your actual activity in the Gantt chart.

References:

[1] www.computingstudents.com. (n.d.). *Computing Students - Notes - HCI / Star Life Cycle Design Approach*. [online] Available at: http://www.computingstudents.com/notes/interactive\_systems/hci\_star\_life\_cycle\_design\_approach.php [Accessed 12 Feb. 2020].

2. Wilbert O. Galitz. The Essential guide to User Interface Design Second Edition by Wilbert O. Galitz

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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.

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](https://classroom.synonym.com/pros-cons-qualitative-quantitative-research-8179604.html.%2015%20March%202020).

Universal Principles of Desgin by William Lidwell, Kritina Holden and Jill Butler

Nielsen J.1994 *Heuristic Evaluations And Expert Reviews | Usability.Gov*. [online] Usability.gov. Available at: <https://www.usability.gov/how-to-and-tools/methods/heuristic-evaluation.html> [Accessed 16 March 2020].

Regoli, N. *Disadvantages And Advantages Of Naturalistic Observation*. [online] ConnectUS. Available at: <https://connectusfund.org/disadvantages-and-advantages-of-naturalistic-observation> [Accessed 16 March 2020].

Nielsen J. 113 design guidelines for homepage usability. 2001; Available from:<[www.nngroup.com/articles/113-design-guidelines-homepage-usability](http://www.nngroup.com/articles/113-design-guidelines-homepage-usability)> [Accessed 16 March 2020]

Usability.gov, *Usability Testing | Usability.Gov*. [online] Usability.gov. Available at: <https://www.usability.gov/how-to-and-tools/methods/usability-testing.html> [Accessed 16 March 2020].

Appendix

Gantt Chart

A screenshot of a cell phone

Description automatically generated