Human Robot Interaction Group 5A Coursework UWE UFMFHP-15-M

Jasmine Copeland
UWE Student ID: 20052644

Joseph Guichard
UWE Student ID: 20052658

Santhosh Sabapathy
UWE Student ID: 20052660

***Abstract*—As a result of the COVID epidemic, many individuals are having difficulty differentiating between flu and COVID symptoms. This paper presents a covid symptom checker system in form of a social robot (NAO) that interacts with an individual living alone at home. This symptom checker will recommend the appropriate course of action for the user based on the symptom they are experiencing. We compare the robot algorithm experimentally to an online Covid symptom checker provided by the NHS in the United Kingdom. Five subjects were used, each of whom was presented with three distinct symptom situations. The NAO asks participants on a variety of covid-related yes or no questions, and similarly, this is done through the online checker on their respective phones. Following each scenario, data on the user's perception of the systems' usability is gathered. The obtained data from both approaches were analysed statistically to determine which approach participants preferred for this task. The analytical technique's results indicate that the NAO's usability is a significant design problem.**

I. Introduction

Determining if you have Covid-19 is considerably more difficult because of the variety of symptoms, many of which are similar to those of the flu. Both conditions are characterised by a fever, which may be accompanied by chills, a dry cough, a sore throat, congestion, a runny nose, vomiting, diarrhoea, stomach pain, and fatigue.

The one distinction between the two infections is that many Covid-19 sufferers quickly lose their sense of smell, not because of a congested nose, but because even strong aromas like onions or coffee are not registered. Although not all virus victims experience loss of smell, one study indicated that 87 percent of those who were treated with covid did (1). Covid-19 most dangerous symptoms are severe difficulty breathing, chest discomfort, or pressure. Which means the person should seek medical assistance immediately.

Because the symptoms of both diseases are mostly identical, individuals often mistakenly believe they have the flu and delay taking appropriate treatment until the symptoms become severe. Causing them to experience potentially fatal consequences. The primary goal of this project was to inform the user if they were suffering from Covid in order to prevent them from having to endure these agonising conditions. During this pandemic, what better way than to use a social robot for this task.

Social robots provide a new style of engagement. Interacting with a robot is an embodied experience: robots use gestures and nonverbal behaviour to convey their internal state and other information. Additionally, by sharing physical space and items with their users, they promote interaction schemes that require physical activity on the part of the user, such as hand gestures. According to the literature, embodied contact may enhance thinking via action, improve understanding, and increase engagement of users.

The main research question that this experiment will address is whether people prefer to use a social robot system or a regular chat bot to ascertain their health status. This is accomplished by posing a series of questions to the user and determining the most appropriate course of action based on the responses.

II. Related Work

A. Influence of Embodiment and Substrate of Social Robots on Users' Decision-Making and Attitude (2)

In a study from Tsinghua University, a study was performed on the impact of embodiment in user decision on social robots. Four interfacings were implemented, a virtual reality (VR) robot, an augmented reality robot, a physical robot, and a telepresent physical robot displayed on a monitor. The users faith, attachment, social presence, and credibility towards the four interfacings were assessed through questionnaires. Findings show the VR and physical robot had the most impact on the users decision making. This article further supports social interfacing to impact the user willing to use a product over an online health checker.

B. The role of physical embodiment in human-robot interaction (3)

In a study at University of South California, humans were designated to complete a puzzle with the assistance of a physical robot and a computer monitor. Finding show times to complete the puzzle were inconclusive due to the satiation effect. This article further explores the importance of physical embodiment for social interfacing. The study is similar to ours in that it tests the importance of physical embodiment in human robot interaction. This study stresses the importance of randomizing order to prevent this satiation effect in our users.

C. Comparing Social Robot, Screen and Voice Interfaces for Smart-Home Control (4)

This paper introduces a novel concept for a home control interface in the form of a social robot, which is controlled by tactile icons and provides input through expressive gestures.

The experiment measures the robot against three traditional smart-home interfaces: a wall-mounted touch-screen, ,smartphone app and a voice-control loudspeaker. According to the results, interfaces with higher flow rates have poorer usability, and vice versa. Participants had the greatest sense of control when utilising common interfaces and the least when using speech control. When using the robot, situation awareness is highest, and when using speech control, it is lowest. These results call into doubt the use of voice control as a smart-home device, implying that embodied social robots may have an immersive interface with strong situation awareness, but their usability remains a significant design challenge.

D. Robots humanize care (5)

A common concern raised by healthcare workers regarding social robots in healthcare is of moral nature. Of note, criticisms usually speak of their potential maleficence (i.e. bringing harm to a patient accidentally or otherwise) or their inability to replace human contact. While evidence suggests that this may be warranted for assisting robots, which aim to physically support the patient, this study suggests otherwise when it comes to monitoring robots, which only supervise. Elderly women were made to have casual interactions with a social robot over several periods of time. While initially reluctant, they eventually seemed to bond with the robot, and talk to it as they would to a human being. The author then advocates for a reconsideration of the roles of human caretakers over that of robots, citing a financial concern as the source of their criticisms. Another advantage of such robots is the greater feeling of privacy, making their users more at ease when discussing personal topics. Needless to say, this study is close enough in nature to our own, and shows that there is a strong moral argument to be made in favour of implementing the NAO for social care.

E. The NAO models for the elderly (6)

The NAO robot has already been compared with screen-based modalities as far back as 2013. In this study, the focus was on more physical activities with the elderly. Sets of exercise were conducted with a physiotherapist either alone, accompanied by the NAO or accompanied by a virtual representation of the NAO. Interestingly, the patients would mimic the robot's movements if they could match its speed, to the point of performing with better technique, but more limited range. This mimicking was more prominent with the real NAO than the virtual one, suggesting a higher level of engagement with a physical robot. While the authors expressed their desires to perform future experiments with the NAO, it was already thought that it could fulfill the role of a physiotherapist.

III. Methods

A. Research Question and Hypothesis

The hypothesis of the experiment is as follows:
"In a pandemic situation, users will be more motivated to check in with their health regularly with a robot than an online chat bot due to social interfacing"

B. User Study Design

The prototype design follow a "Wizard of Oz" format with the experiment team being in the same room as the user, albeit at a different table than the one the NAO was set up on. The user believes the robot is using speech recognition and following an algorithm to determine the users state based on a list of arbitrary symptoms. The user has to go through 3 arbitrary scenarios:

- A) The user is healthy.
- B) The user has a slight cold.
- C) The user is very sick and needs to go to hospital.

To which the robot will ask them a list of symptoms which the user responds to with yes or no depending on the scenario. Depending on the answers, NAO gives a general assessment of the user's condition and recommends a course of action based on the results. The list of symptoms include: slight cough, fever, soar throat, losing the sense of taste, and difficulty in breathing. Scenario C would include all of these symptoms, scenario B would include a couple of these symptoms and scenario A would include no symptoms. The courses of action recommended are respectively to contact emergency services, visit the local GP to check for a cold and nothing in particular.

In order to perform a baseline to compare the results obtained with, the participants are also tasked to complete a self-checker for symptoms on the NHS Wales website((7)) at home. This is performed several days after the original experiment, in an effort to reduce bias from their experience. The self-checker only replaces the NAO and the experiment is otherwise the same.

C. User Study Procedure

The user is greet with a brief verbal description of the experiment. The user is then handed a study information sheet to further read through on what the study is about. The user is then handed a privacy notice for the user to read through how their data will be handled. Once all the paperwork has been read the user will sign a consent form in taking part of the study.

The user will receives a list of scenarios A, B, and C which contain the symptoms the user is experience. The user goes through each scenario and fills out a a usability score based on each scenario. The order of scenarios are randomized to ensure there is no bias in order when analysing the results. Finally, once all the scenarios and usability scores are completed, the user will fill out an overall survey on the study. The user is then done with the study. The user will complete the above processes with the NHS chat-box as a baseline ((7)) and the NAO interfacing.

D. Dependent Measures

A basic usability score is used, asking the user to respond to 10 statements (8). The user responds on a scale 1 to 5, 1 being strongly disagreeing with the statement and 5 being strongly agreeing with the statement. This give quantitative data that will be easier to analyze. The statements listed are:

1) I think that I would use this system frequently.
2) I found the system unnecessarily complex.
3) I thought the system was easy to use.
4) I think I would need the support of a technical person to be able to use this system.
5) I found the various functions in this system were well integrated.
6) I thought there was too much inconsistency in this system.
7) I would imagine that most people would learn to use this system very quickly.
8) I found the system very cumbersome to use.
9) I felt very confident using the system.
10) I needed to learn a lot of things before I could get going with this system.

The overall survey at the end of the participants trail will give more insight on how they felt about the whole study and not just the individual case scenarios. The questions in the overall study are as follows:

1) What did you like about the NAO in the experiment?
2) Would you recommend the NAO to a friend to assist them in checking their daily health/well-being?
3) How easy did you find the NAO to be used?
4) Did the NAO assist in social interfacing?
5) How often do you think the NAO should check-in with the user where it would not be annoying? i.e., once a day, twice a week, once a week, etc.
6) What did you dislike about the NAO and how could the user experience be enhanced?
7) What would you score the product out of 10?

E. Participants

Five participants were found in the engineering building on UWE campus. The table below briefly describes the nature of each subject. About 20% were female and 60% were familiar with robots. All participants were university students in their 20s.

TABLE I
DESCRIPTION OF PARTICIPANTS

Participant Description			
Participant	Gender	Experience with Robotics	Age
1	Male	None	Early 20s
2	Female	None	Early 20s
3	Male	Some	Early 20s
4	Male	Some	Mid 20s
5	Male	Some	Late 20s

IV. RESULTS

A. Quantitative Data

From the data obtained the from three groups, we ran three different Wilcoxon–Mann–Whitney statistical analysis to identify similarities between groups A & B, B & C and A & C, the p-values achieved are provided in Table II. Assuming alpha is 0.5 we can conclude the p-values attained from these groups are statistically insignificant and they are highly similar. Hence, all of the following analysis are only focused on group-A as the other groups would also provide similar results.

TABLE II
WILCOXON–MANN–WHITNEY TEST RESULTS

Wilcoxon–Mann–Whitney test Between groups	
P-Value for A & B	0.657
P-Value for B & C	0.632
P-Value for A & C	0.888

From the data we gathered from the usability study we can calculate the average values for each of the question as shown is Table IV and Table V. These data are plotted in Figures 1 to 10.

As the data is non-parametric we used a statistical analytic method called Wilcoxon–Mann–Whitney test which determines if our suggested hypothesis is valid, the results are mentioned in Table III. The p-value obtained is statistically insignificant assuming the alpha value is 0.5.

TABLE III
WILCOXON–MANN–WHITNEY TEST RESULTS

Wilcoxon–Mann–Whitney test	
n1	10
n2	10
Sum	108
Expectation	105
Std.Error	14.491
Stat	0.207
P-value	0.836

The averages and standard deviations of the data for the usability scores from the NAO robot and NHS baseline are displayed in table IV and table V.

TABLE IV
NAO TRIALS

Statistics Across Five Trials for NAO										
Q	1	2	3	4	5	6	7	8	9	10
Avg	3.3	1.8	4.8	2.2	3.7	1.1	4.5	2.1	4.7	1.7
Std	1.2	0.8	0.4	1.3	1.3	0.3	1.0	1.3	0.5	0.9

TABLE V
NHS CHATBOX

Statistics Across Five Trials for NHS Chat-bot										
Q	1	2	3	4	5	6	7	8	9	10
Avg	4.1	1.7	4.5	1.6	4.1	2.4	4.6	1.3	4.0	1.6
Std	0.8	0.8	0.6	1.0	0.7	1.4	0.5	0.6	1.6	0.6

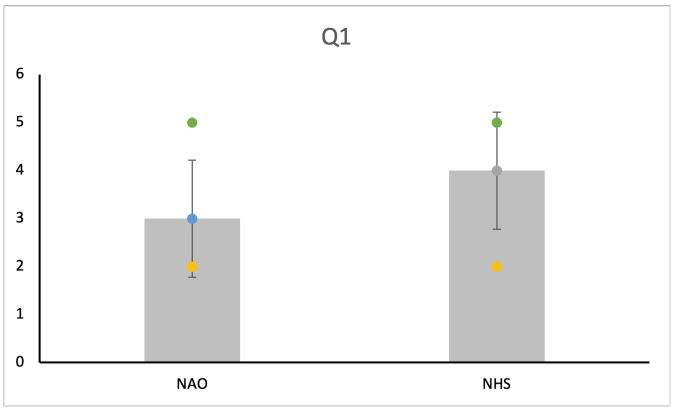

Fig. 1. Bar chart with scatter points for Q1 from the usability study

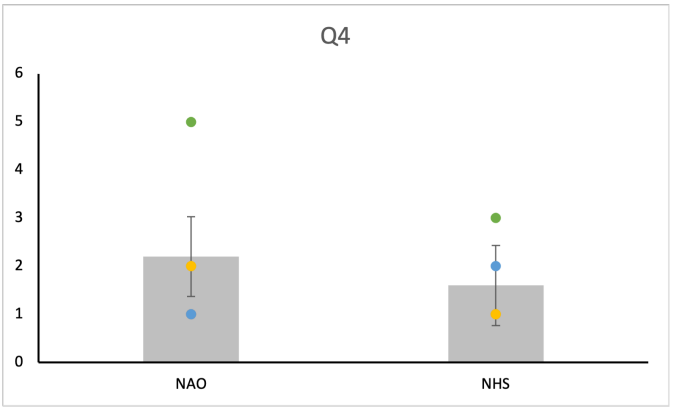

Fig. 4. Bar chart with scatter points for Q4 from the usability study

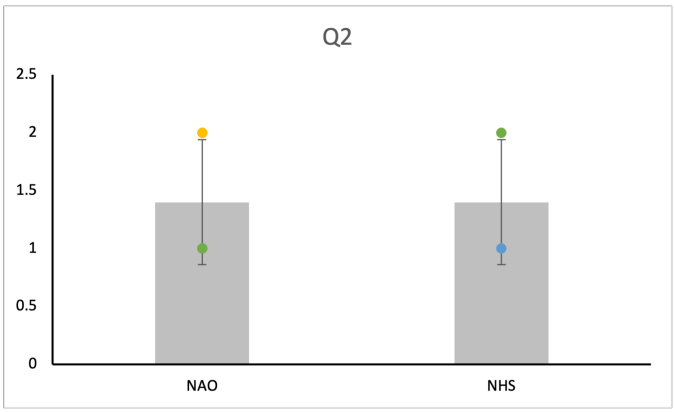

Fig. 2. Bar chart with scatter points for Q2 from the usability study

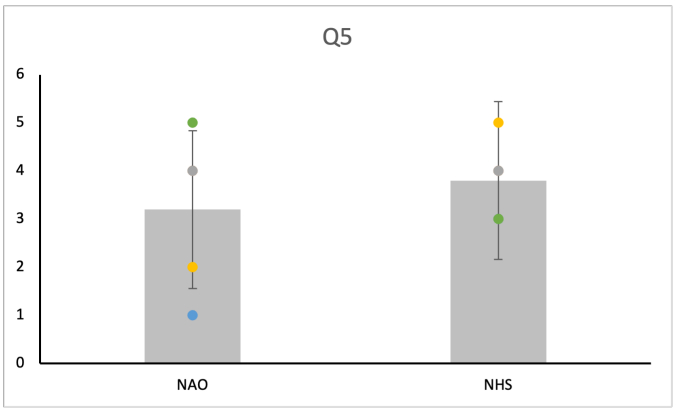

Fig. 5. Bar chart with scatter points for Q5 from the usability study

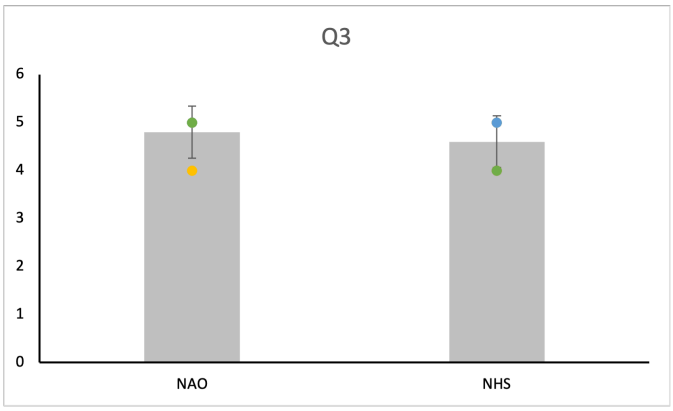

Fig. 3. Bar chart with scatter points for Q3 from the usability study

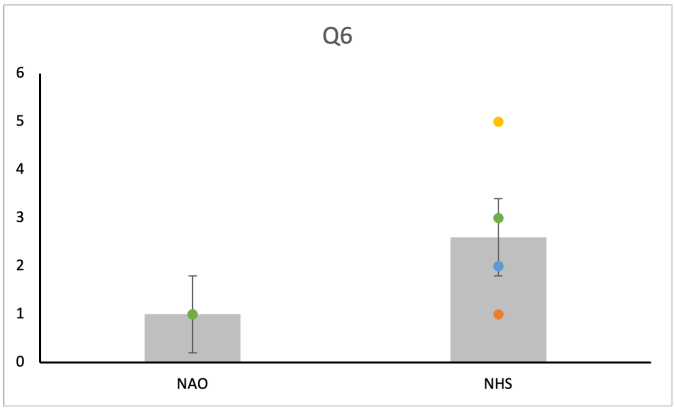

Fig. 6. Bar chart with scatter points for Q6 from the usability study

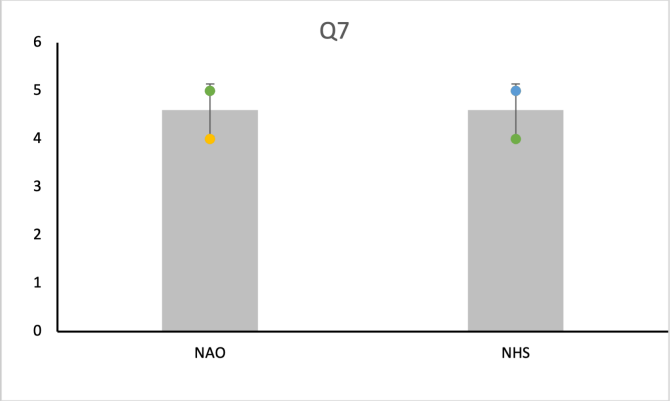

Fig. 7. Bar chart with scatter points for Q7 from the usability study

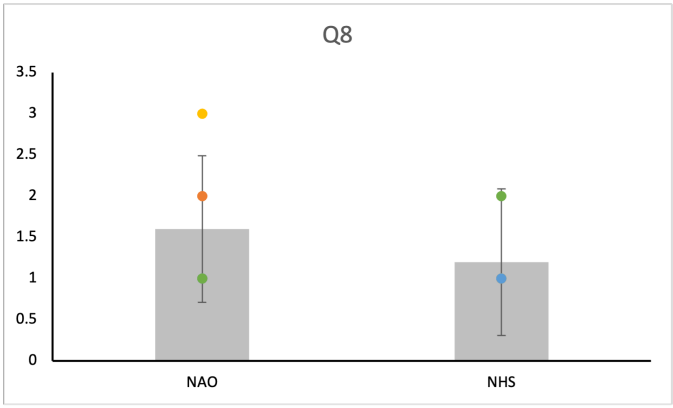

Fig. 8. Bar chart with scatter points for Q8 from the usability study

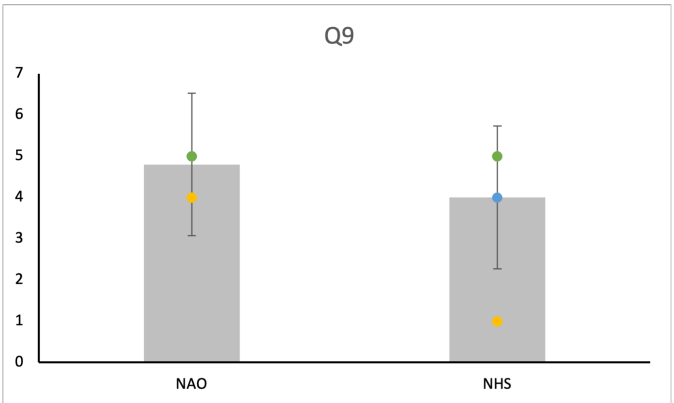

Fig. 9. Bar chart with scatter points for Q9 from the usability study

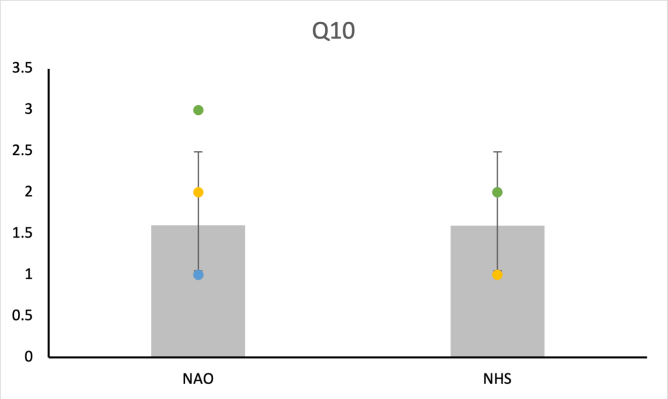

Fig. 10. Bar chart with scatter points for Q10 from the usability study

B. *Qualitative Data*

The qualitative data is assessed from the final questionnaire survey the users would fill out at the end of each experiment. Giving the option to the users to put into their own words their thoughts on the NAO and chat-box checker.

The first two participants, both unfamiliar with NAO, seemed enthusiastic about the idea of interacting with it, which they later noted having enjoyed. They both however lamented the small amount of questions asked. They also did not seem to realise the ”Wizard of Oz” setup and asked us about the potential uses of NAO. Both also noted the ease of use, provided they had instructions.

Users familiar with the NAO also found it easy to use, with one participant noting they felt they could trust it to provide accurate information. In general, any issue while running the experiment with them would usually result from a misunderstanding on the scenario tested. Most users thought that the robot should be interacted with at least twice a week, even daily for some. The social interfacing was well received overall, although one user thought that an app could easily replace the NAO for a much lower cost. Most users stated that they would recommend it to friends or family, although one noted that they would only do so towards people of an advanced age.

The responses for the self-check were fairly similar across all participants. While the service was found to be easy to use and likely to be recommended, every user lamented the lack of social interfacing. Interestingly, users tended on average to think it should be used less frequently than the NAO, despite mentioning how quick it is. One user had minor gripes with the user interface.

V. Discussion

When we examine the quantitative portion of the results obtained, we observe that the Wilcoxon–Mann–Whitney test (Table II) clearly indicates that the three alternative situations are irrelevant since the p-values are too large, indicating that the data gathered are highly comparable; this was the case for both methods. Similarly, when the Wilcoxon–Mann–Whitney

test is used to compare the group A data between the two approaches, the p-value produced is statistically insignificant since the data are 83.6 percent similar, indicating that the data acquired during the experiment have no significant influence on whether individuals prefer the social robot (NAO) or the chat bot. However, based on the qualitative data obtained, it seems that the majority of participants preferred engaging with the NAO robot since it delivered a more human-like experience than the chat bot. From this we can infer from our qualitative data that physical or "material" embodiment in a task-oriented situation may influence how a social agent's skills are perceived and how much a user enjoys a task. This finding is consistent with a work on the importance of physical embodiment in human-robot interaction. (3).

Some of the experiment's drawbacks include the following: the NAO costs £4844.34, which may not be a feasible choice for everyone to have in their house just for the goal of recommending what to do while unwell. Additionally, there is a possibility that user might not prefer to have a lengthy conversation with the NAO at least twice a week and and would rather utilise an online chat bot for this purpose.

However, this experiment may open new doors for the medical industry and the realm of human-robot interaction through diagnosing users for disease and also prescribing medications based on the individuals medication records and symptoms.

VI. Conclusion

Our results show that our present experimental design does not provide enough quantitative data to demonstrate that utilising a social robot is preferable to utilising a chat bot. The investigation does, however, give a favourable perspective into the topic of human-robot interaction by indicating that users would choose a conversational companion over a mere digital screen. The findings of this experiment will benefit engineers and researchers who develop social robots since they will have a better knowledge of what people want on the robot. Additionally, the system could be implemented at nursing homes or hospitals rather than at homes, allowing the technology to benefit a greater number of people. This might result in more research into how the environment affects the use of social robots for COVID symptom checking.

References

[1] D. G. M. Jr., "Identify the different symptoms of the flu and covid-19," 2021.

[2] P.-L. P. R. Bingcheng Wang, "Influence of embodiment and substrate of social robots on users' decision-making and attitude," *International Journal of Social Robotics*, 2019.

[3] J. Wainer, D. J. Feil-Seifer, D. A. Shell, and M. J. Mataric, "The role of physical embodiment in human-robot interaction," *15th IEEE International Symposium on Robot and Human Interactive Communication*, 2006.

[4] M. Luria, G. Hoffman, and O. Zuckerman, "Comparing social robot, screen and voice interfaces for smart-home control," in *Proceedings of the 2017 CHI conference on human factors in computing systems*, pp. 580–628, 2017.

[5] M. van Kemenade, E. Konijn-Hoorn, and J. Hoorn, *Robots humanize care: Moral concerns versus witnessed benefits for the elderly*, vol. 1, pp. 648–653. SciTePress, 2015.

[6] D. L. Recio, L. M. Segura, E. M. Segura, and A. Waern, "The nao models for the elderly," in *2013 8th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pp. 187–188, 2013.

[7] NHS, "National health service." https://tinyurl.com/4u8es68s.

[8] ScienceDirect, "System usability scale." https://www.sciencedirect.com/topics/computer-science/system-usability-scale.

UWE Bristol University of the West of England

Faculty of Environment & Technology
Faculty Research Ethics Committee (FREC)

Ethical Review Checklist for Undergraduate and Postgraduate Modules

Staff and PG research students must not use this form, but should instead, if appropriate, submit a full application for ethical approval to the Faculty Research Ethics Committee (FREC).

Please provide project details and complete the checklist below.

Project Details:

Module name	**Human-Robot Interaction**
Module code	**UFMFHP-15-M**
Module leader	Professor Manuel Giuliani
Project Supervisor	Professor Manuel Giuliani
Proposed project title	Social Robots for Health Monitoring in the COVID-19 Pandemic

Applicant Details:

Name of Student	Joseph Guichard
Student Number	20052658
Student's email address	bx20531@bristol.ac.uk

	CHECKLIST QUESTIONS	Yes/No	Explanation
1.	Does the proposed project involve **human tissue, human participants, animals, environmental damage, or the NHS.**	Yes	*If the answer to this is 'No' then no further checks in the list need to be considered.*
2.	Will participants be clearly asked to give consent to take part in the research and informed about how data collected in the research will be used?	Yes	A consent form will be given before the start of the study.
3.	If they choose, can a participant withdraw at any time (prior to a point of "no return" in the use of their data)? Are they told this?	Yes	There is nothing preventing the participant from leaving early, any result from them will be discarded.
4.	Are measures in place to provide confidentiality for participants and ensure secure management and	Yes	Data will only be made available to the people involved in the study and discarded once it is concluded.

Fig. 11.

	CHECKLIST QUESTIONS	Yes/No	Explanation
	disposal of data collected from them?		
5.	Does the study involve people who are particularly vulnerable or unable to give informed consent (eg, children or people with learning difficulties)?	No	
6.	Could your research cause stress, physical or psychological harm to humans or animals, or environmental damage?	No	
7.	Could any aspects of the research lead to unethical behaviour by participants or researchers (eg, invasion of privacy, deceit, coercion, fraud, abuse)?	No	
8.	Does the research involve the NHS or collection or storage of human tissue (includes anything containing human cells, such as saliva and urine)?	No	

Your explanations should indicate briefly for Qs 2-4 how these requirements will be met, and for Qs 5-8 what the pertinent concerns are.

- **Minimal Risk:** If **Q 1 is answered 'No'**, then no ethics approval is needed.
- **Low Risk:** If **Qs 2-4 are answered 'Yes' and Qs 5-8 are answered 'No'**, then no approval is needed from the *Faculty Research Ethics Committee* (FREC). However, your supervisor must approve (a) your information and consent forms (Qs 2 & 3) and (b) your measures for participant confidentiality and secure data management (Q4).
- **High Risk:** If **any of Qs 5-8 are answered 'Yes'**, then you must submit an application for full ethics approval *before* the project can start. This can take up to 6 weeks. Consult your supervisor about how to apply for full ethics approval.

Risk Assessment: Separate guidance on risk assessment can be found on UWE's Health and Safety forms webpage at https://go.uwe.ac.uk/RiskAssessment. If needed, you must complete a Risk Assessment form. This must also be attached to your application for full ethics approval if your project is **High Risk**.

Your supervisor must check your responses above before you submit this form.
Submit this completed form via the *Assignments* area in Blackboard (or elsewhere if so directed by the module leader or your supervisor).
After you have uploaded this form, your supervisor will confirm it has been correctly completed by "marking" it as *Passed*/100% via the *My Grades* link on the Blackboard.

Fig. 12.

Privacy Notice

Study Title: Social Robots for Health Monitoring in the COVID-19 Pandemic

Purpose of the Privacy Notice

This privacy notice explains how the University of the West of England, Bristol (UWE) collects, manages and uses your personal data before, during and after you participate in this focus group. 'Personal data' means any information relating to an identified or identifiable natural person (the data subject). An 'identifiable natural person' is one who can be identified, directly or indirectly, including by reference to an identifier such as a name, an identification number, location data, an online identifier, or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.

This privacy notice adheres to the General Data Protection Regulation (GDPR) principle of transparency. This means it gives information about:

- How and why your data will be used for the research;
- What your rights are under GDPR; and
- How to contact UWE Bristol and the project lead in relation to questions, concerns or exercising your rights regarding the use of your personal data.

This Privacy Notice should be read in conjunction with the Participant Information Sheet and Consent Form provided to you before you agree to take part in the research.

Why are we processing your personal data?

UWE Bristol undertakes research under its public function to provide research for the benefit of society. As a data controller we are committed to protecting the privacy and security of your personal data in accordance with the (EU) 2016/679 the General Data Protection Regulation (GDPR), the Data Protection Act 2018 (or any successor legislation) and any other legislation directly relating to privacy laws that apply (together "the Data Protection Legislation"). General information on Data Protection law is available from the Information Commissioner's Office (https://ico.org.uk/).

How do we use your personal data?

We use your personal data for research with appropriate safeguards in place on the lawful bases of fulfilling tasks in the public interest, and for archiving purposes in the public interest, for scientific or historical research purposes.

Fig. 13.

We will always tell you about the information we wish to collect from you and how we will use it.

We will not use your personal data for automated decision making about you or for profiling purposes.

Our research is governed by robust policies and procedures and, where human participants are involved, is subject to ethical approval from either UWE Bristol's Faculty or University Research Ethics Committees. This research has been approved by UWE Bristol's Ethics Committee. The research team adhere to the **Ethical guidelines of the British Educational Research Association (and/or the principles of the Declaration of Helsinki, 2013) and the principles of the General Data Protection Regulation (GDPR).**

For more information about UWE Bristol's research ethics approval process please see our Research Ethics webpages at:
www1.uwe.ac.uk/research/researchethics

What data do we collect?

The data we collect will vary from project to project. Researchers will only collect data that is essential for their project. The specific categories of personal data processed are described in the Participant Information Sheet provided to you with this Privacy Notice.

Who do we share your data with?

We will only share your personal data in accordance with the attached Participant Information Sheet and your Consent.

How do we keep your data secure?

We take a robust approach to protecting your information with secure electronic and physical storage areas for research data with controlled access. If you are participating in a particularly sensitive project UWE Bristol puts into place additional layers of security. UWE Bristol has Cyber Essentials information security certification.

Alongside these technical measures there are comprehensive and effective policies and processes in place to ensure that users and administrators of information are aware of their obligations and responsibilities for the data they have access to. By default, people are only granted access to the information they require to perform their duties. Mandatory data protection and information security training is provided to staff and expert advice available if needed.

Fig. 14.

How long do we keep your data for?

Your personal data will only be retained for as long as is necessary to fulfil the cited purpose of the research. The length of time we keep your personal data will depend on several factors including the significance of the data, funder requirements, and the nature of the study. Specific details are provided in the attached Participant Information Sheet. Anonymised data that falls outside the scope of data protection legislation as it contains no identifying or identifiable information may be stored in UWE Bristol's research data archive or another carefully selected appropriate data archive.

Your Rights and how to exercise them

Under the Data Protection legislation you have the following **qualified** rights:

(1) The right to access your personal data held by or on behalf of the University;
(2) The right to rectification if the information is inaccurate or incomplete;
(3) The right to restrict processing and/or erasure of your personal data;
(4) The right to data portability;
(5) The right to object to processing;
(6) The right to object to automated decision making and profiling;
(7) The right to complain to the Information Commissioner's Office (ICO).

Please note, however, that some of these rights do not apply when the data is being used for research purposes if appropriate safeguards have been put in place.

We will always respond to concerns or queries you may have. If you wish to exercise your rights or have any other general data protection queries, please contact UWE Bristol's Data Protection Officer (dataprotection@uwe.ac.uk).

If you have any complaints or queries relating to the research in which you are taking part please contact either the research project lead, whose details are in the attached Participant Information Sheet, UWE Bristol's Research Ethics Committees (research.ethics@uwe.ac.uk) or UWE Bristol's research governance manager (Ros.Rouse@uwe.ac.uk)

v.1: This Privacy Notice was issued in April 2019 and will be subject to regular review/update.

Fig. 15.

Study Information Sheet

Study Title: Social Robots for Health Monitoring in the COVID-19 Pandemic

PLEASE READ THIS SHEET IN ITS ENTIRETY

You are invited to take part in research taking place at the University of the West of England, Bristol. It is carried out as assignment for module UFMFHP-15-M Human-Robot Interaction. Before you decide whether to take part, it is important for you to understand why the study is being done and what it will involve. Please read the following information carefully and if you have any queries or would like more information please contact Joseph Guichard, Faculty of Environment and Technology, Bristol Robotics Laboratory, University of the West of England, Bristol, bx20531@bristol.ac.uk.

Who is organising the research?

The project is led by Jasmine Copeland, Anandaroop Ghosal, Juvith Ghosh, Joseph Guichard and Santhosh Kanaga Sabapathy, University of the West of England. Manuel Giuliani is the supervisor for this research. Please find their details at the end of this document.

What is the aim of the research?

The overall aim of the research is to determine whether social robots can convince people to take preventive or curative measures against COVID-19.

The purpose of this study is to have a NAO robot greet a user and ask them related health questions. Suggestions will then be made based on the answers.

Why have I been invited to take part?

We are recruiting participants who are already working at the University of the West of England and are aware of the current risk and safety procedures due to COVID-19 restrictions.

Do I have to take part?

You do not have to take part in this research. It is up to you to decide whether or not you want to be involved. If you do decide to take part, you will be given a copy of this information sheet to keep and will be asked to sign a consent form. If you do decide to take part, you are free to stop and withdraw from the study at any time without giving a reason.

Fig. 16.

What will happen to me if I take part and what do I have to do?

You will first be asked to sign a consent form, read a privacy notice, and provide some basic demographic information. You will then be given a list of predetermined scenario sheet describing symptoms and actions undertaken. You will be given 10 minutes to memorise it as much as possible and will then be asked to answer questions from a robot based on that scenario. You may keep the sheet at hand through the entirety of the study. You will then be asked to fill in a questionnaire concerning your thoughts on the robot's behaviour. The study will take approximately 30 minutes.

Data will be gathered using the following methods:

Questionnaires

One questionnaire will be used to gather feedback on the robot's behaviour.

Written Feedback/Comments

In addition to the questionnaire, a section letting users give additional feedback that does not fit elsewhere will be written.

Other Measurements

Notes will be taken on how difficult it was for the user to be understood by NAO, as well as outward displays of behaviours by the user.

What are the possible risks of taking part?

This study should present no risk out of the ordinary.

In addition to the normal risk assessments, care has been taken to ensure the experiment is COVID-19 safe. You and the experimenter will be required to wear a mask and sanitise hands before the study, and safe distancing will be observed. All participants will be drawn from staff and students already complying with UWE Covid-19 safety rules. The robot and any other surfaces touched by the participants will be sanitised after each use.

What will happen to your information?

All the information we receive from you will be treated in the strictest confidence.
All the information that you give will be kept confidential and anonymised. You will be assigned a participant ID that you can use to request the removal of your data from the study up to 7 days after completion of the experiment. After this point, the anonymised data will be analysed, and we will ensure that there is no possibility of identification or re-identification from this point.

Fig. 17.

Hard copy material (the consent form) will be kept in a locked and secure setting to which only the researchers will have access in accordance with the University's and the Data Protection Act 2018 and General Data Protection Regulation (GDPR) requirements.

Where will the results of the research study be published?

The results of this usability study will be reported in the coursework report for UWE module UFMFHP-15-M Human-Robot Interaction.

Who has ethically approved this research?

The project has been reviewed and approved by University of the West of England University Research Ethics Committee. Any comments, questions or complaints about the ethical conduct of this study can be addressed to the Research Ethics Committee at the University of the West of England at: Researchethics@uwe.ac.uk

What if something goes wrong?

If you have any questions about the ethical conduct of this research, have any complaints or concerns, or are uncertain about any aspect of your participation please contact the project supervisors or the University's research ethics committee.

Project Supervisor:
Professor Manuel Giuliani manuel.giuliani@brl.ac.uk

What if I have more questions or do not understand something?

If you would like any further information about the research please contact in the first instance:

bx20531@bristol.ac.uk

Thank you for agreeing to take part in this study.

You will be given a copy of this Participant Information Sheet and your signed Consent Form to keep.

Fig. 18.

Consent Form

Study Title: Social Robots for Health Monitoring in the COVID-19 Pandemic

This consent form will have been given to you with the Participant Information Sheet. Please ensure that you have read and understood the information contained in the Participant Information Sheet and asked any questions before you sign this form. If you have any questions please contact a member of the research team, whose details are set out on the Participant Information Sheet.

If you are happy to take part in this study please sign and date the form. You will be given a copy to keep for your records.

Please read the statements below and sign below to give consent:

I have read and understood the information sheet
I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
I am aware of the risks and benefits of taking part in the study
I am aware that data collected will be anonymised, kept in accordance with General Data Protection Regulation (GDPR), and will be viewed and analysed by the research team as part of their studies.
I am aware that I have the right to withdraw consent and discontinue participation without penalty before or during the study.
I am aware that I have the right to withdraw my data from the experiment up to 7 days after the completion of the experiment, using the participant ID that the researcher will provide.
I have freely volunteered and am willing to participate in this study.
I am willing to have my questionnaire responses collected.

Name (Printed)……

Signature…….. Date……

Fig. 19.

Survey Questionnaire for User

1. What did you like about the chat box?

2. Would you recommend the NHS chat box to a friend to assist them in checking their daily health/wellbeing?

3. How easy did you find the chat box to be used?

4. Did the chat box assist in social interfacing?

5. How often do you think the chat box should check in with the user where it would not be annoying? i.e., once a day, twice a week, once a week etc.

6. What did you dislike about the chat box and how could the user experience be enhanced?

7. What would you score the product out of 10?

Fig. 20.

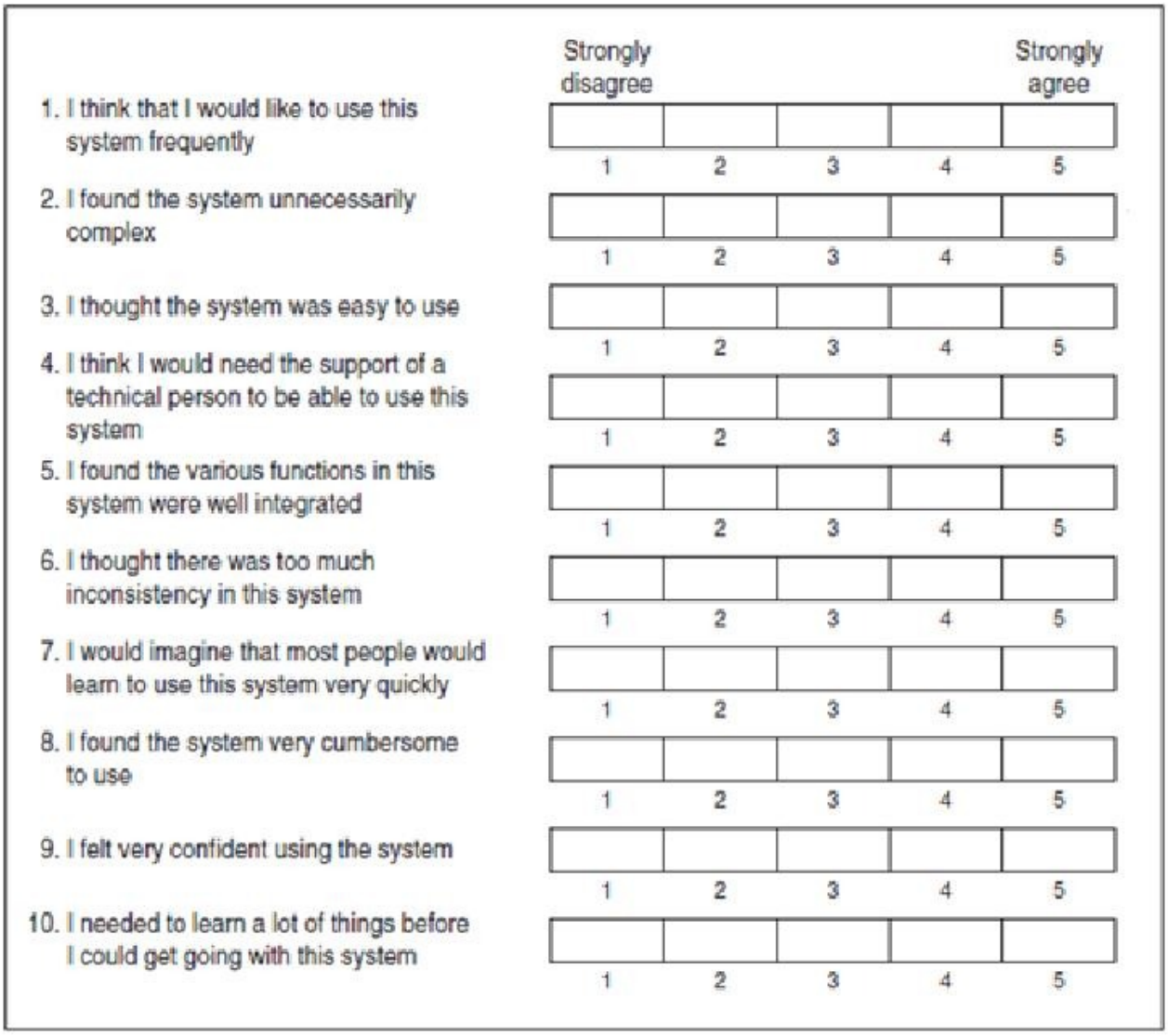
Strongly disagree
Strongly agree
1. I think that I would like to use this system frequently
2. I found the system unnecessarily complex
3. I thought the system was easy to use
4. I think I would need the support of a technical person to be able to use this system
5. I found the various functions in this system were well integrated
6. I thought there was too much inconsistency in this system
7. I would imagine that most people would learn to use this system very quickly
8. I found the system very cumbersome to use
9. I felt very confident using the system
10. I needed to learn a lot of things before I could get going with this system
1 2 3 4 5

Fig. 21.

Potential list of symptoms

Case A:

- No symptoms, you feel fine.

Case B:

- Slight cough
- Fever
- Sore throat

Case C: (all symptoms)

- Cough
- Fever
- Sore throat
- Difficulty in breathing

Fig. 22.