

# **CM2101 Human Computer Interaction Assessed Coursework**

**Geraint Harries | 1100682**

## Application and Task Description

### Overview of System

The application I have chosen to design is a home medical reminder web site. This application reminds users by either text, automated phone call or email when they need to take their medication. This will enable users to remember to take their medication more regularly, avoid missing tablets and taking multiple doses by accident.

The user base is predominantly the age group 65+. This age group (although counting for 14% of the population) consume 41% of prescribed drugs (Goulding, 2005). However, due to the nature of technology, and that only 68% of men and 58% of women over the age of 65 and 36% of men, and 23% of women over 75, have accesses the internet (Office of National Statistics, 2012). This means a higher percentage of youth will have access to the application. Therefore, it is very hard to determine a clear demographic but the application has been designed to be utilized by over 65's.

This application may not, in the current climate, thrive. However, in 10 - 15 years, when the next generation have aged, you will see the demand of this system increase due to the increase in technological literacy.

The context in which the application is expected to be used is alongside long-term prescribed drug treatment or an illness which causes memory loss or confusion.

### Identification of Two main Tasks (Use Cases)

Two main areas of this application are entering personal and medical data and viewing that data. For example, A user should be able to enter a new prescription to be reminded of and then be able to view it to verify it's accepted and correct.

A more detailed explanation of the use cases can be found in the Interface Prototype section.

#### *Entering Personal and Medical Data*

- The user should be able to enter and submit medical data (prescription name, dose quantity, dose frequency, start date and end date).
- The user should be able to enter and submit personal data (Name, Email Address, Phone Number and preferred mode of Contact).

#### *View Daily Medical Breakdown*

- The user should be able to click on a specific day on the calendar and consequently be shown a medication breakdown of the day.

## Interface Prototype

Please find this document with a document entitled "MedicalReminderDocument". I will be referring to this document throughout the rest of the document. When I refer to figures, they will be the figures in the document "MedicalReminderDocument".

## Interface Design Overview

I decided to create and maintain a minimalist and basic design. This is to aid the user demographic in navigating around the site. An example of this is the first page you see (Figure 2), this page is 80%+ white space. This helps the users to not get anxious or worries by multiple options or a busy screen.

The main colour of the site is white. White gives subconscious feelings of purity, sterility, cleanness, etc. White is a colour synonymous with hospitals and when dealing with personal medical matters and information, people want to feel reassured that everything is correct and official.

## Explanation of Use Cases

### *Assumptions*

The user is already logged into the system and are currently at the home page (Figure 4). The log in process is used for both use cases and is not one of the specified use cases. Detailing would be tedious and repetitive.

### *Entering Personal and Medical Data Breakdown*

The user clicks “My Details” on the menu bar which navigates them to the details page (Figure 6).

The menu bar is on every page once you have logged into the system. This is consistent throughout the site. This helps the users become familiar and relaxed within the system whilst starting to learn the system and making it more predictable.

On the details page, users can enter in their personal information alongside their medical information. There are only two types of input on this page; textbox and radio button. This will help build consistency and predictability throughout the input form.

Once the form has been filled in, to submit their personal and medical data, the user simply clicks the submit button in the bottom right of the page. You will notice that the submit button is slightly larger than you would expect. This is deliberate, as some of the users may have reduced eye sight. Larger and clearer buttons will help them navigate around the site easier.

I placed the submit button in the bottom right hand corner to keep consistent with other websites and social conventions. People feel more at ease with the button to progress on bottom right and to digress on bottom left. This is consistent with the rest of the site, as you can see on the daily breakdown pages (figures 3, 9 and 11).

Once the user has clicked “Submit”, it will redirect them to the home page (Figure 4). This gives the user a sense of synthesizability creating a sense of trust in the site. Given the sensitive nature of the data, the users will want to be reassured that their data has been submitted and dealt with rather than lost. Given, also, the lack of computer literacy of the target user, they will want to know that it has worked first time and are not needed to enter information again.

### *Viewing Daily Medical Breakdown*

The user clicks “My Medication” on the menu bar which navigates them to the medication page (Figure 7).

On the medication page, users are presented with their previously entered medical data. On the left of the page, are the upcoming alerts/ reminder that the user are able to view. These reminders are in larger font than you would otherwise expect, this is due to, as mentioned before, the deterioration of eyesight over age.

On the right of the page, is a basic calendar, which the user can browse through and click a particular day. When a user clicks on a particular day, it will navigate them to a daily breakdown of medication (Figure 3).

This page online shows medication the user needs to take that day. The scroll bar on the right of the screen is wider than usual. This is to help users click it easier. Some users may have difficulty maneuvering a mouse precisely due to arthritis and therefore giving them a larger area to click will allow them to need such precision.

There are two buttons on the bottom of the page which allows the user to navigate forward and back throughout the calendar. These are consistent on all calendar pages which helps the user get familiar with the system as well as creating predictability.

Once the user has viewed enough information, they can (as indeed they can do on every page) return home by clicking “Home” in the menu bar.

## **Heuristic Evaluation**

### *Nielson’s 10 Usability Heuristics*

#### Visibility of system status

The system keeps users informed of what is going on. For example the menu bar is present on every page after log in, this allows the user to know where they are and be able to navigate backward and forward.

#### Match between system and the real world

The system uses terms and language that the target user will understand. Words such as “dose” and “prescription”. Given that the target user would be on medication, these would be terms they would very familiar with.

#### User control and freedom

As previously mentioned, the user can escape a page by using the menu bar. This gives the user a lot of freedom and control with navigation. Undo and Redo are not currently supported, however there is no need as there is no editable content that’s not in a website form format. Given that the system is a web application, undo and redo are very hard to implement and not useful.

The user has the freedom to edit their current medication data, which allows them to deal with missed tablets and end of prescriptions.

### Consistency and standards

The system has been designed with consistency in mind. Given the target user, will want to be reassured with the familiarity of the system. For example, the menu bar is always in the same place. This helps the user get familiar and learn the system.

On the daily pages (Figure 3, 9 and 11), there are two navigation buttons (Day Before and Day After). The Day After button is on the right, this is consistent with western reading conventions of left to right. Conversely Day Before is on the left. This also follows computer menu options standards.

### Error prevention

There is no error prevention as the system currently stands, which obviously needs to be addressed. This is addressed in the problems section of this document.

When developing this system further, I would build in an option to ask the user before adding medication “Are you sure you want to add this prescription?” with a yes and no option. This would stop any wrong or mistaken prescriptions being added. This would also give the user more control and freedom.

### Recognition rather than recall

The user is able throughout the entire system to navigate (by one click) back to the explanation of the system (Home Screen, Figure 4). This means at any point the user can look back and re-read instructions rather than having to recall lots of information.

### Flexibility and efficiency of use

There are no accelerators or shortcuts in the system, however, the navigation of the system is simple and fast enough that there is no need for them. Everything is connected to a centralized menu which is on every page. The system, although having a very confusing sketchflow map, is very efficient when navigating to pages.

### Aesthetic and minimalist design

As mentioned in the “Interface Design Overview”, the system has been designed with minimalism and simplicity in mind. All information that is in the system is relevant with very little ‘filler’ content. This makes the information added very clear and relatively visible .

### Help users recognize, diagnose, and recover from errors

As mentioned above there is no error prevention and therefore no error messages. However, when error prevention is implemented, I will make sure the messages are expressed in plain language and precisely indicates the problem with the aim to suggest a constructive solution.

For example, if a user had entered a medication twice, rather than the error message reading “Error(EM00102)” I would make sure it would read “You have enter medication X twice, are you sure you want to do that? (Click Yes if you do and No if you wish to delete it)” with corresponding options below.

### Help and documentation

The home page (Figure 4), has a guide to the system with a brief explanation of the menu bar options. This will help the user initially understand how to use the system but also learn where the relevant sections are without trial and error.

### *Learnability*

Due to the age range of the target user, I think learnability is very important to the system. Many of the target users will not have used the internet, a computer, etc before, and learning how the system works would help them navigate and become familiar with it. Therefore I have included a learnability heuristic evaluation too.

### Predictability

I believe users are very able to predict the result of their actions. I have kept to website standards (Submit buttons bottom right, Heading at the top, clear menu) and hopefully after a few uses of the site the users can start intuitively using it.

### Synthesizability

As mentioned Explanation of Use Cases, users can see results of their actions. When submitting information, the screen returns to the home page, allowing the users to know their information has been submitted.

### Familiarity

Familiarity is a huge part of this design. As mentioned in overview of the system, many users will not have used the internet before and so will not have other websites, systems to compare this to. This can be both an advantage and a disadvantage. It will be an advantage as we will not need to try and be like other systems to maintain familiarity however we hold a responsibility as this site may act as a 'gateway' website to the rest of the internet.

With familiarity being such a huge concern, I have made most stylistic choices with it in mind. The system has a very simple but repetitive style allowing the users to become familiar. A majority of the pages are 30% the same, with the menu and logo being at the top of the page.

Hopefully this will help users get used to the site and become familiar.

### Generalizability

This is maybe repeating what I've just mentioned in the predictability section, but I feel that due to complying by common website standards, the user is able to predict the system and therefore be able to use it instinctively.

### *Problems*

I have decided to prioritize the problems using the below tables as guides.

Severity Rating	
Rating	Definition
0	Violates a heuristic but doesn't seem to be a usability problem.
1	Superficially usability problem: may be easily overcome by user or occurs extremely infrequently. Does not need to be fixed for next release unless extra time is available.
2	Minor usability problem: may occur more frequently or be more difficult to overcome. Fixing this should be given low priority for next release.
3	Major usability problem: occurs frequently and persistently or users may be unable or unaware of how to fix the problem. Important to fix, should be given high priority.
4	Usability catastrophe: Seriously impairs use of product and cannot be overcome by users. Imperative to fix this before product can be released.

Ease of Fixing Rating	
Rating	Definition
0	Problem would be extremely easy to fix. Could be completed by one team member before next release.
1	Problem would be easy to fix. Involves specific interface elements and solution is clear.
2	Problem would require some effort to fix. Involves multiple aspects of the interface or would require team of developers to implement changes before next release or solution is not clear.
3	Usability problem would be difficult to fix. Requires concentrated development effort to finish before next release, involves multiple aspects of interface. Solution may not be immediately obvious or may be disputed.

After conducting a Heuristic Evaluation of the System, I have identified two key problems that violate traditional usability principles. These problems have been prioritized below with an explanation below the table.

#	Problem	Severity Rating	Ease of Fixing	Broad Heuristic
1	No Error Prevention	3	0	Error Prevention,
2	No delete	4	2	User Control and Freedom

## 1. Error Prevention

### *Problem*

The system currently has no error prevention and so users can easily add wrong or unchecked information without the system causing them to stop and revise it.

### *Recommendation*

I would recommend that a “Are you sure you wish to continue?” style menu is implemented so when users enter data they are able to stop and revise before a final submission is committed. This would allow far more use control and freedom over the system and increase error prevention.

## 2. No Delete

### *Problem*

A user is unable to delete a prescription once they have added it to the system. This means any errors or wrong information entered cannot be corrected. This could be very dangerous as users may follow wrong information

### *Recommendation*

Implementing a delete function on prescriptions where the users could control which prescriptions they could delete (again with a “Are you sure you wish to continue?” menu). This would give the users far more control over their information as well as reassuring them that error are fixable and manageable.

## **Critical Reflection and Time Management**

Throughout this experience, I have been constantly aware of how important and relevant this module and these skills will be in later life. Even in a year or so, I know I will be using these newly acquired skills for my final year project. Even during my current group project, we are starting to talk about design with confidence due to our experience with sketchflow.

Sketchflow is a brilliant tool which, when utilized correctly, can greatly help the design of a project. The interaction of it makes it very appealing and I’m sure I will be using it in the future. It is a brilliant tool to learn about sketch designs on due to it’s increased functionality over other options (such as Balsamiq).

The idea of breaking down a design page by page and then connecting pages up and dealing with their interactions is certainly something I’ll continue to do when designing in the future. Prototyping is certainly a skill worth building upon and developing to my best potential. Without prototyping, huge problems (for example the ones in my heuristic evaluation) would not have presented themselves until implementation. It would have been a huge stumbling block if I had not have noticed these problems.

The heuristic analysis has been a great help in learning about how to analyze a design by real measurable criteria. I’m sure I will be using this in the future, especially considering the design stage of my group project is fast approaching.



I was able to utilise a lot of skills from my first year module Developing Quality Software and build further on them. I hope that these skills will be keep being developed throughout my life as they are very useful within computer science.

## References

Goulding, Margie R, February 2005, Trends in Prescribed Medicine Use and Spending by Older Americans, [Online], Available at: <http://www.cdc.gov/nchs/data/ahcd/agingtrends/05medicine.pdf>, [Accessed: 03.11.2012]

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