A background image showing two people in a meeting. A woman in the foreground is smiling and looking towards the left, while a man is partially visible behind her, looking down. The image is overlaid with a dark teal filter.

UCD USER EVALUATION

RESULTS

Group 1



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EXECUTIVE SUMMARY

UCD Project Group 1 conducted a usability test with users of the dementia support prototype to find out their opinions on the usability of the interface design, interactivity, effectiveness, and efficiency of it. The test was conducted online due to movements control orders by the government. 4 participants were chosen as part of the sample population because of time and movement constraints. The average time of each test was about 30 minutes to an hour.

Based on the results of the test, 100% of the participants had a high SUS score which translates to high satisfaction. Overall, users had an easy time interacting with the app with minimal problems. Although, for some of the tasks, some users had a slightly lower score, but the final results exceeded expectations.

The demographics of the users were mainly senior citizens (65-70). They are the main users so the prototype and the prototype had been customized, with them in mind, from the planning stage. This planning helped them interact with ease. Nevertheless, the main issues that they had, and raised, are listed below

- Arrangement of things in the interface
- Labelling
- Colors
- Font sizes & types

The document contains the summary of data collected, problems identified, limitations of the method, and the raw data collection. A copy of the questionnaires is located in the appendix.

1. INTRODUCTION

The official name of the dementia support app is Intellicare. This is the second iteration design of the first version of the app. The entire prototype app was evaluated from the interface to the features to the interactivity of it. In addition, the app was evaluated with usability goals in mind. The targeted population to use this app is the elderly with dementia.

The secondary group to use this app is the caretakers because in the event that the elderly has serious dementia, the caretaker has to know how to operate most of the app. The app is designed to be used in various environments because the purpose of the app is to provide greater independence and security to dementia patients. With this in mind, independence and security means the patient is able to travel anywhere without mishaps happening. Different environments have different dynamics and this app is designed to be versatile and adaptive in all environments.

The type of user work supported by the app such as providing condition updates, alerting first responders, two way calling, GPS tracking, user account creation and customization, health reports are all supported in the app. These are fundamental features which is needed by all dementia support app also.

The test was conducted by Bernard, Joel, Lionel, and Wai Keen. The test was conducted online through different video conferencing software such as Zoom and Teams. The sessions were recorded for analysis purposes.

The session data recorded the users communicating with the developers, interaction with the app, and the filling up of the questionnaires. The users were briefed before the session to get their consent to be recorded using the app. The recorded videos are archived safely in the cloud and only showed to relevant people.

1.2 TEST OBJECTIVES

Objectives

- Users should be able to interact with the app efficiently and effectively without assisted help
- Users should be able to track dementia patient and get notified about their conditions
- Users should be able to allow dementia patients to live with greater independence and security, because this is the main issue the app is created to solve.

Core functions and features objectives

- Users can create user accounts efficiently
- Users can initiate two wall call and enable live GPS tracking of the patient
- Users can view important health conditions and informative report about the patient to make informed decisions
- Users can dial first-responders easily efficiently without delay

Although the whole app was evaluated, the core functions and features are looked at in detail because these are crucial in what a dementia support app is designed to do and factors that helps the app to sell.

2. SUMMARY

Example: Dementia Patient Tracking App (Participant Characteristics)

The aim of this application is to allow users (caretaker) to keep track and monitor the location and health condition of the dementia patient. The user must own a mobile phone with Internet connection and GPS while the dementia patient must wear the smart bracelet.

	Caretaker Age	Caretaker Digital Literacy Skills	Patient Wi-Fi & GPS Connection	Amount of Time Caretaker Check Their Device in A Day	Patient & Caretaker Device Up to Date
P1	51 - 60	Good	Good	4 – 5 Times	Yes
P2	30 - 40	Good	Good	More than 5 Times	Yes
P3	51 - 60	Average	Good	4 – 5 Times	Yes
P4	51 - 60	Average	Good	4 – 5 Times	No

Example: Participants (caretaker) characteristics for the dementia patient tracking app.

According to the table above, the average age of the caretakers is between 51 -60 except for P2 where the caretaker is 30 – 40 years old. The digital literacy skills for the participants is split into half where P1 and P2 have good skills while P3 and P4 have average skills in evaluating technologies. None of the participants had excellent digital literacy skills. All the patients have good Wi-Fi and GPS connection. Hence, we believe there will not be a connection issue between both parties. 3 out of 4 participants check their device 4 - 5 times a day while P2 checks more than 5 times in a day. Only 1 out of 4 participants did not update their device to the latest version but this issue can be easily solved.

The participants were asked to fill and agree to the informed consent forms before we start recording them evaluating prototype and completing tasks using online communication platforms such as Skype, Microsoft Teams, and Discord. Then, participants were asked to complete the Google Forms for the Post Tasks Questionnaire and Standardized Satisfaction Questionnaire (SUS).

Example: Dementia Patient Tracking App (Effectiveness and Efficiency)

The following is an example of reporting effectiveness and efficiency measures for the dementia patient tracking app. Note that information about the task and how it was, is included.

Task 2: Imagine using the dementia patient tracking app to set a reminder of 3:30 p.m. daily to remind your dementia patient to take medicine.

	Unassisted Task Completion	Errors	Assists	Task Completion Time (sec)
P1	100	0	0	28
P2	100	0	0	170
P3	100	0	0	105
P4	100	0	0	20

Example: Effectiveness and effect results for Dementia Patient Tracking App.

This table shows that Unassisted Task Completion of 100 (complete) or 0 (incomplete), amount of errors, assists and time used to complete the task given.

Example: Dementia Patient Tracking App (Effectiveness and Efficiency)

The following is an example of reporting effectiveness and efficiency measures for the dementia patient tracking app. Note that information about the task and how it was, is included.

Task 3: Imagine using the dementia patient tracking app to get the patients current heartrate at 2:30p.m.

	Unassisted Task Completion	Errors	Assists	Task Completion Time (sec)
P1	100	0	0	15
P2	100	0	0	162
P3	100	0	0	123
P4	100	0	0	50

Example: Effectiveness and effect results for Dementia Patient Tracking App.

This table shows that Unassisted Task Completion of 100 (complete) or 0 (incomplete), amount of errors, assists and time used to complete the task given.

Example: Dementia Patient Tracking App (Effectiveness and Efficiency)

The following is an example of reporting effectiveness and efficiency measures for the dementia patient tracking app. Note that information about the task and how it was worded is included.

Task 4: Imagine using the dementia patient tracking app to locate the current location of the dementia patient when you are at home.

	Unassisted Task Completion	Errors	Assists	Task Completion Time (sec)
P1	100	0	0	24
P2	100	0	0	173
P3	100	0	0	165
P4	100	0	0	35

Example: Effectiveness and effect results for Dementia Patient Tracking App.

This table shows that Unassisted Task Completion of 100 (complete) or 0 (incomplete), amount of errors, assists and time used to complete the task given.

Example: Dementia Patient Tracking App

The following is an example of reporting satisfaction measures for the tracking app.

Satisfaction Data

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9	SUS Score	Recommend to Friend
P1	4	2	1	2	1	2	2	1	1	75	9
P2	1	2	1	2	3	2	1	1	1	97.5	10
P3	2	2	1	1	5	2	2	1	3	60	6
P4	2	2	3	2	3	4	5	5	2	77.5	8

Example: Satisfaction results for dementia patient tracking app.

(Where Task Difficulty was rated on a scale of 1 = Very Easy and 5 = Very Hard)

(Recommend to Friend 1 = Very Unlikely and 10 = Very Likely)

SUS Score Clarification

All participants have a high score for the SUS score while P3 has a slightly lower SUS score which shows that the participant have some difficulties while doing certain tasks. The average score for SUS is 77.5 (B+ Grade) which is higher than the specified in the usability requirement targets (68). In terms of interpretation of the SUS score, we use “acceptability” to describe it. Hence, the SUS score indicates that overall, our app has a high acceptability rate with the exception of P3. This shows that the app has an outlier, which is considered “MARGINAL” in the acceptability scale indicating it has just passed the minimum standards. Therefore, we still have to modify the app so that all users will be at baseline scores in satisfaction.

Comment Data (Open Questions):

Positive: User friendly and easy to use, Application will be frequently used. Overall, well done in most of the prototype

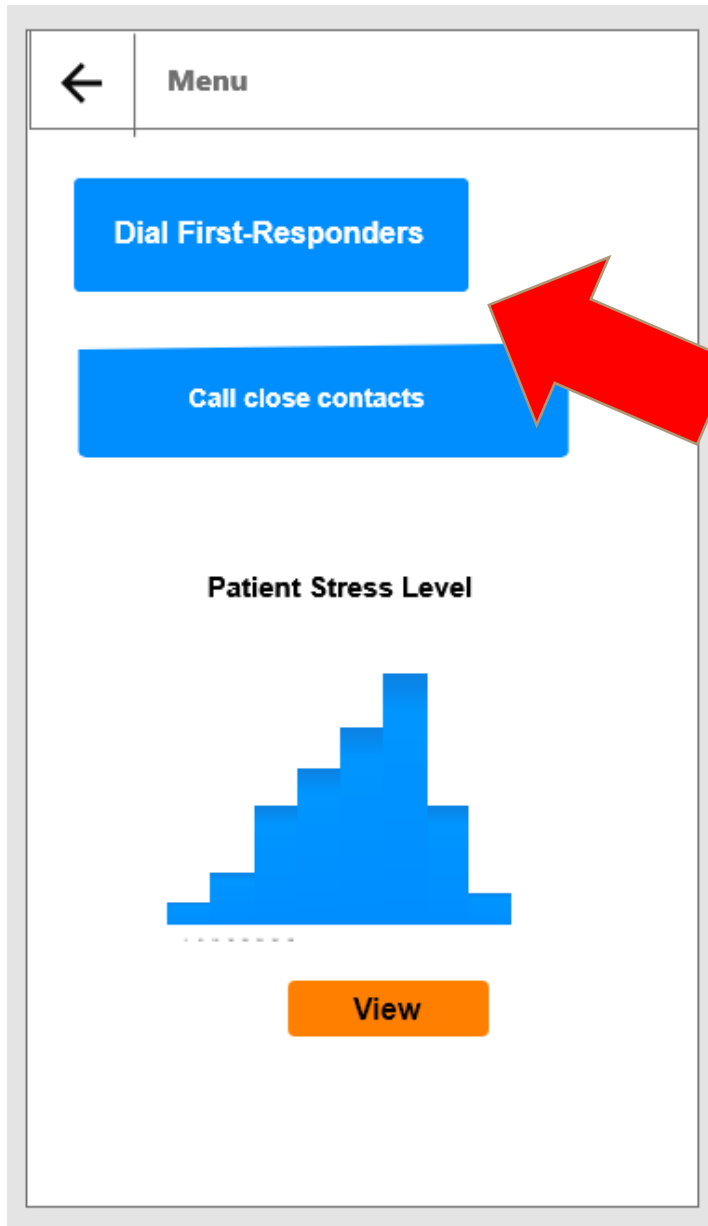
Negative: Visual wise (Need to improve in labelling, colors, font types, and sizes)

3. PROBLEMS IDENTIFIED

From the results of the data evaluation, we have concluded that some of these tasks have took longer than expected but in terms of usability goals, the features and interface have met the baseline expectations, but has avenues for improvement for effectiveness and efficiency. The usability problems that can be improved will be listed as per below.

- Using Intellicare to contact emergency services took longer than expected
- Using Intellicare to return home from the park had a problems activating this feature
- Using Intellicare to contact the dementia patient had some difficulty
- Using Intellicare to get the patient's stress level at a certain time had some difficulty

The screenshots and problem areas are listed in the following page

**Problem Area –**

Based on the data results, about 25% users took longer than expected to find this feature. This feature is important because when an emergency happens, first-responders need to be alerted. If caretakers cannot respond in time.

Usability Issue:

Efficiency

Cause of Issue –

UI improperly designed

Severity of Problem –

Frequency: Occasionally

Impact: Major Impact

Persistence of problem: Occasionally

Priority Rating-

Major Problem

Recommendations:

The emergency services should be located in a prominent section of the app because emergencies can be life threatening and need fast decisions. Areas that it be tracker page so caretaker can view the location and tell first-responders the location.



Problem Area –

Based on the data results, about 25% users took longer than expected to activate this feature. This feature is important because it is important the patient be able to navigate home otherwise it may cause uncalled stress for the caretaker to locate the patient. Feedback was to change it to Go Home, labelling was wrong by Get Patient Location

Usability Issue:

Effectiveness

Cause of Issue –

Feature not improperly arranged in the layout

Severity of Problem –

Frequency: Occasionally

Impact: Major Impact

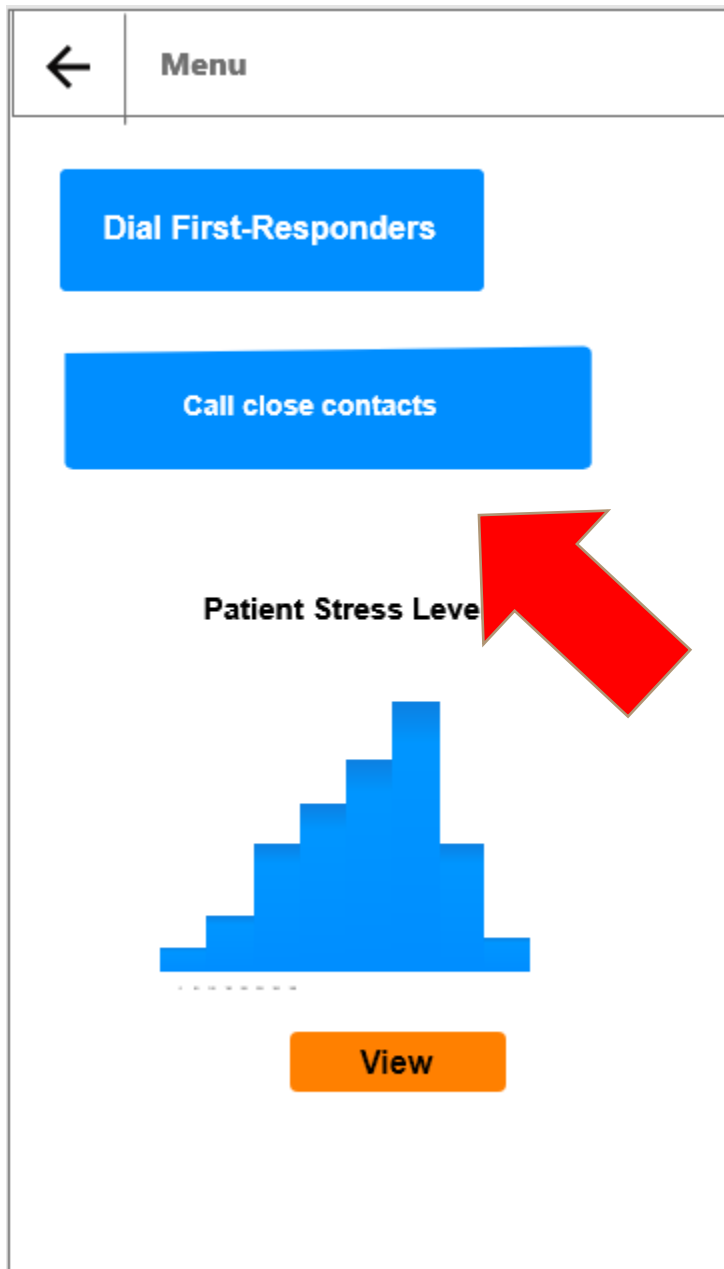
Persistence of problem: Occasionally

Priority Rating-

Major Problem

Recommendations:

Even after modifying the interface of the design and re-arranging the button, users still had an issue. Therefore, this part has to be relooked at in terms of layout and arrangement to provide greater ease in the feature activation process. As this is a dementia support app, the core users need to be kept in mind

**Problem Area –**

Based on the data results, similar to the first issue, users had difficulty in contacting the patient to check on their condition. Labelling should be changed to Call Patient.

Usability Issue:

Efficiency, Effectiveness

Cause of Issue –

UI improperly designed

Severity of Problem –

Frequency: Occasionally

Impact: Major Impact

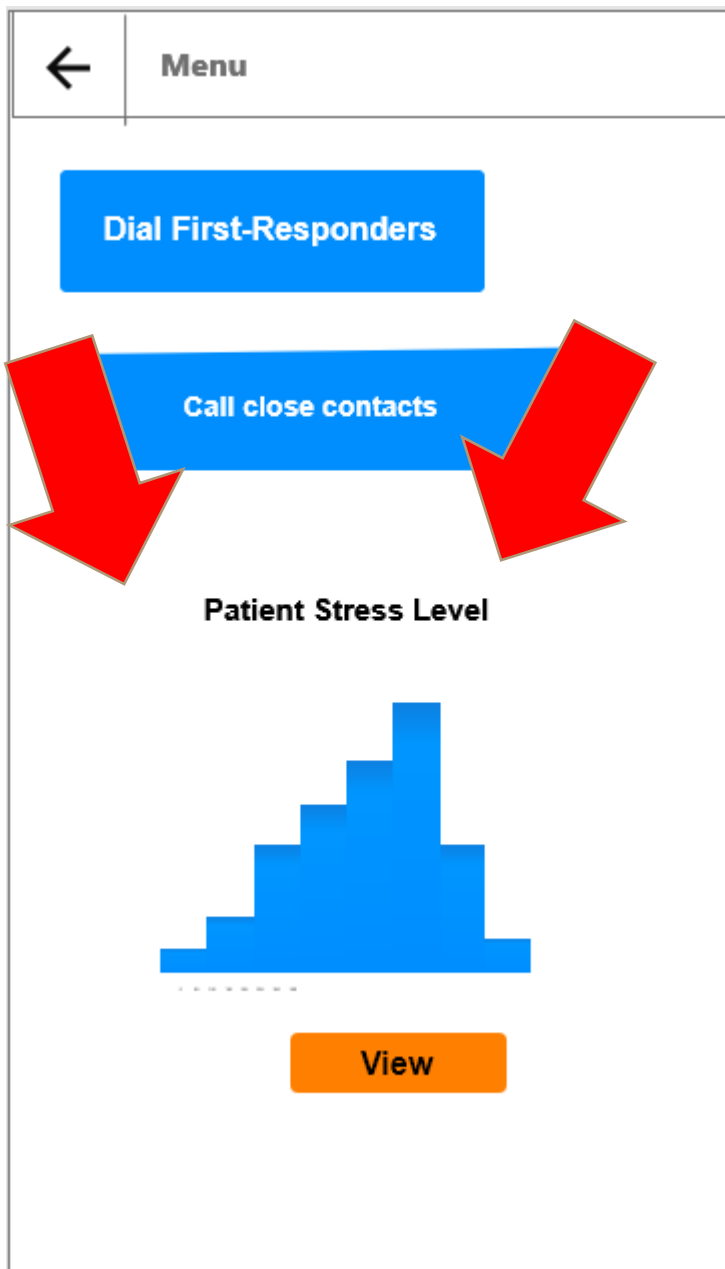
Persistence of problem: Occasionally

Priority Rating-

Major Problem

Recommendations:

Even though this is a major problem, it not as severe as other issues because the caretaker can enable other features that will provide consistent updates to them. However, this feature is still important in case the caretakers needs to contact them therefore its still listed as a major problem.

**Problem Area –**

Based on the data results, 25 % of the users had an issue acquiring the patient's stress level at a certain period.

Usability Issue:

Effectiveness

Cause of Issue –

The section which had this feature, in terms of information, was too vague causing ambiguity

Severity of Problem –

Frequency: Occasionally

Impact: Minor Impact

Persistence of problem: Occasionally

Priority Rating-

Cosmetic Problem

Recommendations:

A separate page should be designated for this section and provide more options for caretaker to make decisions and furnish them with information about what the stress levels show and not just a graph.

4. LIMITATIONS

Demographic Questionnaire

Problem 1

The screenshot shows a demographic questionnaire with two sections. The first section, titled '1. Patient Age', contains three radio button options: '65-70', '71-81', and '82-90'. These options are enclosed in a red rectangular box. The second section, titled 'Caretaker Age', contains three radio button options: '30-40', '41-50', and '51-60'. These options are also enclosed in a red rectangular box. The entire form is set against a light gray background.

Summary

The ages for both the patient and caretaker were limited, making the data collected from the demographic questionnaire not as accurate as we wanted it to be

Severity Assessment

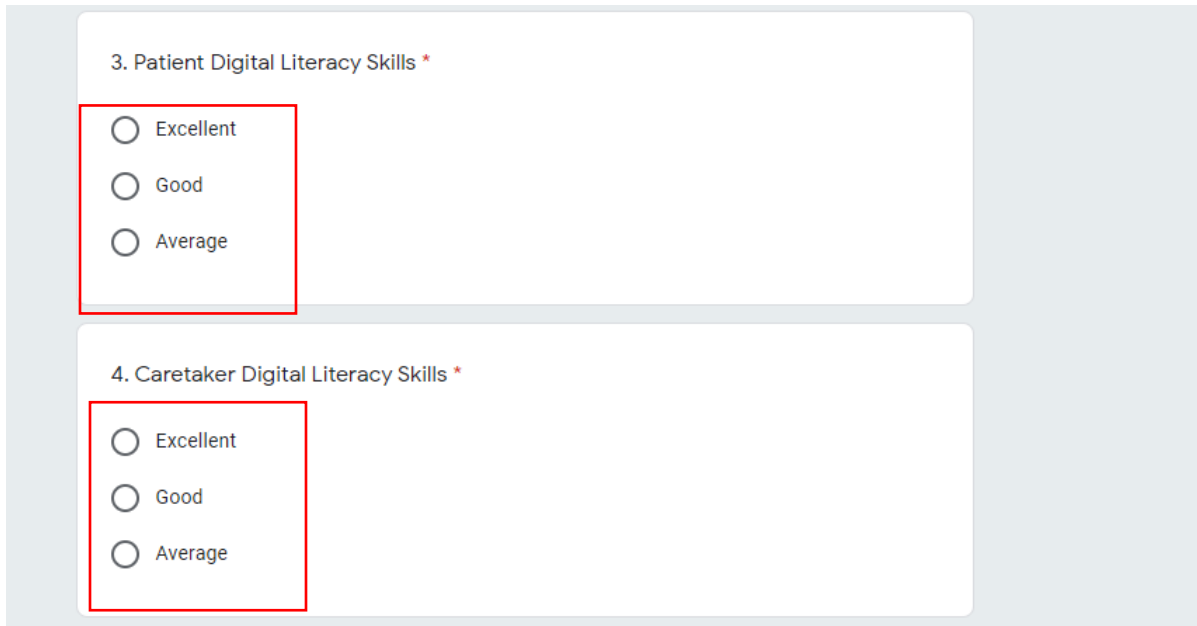
Although it didn't impact the completion of task, it still caused some inaccuracy in the data we collected, as dementia isn't necessarily only in people ages 65 and up. Some people can also get dementia earlier on in life. This created some inaccuracies when collecting data on the dementia patient.

For the caretaker(user) side there was also some problems with the age options we provided. People could still be caretakers after the age of 60, taking care of their parents for example. This led to the data recorded from the test on our target demographic to not be as accurate as we wanted it to be, which could lead us to focus on options that may not necessarily be targeted for the right target user.

Suggested Fix

The suggested improvement after discussing with our group members was to add more options to the demographic questionnaire specifically at the caretaker and dementia patient age section. This improvement was suggested because it did not create any difficulty for the user doing the task but instead actually helped us get more accurate data on the users, allowing us to create better features for the user without actually impacting their ability to complete task.

Problem 2



3. Patient Digital Literacy Skills *

☐ Excellent

☐ Good

☐ Average

4. Caretaker Digital Literacy Skills *

☐ Excellent

☐ Good

☐ Average

Summary

Limited scope for both patient and caretaker's digital literacy skills. May have caused inaccuracies in data collected.

Assessment

The options we provided for the patients and caretakers digital literacy skills were excellent, good and average. After completing the interviews, we found that the options provided wasn't enough. Some of the participants told us that the patients have low digital literacy skills. In hindsight, this was expected as the patient could be 80 or 90+ years old in age, thus may have not been familiar with using digital technology for most of their life.

Some of the caretakers also stated that they have poor digital literacy. However, since we only provided excellent, good and average as the options, they are forced to choose average as that is closest option. Thus, this created some inaccuracy in data collected when we were collecting the demographic of the target user. This could lead us to go forward with ideas for features which some of the users in this case may not be able to operate properly.

Suggested Fix

After discussing with both the users and our group members we concluded adding 2 additional options to the digital literacy skills option, for example 'poor' and 'very poor'. This will enable us to collect more accurate data when we plan to move forward and improve on our design and features. It also allows the users to state a more accurate opinion on their own digital literacy skills.

Evaluation Post Task

Problem 3

Task 7



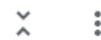
Use IntelliCare application to get the patients current stress level at 10:00a.m.
Patient current stress level:_____



Task 7 - Please rate the difficulty of this task:

	1	2	3	4	5	
Very Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Hard

Task 5



Use Intellicare to contact the emergency services. How long does it take?
Time:_____

Task 5 - Please rate the difficulty of this task: *

	1	2	3	4	5	
Very Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Hard

Summary

Provided requirement to complete in task but no place to write down completed requirement, leading to some users feeling confused.

Assessment

For some of the task provided (examples above), we gave some requirements to the user to note down the post evaluation task. However, since this was an evaluation of the prototype, we didn't provide a specified place for the users to fill in said requirements. This led to some of our users feeling confused on whether they have completed the task or not. This led to some of us requiring telling the user that they have completed their task successfully. This problem leads to the user being confused and second guessing whether they have properly finished the task.

Suggested Fix

After discussing with our group members, we can have 2 ways to fix the problem. The first would be to remove the requirement of needing the user to fill in the additional requirements. The logic to this conclusion was because we were asking the user to conduct an interview using a prototype design, some of the additional requirements that the user needed to do was not be able to be completed because some of the features provided were not fully operational. Thus, removing the those additional options will not lead them to being confused on whether they correctly finished the task.

The other improvement that we came up was to add a clearer location on where the user should write down their finished tasks. Since there was no proper location for the user to write down their finished task, by adding a clear location, this will clear up the user's confusion on whether they must write down their finished task.

Coordination of Activities

Problem 4 summary

Miscommunication occurred when coordinating group members conducting multiple simultaneous interviews.

Assessment

During the coordinating of interviews, we were each required to interview a caretaker for our prototype. However, there was some difficulties when trying to coordinate simultaneous interview. This led to some group members being confused on what documents each of them must bring to the interview as well as whether they have the all the same documents as other group members. There was also an issue with checking up on group members on whether they are progressing smoothly with their interviews. Since the main form of communication in our group was through a group chat, there was some difficulties in knowing whether our group members have finished the task given to them.

Suggested Fix

In order not repeat this problem, after discussing with our group members, we concluded that conducting a check on each group member during the beginning on the task was crucial. This is to ensure that each group member know exactly what they must do, thus minimizing the risk of miscommunication. Besides that, we conducted a progress call to check on the status of each group member by calling them periodically during the task. This will enable us to properly check on the status on the progress of each group member and makes the task completion easier.

5. DATA COLLECTION

Participant Consent

4.	Email Address	Over Age of 18	Consent	Signature & Date
	developers360@gmail.com	Yes	Yes	Yeow Soon Tet (21/10/2020)
	lilybai98@gmail.com	Yes	Yes	Mercy (23 October 2020)
	wongkam18@gmail.com	Yes	Yes	Wong Kam Chuen 10/24/2020
	liansy_teh1663@yahoo.com	Yes	Yes	Liansy (24/10/2020)

Participant Demographic Questionnaire

Participant ID	001	002	003	004
Patient Age	71-81	65-70	65-70	82-90
Caretaker Age	51-60	30-40	51-60	51-60
Patient Digital Literacy	Average	Average	Average	Average
Caretaker Digital Literacy	Good	Good	Average	Average
Patient Background	Patient exhibit beginnings signs of dementia. This has been confirmed by the specialist doctor.	Patient was a active and energetic person previously. He began to have epilepsy which leader to his dementia resulting in difficulty to remember and perform daily task independently.	Early dementia onset around 80 years old, but got worse this year	Old man who cannot walk smoothly
Caretaker Background	Caretaker comes with about 8 years' experience handling dementia patients at Old Folks Homes.	I am his daughter who stays with him and helps him with his daily tasks.	Started to take over duty from dad(91yrs) last year	Housewife who speaks mostly in Mandarin to her family.
Patients Location Have Good GPS and Wi-Fi Signals	Yes	Yes	Yes	Yes
Frequency Of Caretaker Checking Their Device	4-5 Times	More than 5 Times	4-5 Times	4-5 Times
Are Patient And Caretakers Device Up To Date	Yes	No	Yes	Yes
Is The Patient Prone To Any Reactions If An Artefact Is Placed On Them ?	No	No	Yes	Yes

Participant Post Tasks Responses

Difficulty

ID	001	002	003	004
Rating				
Task 1	4	1	2	2
Task 2	2	2	2	2
Task 3	1	1	1	3
Task 4	2	2	1	2
Task 5	1	3	5	3
Task 6	2	2	2	4
Task 7	2	1	2	5
Task 8	1	1	1	5
Task 9	1	1	3	2

6.APPENDIX

Informed Consent & Briefing

<https://docs.google.com/forms/d/1DS9LqOSsT6H7RxvXdmk799Cou2QJmx0nDzyYsqyYRi4/edit>

Demographic Questionnaire

https://docs.google.com/forms/d/1_ZApC_ICaQuHsm8U5wNP8AgNG8nxTDGULo4OqnQV3M/edit?edit

Evaluation Tasks

<https://docs.google.com/forms/d/1t4V8CqIBopHtCqEQbEi98S2KA-KV1JTULoyTswJbw84/edit>

Post-Study & Questionnaire

https://docs.google.com/forms/d/1a4lSXu7Donk7_1CfmHqC5eA236g-OgyeyFs8kRhILkI/edit

