**Evaluation Approach**

The chosen approach was an evaluation in the Lab.

We decided to evaluate the user interface in a Lab-based testing environment because this would allow us to select users with specific backgrounds. Since some aspects of the tool requires some specialised knowledge - i.e the Doctor deals with medical concepts such as blood type or health parameters, the participant should have at least some higher education completed and sound writing and reading skills in English. We decided to include a participant with advanced programming skills in order to gather technical feedback as well.

A major reason to choose this approach was the fact that due to the current social distancing guidelines to stop Covid-19, it was not possible for us to undertake an Evaluation in the Wild because it would require us to approach people with a medical background or even real patients. This would not only be a hazard for ourselves but for other members of the general public. Furthermore, we wished not to waste NHS assets as they are currently trying their best to prevent the spread of COVID-19.

**Evaluation Plan**

**Scope**

* Test login, register new patient, register new Doctor, input health data, display data and logout. Test all of these for both mobile and desktop interface.

**Purpose**

* Test if users can perform all of these tasks on both interfaces
* See if users prefer one interface to the other
* Measure how usable each system is
* Find out which parts of each interface the users like or dislike

**Schedule & Location**

* In users’ homes or public spaces at times requested by users

**Sessions**

* Sessions will take 30 minutes to 1 hour
* Sessions will begin with explanation of the project
* Users read information sheet and sign consent form
* Users are randomly assigned 1 interface to test first
* Users perform all tasks for this interface
* Users complete SUS form
* Users perform all tasks for second interface
* Users complete SUS form
* Users are interviewed about their experience with the 2 interfaces

**Equipment**

* Laptop computer with keyboard and mouse
* Screen recording
* Audio recorder

**Participants**

* Recruit 5 participants. Participants to be recruited from our social networks. All participants received an information sheet and a consent form.

**Scenarios**

Desktop:

* Log in with provided Doctor credentials and Register new patient
* Register new Doctor
* Display patient’s data
* Open chat and message between patient and Doctor (Patient is controlled by a member of the team)
* Log out from Doctors page and Log in as Patient
* Input health data
* See data as graphs
* Open chat and message doctor

Mobile:

* Log in with provided Doctor credentials and Register new patient
* Register new Doctor
* Display patient’s data
* Open chat and message between patient and Doctor (Patient is controlled by a member of the team)
* Log out from Doctors page and Log in as Patient
* Input health data
* See data as graphs
* Open chat and message doctor

**Subjective metrics**

* SUS questionnaire
* Likert scale

**Objective metrics**

* Time taken
* Number of errors

**Roles**

* Single person acted as facilitator and took some notes
* Another person logs timing

**Ethical Considerations**

* Minimal risk
* Informed consent
* No deception
* Participant may withdraw at any time
* Participant's data is kept confidential
* Participants may withdraw his or her data from the study or test at any time.
* Participant data will be deleted after 12 months of the date of the study

The consent page provides the following information:

* Purpose of the study
* Who is in charge of the study
* What the participants will be doing
* That the participant may withdraw at any time
* How the results will be used and how the participant's data will remain confidential
* That the participant may decide that his or her results will not be used

**Report on evaluation conducted**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Jason** | **Hamza** | **Ashgar** | **Sam** | **Edward** |
| **Test 1:**  **Login with provided doctor credentials and Register New Patient** | Dark background makes data entry fields hard to read.  Medical history is an ambiguous field - what does the user need to enter?  Good validation on fields.  Medical history just accepts plain text, no formatting present.  Time: 04:50:00. | User likes the layout of views for both Doctor and Patient Login.  Likes background image.  When registering a new patient a validation message appears and floats to the top.  When registering a new patient the user is asked for their date of birth and age.  Time: 00:02:56. | Validation not live.  Anything can go in the medical history field.  Own medical history list, not just one text box.  Medical history should be separate.  Time: 04:29:00. | User found the task simple.  User was confused by the date of birth when he had to enter age.  Adding age is unnecessary when you have to do date of birth as well.  Time: 01:39:00. | No text box for middle name.  User was confused if the address was an email address.  Time: 03:08:00. |
| **Test 2:**  **Register New Doctor** | Add more fields for address entry - Line 1, 2 etc, post code.  Specialty fields should be changed to departments.  Time: 01:54:00. | Mobile number should not be stepped input.  User likes the use of a date picker.  Time: 01:49:00. | Drop down box is actually a drop up.  Footer does not stay consistent depending on the amount of data entries.  Time: 02:45:00. | User thinks the address should be separate. Post Code, address line 1 etc.  Time: 01:33:00. | User liked the use of drop down menus.  User would like licence revalidation date to be on a seperate line.  Age and date of birth dont link.  Overrode speciality by typing in the drop down box.  Time: 02:15:00 |
| **Test 3:**  **Doctor Displays Patient List** | Time: 00:04:30. | Time: 00:04:29. | Consistent button.  Table headers are too long.  Difficult to see search option.  Time: 00:05:00. | Time: 00:04:00. | Time: 00:03:00. |
| **Test 4:**  **Doctor Displays Patient List** | Can only search for patients currently assigned to the doctor that is logged in.  Search bar needs a title.  Edit patient data is shown as placeholders rather than field entries.  CSS on patient list - overlapping on right side.  Search field needs labels.  Time: 00:06:24. | Time: 00:06:32. | Change to patient edit - should be changing patient information rather than patient data.  User likes the use of colours for the buttons.  User likes the delete page.  Time: 00:02:55. | Time: 00:05:00. | Buttons for functionality could be more aesthetically pleasing.  Time: 01:25:00. |
| **Test 5:**  **Open Chat and message between Patient and Doctor (Patient is controlled by a team member)** | Add a chat button to the patient list so you don’t need to click view patient data in order to chat.  Text area should be fixed - can be resized past page boundaries.  Send button is small.  Time for chat is 1 hour ahead.  Saves chat history.  Registered second patient to test multiple user chat - application only allows chat between one patient and doctor.  Add chat notification number to icon for chat as well as notification popup.  Time: 00:03:50. | Chat is nice and easy to use.  Time: 00:38:51. | User likes the use of a big text box for chat data entry.  Should add tool tips on the homepage icons. - ensure functionality is clear.  Can write scripts into the chat.  Time: 00:02:00. | Separate colours for users in chat. Maybe have sender on the right hand side of the screen and receiver on the left.  Time: 00:24:45. | User could not tell which image led to the message screen for the patient.  Time: 00:10:00. |
| **Test 6:**  **Logout from Doctors page and Login as Patient.** | Credentials entered incorrectly.  Time: 00:40:00. | Time: 00:03:65. | Time: 00:15:00. | Time: 00:05:00. | Time: 00:01:24. |
| **Test 7:**  **Input Patient Health Data** | Add labels to icons on homepage for usability clarity.  Heart rate outlined in red with no error displayed (BPM lower than 50).  What is the requested format for exercise data? - also does not allow for the entry of spaces.  Navigation bar at the top does not make it clear where to upload the data. Jason thought you could upload data using the icons but you need to click upload in the navigation bar in order to do this.  Time: 2:43:00. | Upload link in navigation bar a bit small  When entering health data for Sleep it is not possible to enter a value less than 4. In certain circumstances people will have had less sleep than that.  Time: 01:16:00. | Pictures need labels.  Upload button inside the navigation bar is hard to find.  User likes the graph animation.  Time: 00:04:02. | Could have words as well as pictures for the patient homepage.  Heart Rate max should be higher.  Upload button should be easier to see.  User likes the look of the graphs.  Series one label doesn't make sense, overlaps on x axis.  Hours of exercise is not one word.  Time: 01:28:68. | Hours of sleep should be able to enter less than four.  Hours of exercise should accept a more precise number.  Time 01:21:03. |
| **Test 8:**  **Patient Data displayed in graphs** | Displayed date on the datapoint is inconsistent with the date picker format.  Graph labels aren't clear.  Time: 00:03:45. | Time: 00:04:28. | Time: 00:05:36. | Time: 00:05:49. | Time: 00:03:44. |
| **Mobile View** | Dead space at the top of the homepage and chat.  Charts not centered. | Consistency between the desktop application and mobile application.  Chat system remembers the chat history.  Same validation issues as desktop. | Responsive.  Logo is good.  App consistency. | Table UI does not fit on the screen on mobile.  UI transfers well to mobile for chat. | UI looks good.  Application reacts well to screen size. |

**Results and re-design suggestions**

**Doctor View**

**Results**

* All functionality working
* Consistent professional look
* Likes the use of colour for buttons
* Doctor mobile view doesn’t look very good
* Average time of completion (7 minutes 30 seconds)

**Redesigns**

* Validation Not Live
* Patient sign up address should be split up into address line 1
* Doc home page, footer and css doesn’t work if there are many patients
* Table headers are too long, and not reactive
* Search bar removes table headers so unclear for the user

From the evaluation that we carried out there are a variety of redesigns that can be made to improve the user experience for the doctors view. The patient sign up form on the doctors home page needs some redesigns, as the users suggested that the address input fields should be split up into, address line 1, address line 2, etc. The doctor home page needs some redesign as well, as the users pointed out that the footer and CSS for the background colours fail when there are many patients in the list. A redesign could be to change the colour on the backgrounds, or to fix the CSS containers. This issue also extends to the selected patient page, as the table displaying the patients data is too long and not reactive according to the users testing. The final redesign for the doctors view would be the search bar. From the testing the users stated that the search bar was hard to see, as it’s white and the background is also white, they also mentioned that when you search the table headers are removed. A redesign for this would be to make the search bar a different colour, or to make it more noticeable to users, and to keep the table headers on the search so that the users know what each field is related to.

**Patient View**

**Results**

* All functionality working
* Very nice graphs with animations
* Mobile view is very nice and reactive
* Average time of completion (5 minutes 25 seconds)

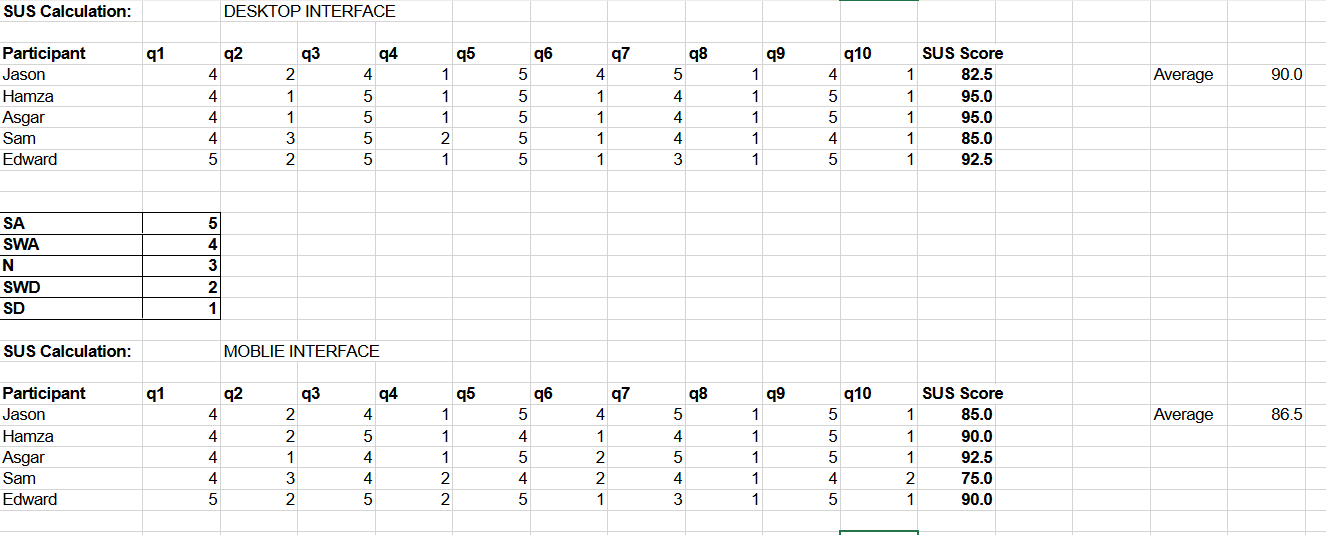
**Redesigns**

* Tool tips or labels on patient home page so links are clear
* Upload button inside the nav bar is hard to find
* Can write scripts into the chat

From the evaluation that we carried out there are a variety of redesigns that can be made to improve the user experience for the patients view. Feedback that many of the users gave was that on the home page the pictures should have labels as the users were unclear on what the meaning of each picture was. The redesign for this would be to add labels to the bottom of each of the pictures saying what it is. We could also have text to hover on the picture, to explain what the pictures are representing. And a final redesign could be to add a tutorial when the user first logs in that would take them through each of the pages on the system, while explaining what and how everything works. Users also said that the upload button was difficult to find on the nav-bar, a redesign for this would be to either move the manual data upload link from the nav-bar to an icon, similar to all the other links, or to make the link stand out more on the nav-bar by changing the colour, font size, or positioning. The final redesign is for the chat system as one of the users was able to insert a javascript alert function into the database and break the chat. This would be a redesign of the back end system as we would have to sanitize all of the messages sent from users and doctors before they are stored in the database, to prevent this scripting issues. Furthermore, one user noted that it was hard to distinguish who was sending and receiving certain messages. This could be prevented by assigning different colours or positions to each participant in the chat.

To conclude the user evaluation highlighted many user interface issues that can be re-worked for both the doctors views and the patient views.

**Appendix**

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