

# **Designing a Prototype Chatbot for People with Minor Strokes**

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# Abstract

A minor stroke is a severe illness that can have life-changing effects, and many people suffer from anxiety afterward. Even though anxiety is common after a minor stroke, the treatments are still limited, and often not affordable or accessible. A chatbot that supports people with therapeutic exercises could address some of those issues.

A systematic qualitative review was conducted to discover stroke patients' attitude towards technology and arrive at an initial set of guidelines and requirements to consider when building a chatbot. Based on these requirements, a prototype chatbot was designed, allowing patients to work through well-defined therapeutic exercises to treat anxiety that were based on the validated TASK intervention. The prototype was evaluated with ten healthy participants. The evaluation included interviews probing their attitude towards technology, and more specifically towards chatbots.

We found that that the majority of users accepted the idea of a chatbot to guide them through exercises designed to target anxiety, and would be motivated to use it, but did not regard it as being sufficient for delivering full therapy sessions.

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# Chapter 1

## Introduction

### 1.1 Motivation

Having a stroke is the fourth most common reason for death and more than 100.000 people suffer from a stroke each year in the UK [50]. Devastating effects from having a stroke include physical impairments, such as pain, spasticity, hemiparesis and dysphagia, cognitive impairments, such as aphasia and memory loss, and neuropsychiatric disorders, such as anxiety and depression [13, 57]. The treatments and rehabilitation centres are expensive. At the current time the economic cost of stroke patients in the UK is £26 billion per year [41] and the rate of strokes in the UK is expected to increase in the next twenty years by around 58% [50]. Today, there is already a shortage of available treatments for stroke patients, in particular for anxiety [12]. Consequently, stroke patients often feel abandoned after hospital release [50].

To combat the shortage of treatments, Chun [12] developed the TASK (Treating Anxiety after StroKe) intervention programme. The TASK treatment is delivered by phone and internet, focusing on tackling anxiety problems in stroke survivors. The treatment provides knowledge about stroke topics and teaches patients techniques to conquer their anxieties. In the past years, there has been a major increase in using technological devices for treating stroke patients [21]. Currently, patients in the TASK treatment have to go through exercises on their own. New technological devices, and more specifically, a chatbot, could help guiding patients through exercises and increase adherence to the programme. However, a treatment through technology can only be effective if patients are motivated to use the device. It is, therefore, important to identify what affects stroke patients' attitude towards technology and chatbots.

## 1.2 Research Question

The aim of this thesis is to create a prototype chatbot which patients can use to practice cognitive behavioural therapy exercises. To decide where to place the chatbot in the overall delivery of the TASK intervention we must understand people's attitudes towards technology in general and particularly chatbot technology. The key research question is how a chatbot should be designed to be acceptable to patients who have experienced a minor stroke, and what exercises are suitable for chatbot implementation.

## 1.3 Report Outline

The chapters of the thesis are structured in the following way:

- **Chapter 2:** Presents the background research, including definitions of stroke and anxiety, the origin of anxiety in stroke patients, how to treat it and existing chatbots targeting mental health. Lastly, the design framework, worth-centred design, for developing the prototype chatbot will be presented.
- **Chapter 3:** Includes a systematic review on stroke patients' attitudes and usage of technology, as well as a discussion of the results followed by a conclusion which will cover the implications for the implementation of the chatbot.
- **Chapter 4:** Describes the development process of the chatbot, including development environment, designing the conversation and the implementation phases of the chatbot.
- **Chapter 5:** Presents the final study including an interview and the evaluation of the chatbot on healthy individuals. The results will be analysed and extensively discussed.
- **Chapter 6:** Concluding remarks and suggestions for future work.

# Chapter 2

## Background

### 2.1 Stroke and Transient Ischaemic Attacks

The brain is remarkable, and it is the most complex organ in the human. It accounts for various essential cognitive functions, including perception, attention, motor skills, language, and executive skills. Damage to the brain can, therefore, have devastating and life-changing effects for the human. The brain is made up of approximately 100 billion nerve cells [56] that account for these cognitive functions as well as the controlling of other organs. To function, the nerve cells need a constant supply of oxygen and nourishment, which they receive through blood supply from the heart and transported via arteries.

If the blood supply is blocked, nerve cells can die within a few minutes [57]. During strokes and transient ischaemic attacks (TIA), the blood supply to the brain is blocked, and, often, similar areas of the brain are affected in different individuals. A standard definition of a stroke is, therefore “a syndrome characterized by rapidly developing clinical symptoms and/or signs of focal, and at times global loss of cerebral function, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin” [10]. There are two common ways in which the supply to the brain is interrupted. During ischaemic strokes, the artery supplying the brain is blocked. In a haemorrhagic stroke, the artery leaks within the brain [57]. If the blood supply to the brain is blocked for less than 24 hours, fewer nerve cells die, and the effects are less devastating. In this case, we refer to the episode as TIAs or “mini-strokes” [57] (See Appendix A.1). The definition of a TIA is, in contrast: “a clinical syndrome characterized by an acute loss of focal cerebral or monocular function with symptoms lasting less than 24 hours and which is thought to be due to inadequate

cerebral or ocular blood supply as a result of low blood flow, thrombosis or embolism associated with disease of the arteries, heart or blood” [26]. A TIA indicates higher risk of experiencing a full stroke in the future. Statistics show 50% of all patients experiencing a TIA will go on to have a full stroke within 24 hours, and 10% of all TIA patients experience a full stroke within a week.

### **2.1.1 Treatment of Stroke Patients**

In the UK, stroke patients are being cared for in stroke units, and rehabilitation is provided to those patients with deficits and functional impairments. For less severe cases i.e. “mini-strokes”, post-stroke services mostly only include charity-employed community stroke nurses. Currently, only 33% of stroke survivors receive follow up health checks from their clinic to examine recovery progress [50]. Thus, 45% of stroke survivors feel abandoned after they get released from the hospital [44]. Treatments are not only essential for functional impairments, but also for neuropsychiatric complications, which are common in post-stroke patients. These include cognitive impairment, emotional lability, post-traumatic-stress disorder (PTSD), depression, and anxiety [9]. Between 20-25% of these patients experience anxiety and even though this is a severe illness accompanied by many negative outcomes, there are limited treatments for patients suffering from anxiety after having had a minor stroke [12].

## **2.2 Anxiety**

Anxiety can be a healthy emotion essential for survival. From an evolutionary perspective, anxiety is an emotional response to a threat, warning us of danger that helps us adapt to changing environments. However, when anxiety becomes excessive, and out of proportion, it can interfere with functioning and life-quality. In this case, it becomes maladaptive and we then refer to anxiety as a disorder. Anxiety disorders are defined by the Diagnostic and Statistical Manual of Mental Health (DSM-5) published by the American Psychiatric Association (APA) in 2013, as ‘disorders that share features of excessive fear and anxiety and related behavioral disturbance. “Fear” is the emotional response to a real or perceived imminent threat, whereas anxiety is the anticipation of future threat’ [APA, 2013, p.189].

### 2.2.1 Anxiety in People with Minor Strokes

The two most common anxiety subtypes in people with minor strokes are generalised anxiety disorder (GAD) and phobic disorders [13]. Phobic disorders describe excessive fear of objects or situations [APA, 2013, p.206]. GAD, on the other hand, describes a person with general excessive anxiety and worries. These anxieties concern different events or situations and persist for at least six months [APA, 2013, p.207]. To classify anxiety disorders and their subtypes, the Structured Clinical Interview for DSM disorders (SCID-DSM-V) can be used (See Appendix A.2).

Chun [12] found that the cognitive model is good for explaining anxiety in stroke patients. The cognitive model by Clark and Beck [14] explains the interplay between the cognitive, affective, behavioural, and physiological changes during an anxiety attack. The idea of the model is that emotions and behaviour evolve through the way people perceive their situation. This explains why some situations are only perceived as dangerous by some individuals, as it is not the situation itself that has to be dangerous, but rather the appraisal of the situation that determines the subsequent emotions and behaviour. Chun [12] identified that the majority of stroke and TIA patients interpreted a stroke as a life-changing event, which is likely to recur. In fact, most patients identified the risk of having a recurring stroke as much higher than it was in reality. Their findings showed that the most typical thinking pattern was worrying about experiencing another stroke. Patients started paying selective attention to internal and external stimuli that could indicate another stroke. Situations such as “headaches, odd sensations, physical exertion or going out alone” [12, p.136], as described in the cognitive model, can further activate affective and behavioural emotions, and the selective attention can reinforce incorrect appraisals of these situations [14]. Other prevalent thinking patterns were fear of embarrassing situations such as “falling, collapse, looking odd or stupid” [12, p.136] as well as fear of interacting with people. The constant worrying and fear result in many patients showing maladaptive avoidance of specific places, situations, and even social groups, such as avoidance behaviour towards going on a bus, shopping malls, taking showers as well as avoidance of people. This results in patients isolating themselves from family and friends. According to Chun [12], many patients did not understand why they were afraid of these situations.

## 2.2.2 Treatment of Anxiety in Stroke Patients

Exposure therapy delivered through cognitive behavioural therapy (CBT) is especially effective in phobic disorders. Classical CBT is effective for patients with GAD as well as challenging thinking patterns [13].

CBT is based on the cognitive model and exposure therapy. The aim is to make patients understand the way they think and behave and give them skills to adjust their maladaptive cognition and behaviour [20]. CBT includes cognitive and behavioural elements. The following parts are involved in the intervention:

1. **Educating the patient:** This involves explaining what fear and anxiety are and describing the cognitive model of inappropriate anxiety as well as what consequences it can have. The patient will also be informed about the effects of safety-seeking and avoidance behaviour and what the treatment goals and strategies should be.
2. **Self-Monitoring:** This phase involves teaching the patient to identify their anxious thoughts. It is essential for the treatment that patients learn to become aware of when they overestimate, exaggerate and appraise a situation as being dangerous.
3. **Cognitive Restructuring:** The goal is to reconstruct the patient's anxious thoughts. Reconstruction can be achieved by seeking evidence for and against their thoughts, through de-catastrophising and by identifying errors in their thinking patterns.
4. **Exposure interventions:** This phase involves repeated and continuous exposure to situations or events, both internal and external, that the patient's fears and avoids. Exposure is effective, as it reconditions the memories involved with the stimuli. Thereby fear schemes can be restructured.
5. **Response Prevention:** This refers to targeting maladaptive coping strategies of patients and teaching them to adopt more appropriate responses. It, thereby, also targets the safety-seeking behaviour of patients.
6. **Relaxation Training:** This phase involves different strategies to reduce physical tension, such as progressive muscle relaxation (PMR). However, the effect of relaxation in patients has been debated within the field in the past years [14].

CBT therapy requires face-to-face sessions for five to twenty weeks, with a skilled psychotherapist. It is, therefore, a time-consuming and expensive treatment. The waiting times for therapy spots are often long. Furthermore, it can be challenging to travel weekly to different places to receive therapy, especially for the elderly (and, inevitably, patients who have suffered a stroke/mini-stroke). Nevertheless, it is vital for patients suffering from anxiety, to get adequate treatment to improve their life quality.

To combat the shortage of treatment offers and to make the treatment more accessible for people with minor strokes, Chun [12] developed the TASK-CBT (Treating Anxiety after StroKe) intervention. TASK-CBT is a guided tele- and internet-based treatment that teaches post-stroke patients' techniques to tackle their anxieties better. In the first trial it was found to be feasible on a small scale [12]. It involves six telephone therapy sessions and five online tasks in practising CBT therapy. The web-based therapy tasks involved recording anxious moments, challenging maladaptive thoughts, identifying thinking styles of the patients, confronting situations feared, a relaxation exercise, and planning enjoyable activities. Additionally, information about stroke and anxiety in people with minor strokes and videos about the tasks was provided. The intervention is an ongoing trial, and we will be further developing it by employing the tasks into a chatbot. This intervention programme lays the foundation of this thesis.

## **2.3 Building a Conversational Agent**

A conversational agent or chatbot is a system that can imitate a human conversation both in speech and text. In 1966, the first chatbot, ELIZA, was developed to mimic a therapist [58]. Due to the major development in artificial intelligence, specifically machine learning and neural networks in the last years, chatbots have become far more complex with advanced conversational flows. Through the development of Watson and Siri, the chatbot has become more prevalent in society. Consequently, the chatbot has become increasingly popular and has become employed in various sectors, such as industry, education, as well as the health sector. The increasing popularity and attractiveness of chatbots is partly due to its cost efficiency and continuous availability at all times from any location. Several studies have already shown the positive impact of chatbots in health - improvements in physical health, health information availability, improved awareness of symptoms and a significant reduction in depressive symptoms [51]. The chatbot in this thesis will be a text-based therapy chatbot used to treat anxiety in stroke patients through offering CBT exercises inspired by the TASK intervention. Examples of a text-based chatbot used for mental health are presented below.

### **2.3.1 Aquabot**

Mujeeb et al. [38] designed the chatbot, Aquabot, that can be used to check symptoms of Achluophobia (the fear of darkness), and Autism in patients. They designed the

chatbot for usage in clinics and hospitals to diagnose the mentioned disorders. The system uses decision trees to test against symptoms. When the user enters text, the message will be split into sentences and then further into tokens. After that, synonyms are found and checked against a set of conditions in the decision tree. Natural Language Processing (NLP) was used for meaning extraction, such as tokenisation and keyword extraction. Aquabot was tested on its diagnostic accuracy in a total of 70 people, showing high accuracy in diagnosing the mentioned disorders. The authors proposed that Aquabot is useful in efficient and accurate diagnosis for psychological counselling.

### **2.3.2 Woebot**

Scientists at the University of Stanford designed the Woebot chatbot, which delivers CBT therapy to young adults and university students, by offering daily conversations and mood tracking [22]. The bot was designed to target anxiety and depression symptoms. Woebot is built into an Instant Messenger app that can be both used on the desktop and as an app. Every time a user checks in with Woebot, the conversation starts with a question about their feelings and mood. After documenting the data on mood, the chatbot explains CBT concepts and theories, shows videos to clarify these concepts and highlights that the bot is not a replacement for real therapy. Fitzpatrick et al. [22, p.4] aimed to create the personality style of Woebot as a “human clinical decision making and the dynamics of social discourse”. Additional to the CBT therapy content, Woebot was designed to have the following features: “Empathic responses”, replying empathetically, by giving a response according to the mood of the user; “Tailoring”, the content sent to the user being dependent on the users mood; “Goal setting”, the participant was asked to set a goal they would like to achieve; “Accountability”, Woebot will follow-up on the users earlier activities; “Motivation and engagement”, the bot automatically reminds the user to use it by sending a personal message, and “Reflection”, the bot provides weekly information on mood levels of the user [22, p.4]. In an experiment, by Fitzpatrick et al. [22], they randomised 70 participants to either receive treatment through Woebot or by obtaining an NIMH’s ebook on depression over two weeks. The participants in the Woebot group showed higher acceptance towards using the Woebot, and they used the chatbot daily. Additionally, participants in the Woebot group showed a significant reduction in depression measured through a depression scale.

## 2.4 Worth-Centred Design

Worth-centred design (WCD) is a design framework proposed by Cockton [17]. The framework gives a set of tools and methods to design an interactive computer system that can deliver worth to users. Cockton [17, p.168] describes the framework in the following way: “Designing worth means designing things that will motivate people to buy, learn, use or recommend an interactive product, and ideally, most of all these”. WCD has been chosen for the development of the chatbot, to meet the users’ needs, and to create a therapeutic product that people are motivated to use and interact with. To make a worth-centred chatbot, the design process will be structured around the four phases proposed in the WCD framework [17].

1. **Opportunity identification:** This is the process by which the digital product or system is described. In this phase, the needs, unfelt needs, and wants are being studied, which can be done by culture diagrams, interviews, and reviews. Cockton [15] highlights that the worth of the target group should be expressed throughout the design process. In the current study, opportunity identification will be conducted by reviewing stroke patients’ attitude, acceptance, and motivation towards using technology as well as interviewing people about these themes, and more specifically, about chatbots.
2. **Design:** The goal of this phase is to develop and implement the chatbot. We will make a prototype of the chatbot to assure a product with worth achievement.
3. **Evaluation:** The evaluation phase should be started at an early stage of the design process and can be stretched through the entire development. Even though Cockton [16, p.1294] states that evaluation should be “placed in the real world, where value is created” instead of an artificial usability environment, he also argues that a product that is not usable can harm the worth. We will, therefore, also test the usability of the chatbot as well as the engagement to use the product on healthy people.
4. **Iteration:** The causes of difficulties experienced by the user in products with degraded and destructive evaluations have to be identified, so the necessary changes to the design can be made.

The goal of this chapter was to establish the essential background knowledge to understand our target group for our prototype chatbot and to set the project into context. Chapter 3 will proceed with identifying stroke patients’ attitude towards technology.

## **Chapter 3**

# **Systematic Review of Stroke Patients’ Attitudes Towards Technology**

There is a growing interest in using technologies, such as telemedicine (TM), in health care to support treatments of stroke patients [47]. Knowledge about stroke patients’ attitudes towards technology as well as experience and evaluation of the usage of the devices is essential to develop devices and more specific chatbots that address the values by the patients. To our knowledge, there is no previous review identifying stroke patients’ general attitude towards technology. We, therefore, conducted a systematic literature review to evaluate themes influencing the attitude of stroke patients towards using technologies. The methodology used for identifying the relevant literature, the process of extraction and the description of the data analysis are outlined. This is followed by the synthesis of the results and a general discussion of the findings.

### **3.1 Method**

The review was conducted in May-June 2019 and the PRISMA guidelines for reporting systematic reviews and meta-analysis were used [37].

#### **3.1.1 Searches and Identification of Studies**

Articles concerned with stroke patients’ attitudes towards technology were identified through a broad search. We searched for articles in PubMed, PsycINFO and in the ACM Digital Library. Search terms related to technology in general and more specific to healthcare (e.g. mhealth, technology, mobile, app, phone, VR, chatbot), stroke

conditions (such as stroke, ischaemic, haemorrhagic, mini stroke, TIA) together with keywords related to attitude (attitude, use, acceptance) were used (see Appendix B.1). In addition, the reference lists of the included papers were explored for additional papers of relevance [54].

### **3.1.2 Eligibility Criteria**

This review considered studies that were published in peer-reviewed journals which included stroke patients aged >18 suffering from any subtype of stroke and measured their attitude towards technological devices. Systematic reviews and mixed patient studies were not included, as we were only interested in stroke patients. We aimed to create a qualitative systematic review, instead of a standard systematic effectiveness review, to find facilitators and barriers moderating stroke patients' attitude towards technologies. The making of qualitative reviews is a more recent phenomenon and there is a general debate about the criteria which decide about the studies that are considered in qualitative reviews [24]. Consequently we decided to conform to the "qualitative research" defined by the Cochrane Handbook for Systematic Reviews [28, Chapter 20]. In the main analysis we, therefore, only included interview, open-ended responses in quantitative questionnaires, surveys and diaries. Papers with no qualitative analysis, but concerned with stroke patients' attitude towards technology, were analysed separately.

### **3.1.3 Data Collection and Extraction**

All retrieved papers were downloaded to the reference manager, Mendeley, and were screened for eligibility criteria in their titles and abstracts. This was carried out by the first author (KL<sup>1</sup>). The papers meeting the inclusion criteria were read through fully and checked for inclusion criteria again. The final list of included studies was further checked by the second reviewer (MW<sup>2</sup>). Figure 3.1 shows the process of the inclusion and exclusion of the studies.

### **3.1.4 Analysis and Synthesis**

The included studies were imported to the QSR International's NVivo 12 qualitative data analysis software [45] for analysis and coded using thematic analysis [46]. The

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<sup>1</sup>KL: Ms Kim-Morgaine Lohse

<sup>2</sup>MW: Dr. Maria Wolters

studies were coded aiming at identifying areas influencing stroke patients' acceptance towards technology. Memo writing was provided during the coding process to record concepts and the ideas behind the codes. Eighteen of the included studies were coded by the first coder, while three papers were read and coded by a second coder (MM<sup>3</sup>) using the first author's codebook. Further, the second coder went through the codebook of the first author to check for similarities and disagreements and to find coding agreements. Simultaneously, the first author also coded the same three studies that were given to the fellow student, so that the codes thereafter could be compared and discussed until a collaborative interpretation was found. In general, there was a high coding agreement between the authors, helping verifying that the final codebook was representative. The preliminary coding resulted in 36 codes, with six main themes. During synthesis, similarities and connections between codes were found, leading to three main themes: *Technological Factors*, *Personal Factors* and *Organisational Factors*.

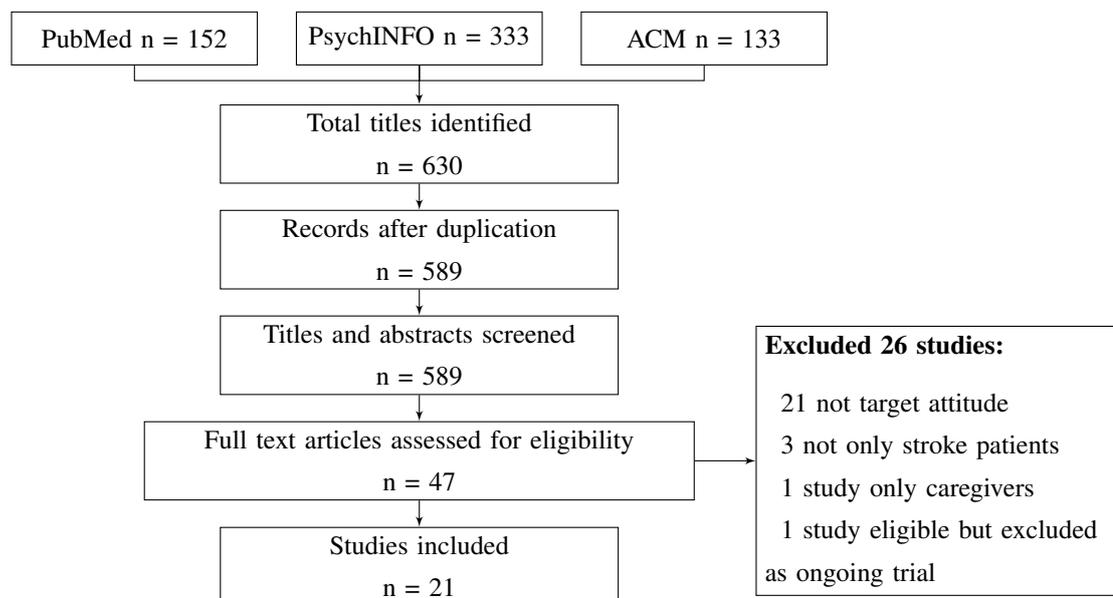


Figure 3.1: PRISMA diagram of included studies

## 3.2 Results

We identified twenty-one relevant studies, reporting stroke patients' attitudes towards technological devices. Table 3.1 and 3.2 provide a summary of the relevant studies. Eight qualitative studies using interviews, six mixed-studies and seven descriptive studies using Likert scales and other means of questionnaires were identified. Of

<sup>3</sup>MM: Mr. Mattia Mossano

these, six studies targeted the attitude towards TM, four were about mHealth or ICT-devices in general, five were about virtual reality, two were about apps and four were about other means of technological devices to treat stroke patients. All studies included stroke patients with varying degrees of stroke impairments.

### 3.2.1 Key Themes

The analysis and synthesis identified three key themes. The three themes, their characteristics and sub-themes will now be described (See Appendix B.2 for the codebook).

#### 3.2.1.1 Technological Factors

Fifteen papers identified themes and described barriers and facilitators directly related to the technology. These themes can help us understand how changes in the technology contribute to the attitude of the user. The included sub-themes are:

**1.1 Advantage of use:** described sub-factors related to the added value of the innovation. Eleven papers identified stroke patients' perceptions of advantages of using the device. The majority of studies were coded as *physical and mental improvements* through the technological devices, of which four studies highlighted improvements of arm movements, balance, and coordination [11, 19, 40, 29, 30]. Two studies addressed mental well-being, in which one described how the technology improved patients' depressive symptoms [49] and one reported improving mental health by maintaining social contacts and by preventing boredom [52]. Another code was *enabling treatments*. In the studies by Gibson et al. [23], Brouns et al. [8] and Tyagi et al. [54], patients perceived the following advantages of using the technology: faster assessment, enabling treatment after discharge at a time of their own choice and thereby, providing flexibility and not being constrained by a fixed schedule.

**1.2 Attractiveness:** This sub-theme described *satisfaction* and *technological issues* that are related to the technological devices. Nine studies highlighted patients' satisfaction with the technologies, while five described issues of using the technology. Hughes et al. [30], Chumbler et al. [11] and Amaya et al. [2] commented on how patients showed acceptance towards the product, how effective the communication was and that the patients would recommend the technology. Five studies commented on the effectiveness of the technology-based intervention and how simple and user-friendly the product was [19, 49, 6, 23, 52]. Four studies found that technical problems, including software malfunctions and connection problems, were seen as a significant issue

for patients [23, 8, 7, 54]. Several patients stated that they would not use the technology if they experienced software problems, and they did not know where to receive help. Researchers indicated that it was challenging to give remote support on technological issues, and, sometimes, home visits were needed to fix the issues. In the study by Chumbler et al. [11], patients found exercise questions confusing and not useful.

**1.3 Design:** This is concerned with describing aspects of the design of the innovation that influences the attitude of the patients. Brouns et al. [8] outlined that the “ease of use” would make a product more attractive. They found that simple and clear design, with icons instead of too much text and a design corresponding to the user’s personality, would increase the ease of use. The simplicity of use as well as large buttons were also seen as facilitators [7]. Five studies described that patients would value if the technology would give them feedback on their performance and having modifiable exercises with different levels of difficulty to prevent repetitive tasks [29, 39, 11, 2, 54].

### 3.2.1.2 Personal Factors

Fourteen papers in total were identified in this theme. Descriptions of the characteristics, values, and criteria important for stroke patients when using technological devices were coded as personal factors. The following sub-themes were identified:

**2.1 Motivation:** The majority of studies pointed out the importance of *enjoyment*. Six studies identified that exercises on the devices were perceived as more enjoyable compared to traditional exercises [19, 40, 30, 8, 6, 2]. Additionally, Nasr et al. [39] found two factors moderating the enjoyability of the devices. Firstly, games that had a “simple, fun, engaging, tailored and encouraging” [39, p.658] design would increase patients’ enjoyment and thereby also increase motivation. Secondly, doing exercises together with family members or other “human agents” was perceived as uplifting, fun and motivating. Furthermore, they identified that the technologies increased patients’ social network, which they experienced as a major motivational factor for using the product. Another crucial code for motivation was the increased *independence* gained through the technologies. Two studies pointed out that patients’ motivation to train with the device was moderated by the wish to independently do daily activities again [39, 19]. Patients commented that the usage was directly related to how “successful it was in improving the person’s physical and cognitive abilities” [52, p.32].

**2.2 Knowledge:** This sub-theme was concerned with identifying how *Experienced* stroke patients were with technologies and what moderated their willingness to learn

about the usage, *Education*. The majority of the studies found patients being knowledgeable about technological devices. In the study by Skolarus et al. [49], stroke patients described the technologies as being easy to use and understand. Interestingly, Nasr et al. [39] identified that stroke patients with novice knowledge in technology prior their stroke had a positive attitude towards learning to use technological devices after their stroke. Additionally, Brandenburg et al. [7] and Tyagi et al. [54] found that, with increasing age, the rating of ease of use decreased, as well as patients experienced problems when being confronted with unexpected functions. However, having a manual or caregivers assisting them with the usage, encouraged and helped the intake of the devices. Brouns et al. [8] and Boone et al. [6] confirmed that education and examples helped increase patients' motivation to use the technologies.

**2.3 Barriers:** This was concerned about subjectively expressed difficulties using the technologies. Nine papers were identified, of which the majority of the studies highlighted *physical barriers*. These included patients with severe physical impairments; having not enough strength, fine motor difficulties (especially with hand-movements) and suffering from hemiparesis [7, 19]. Patients in Nasr et al. [39] argued that, to combat this, the system should be simple and have different levels of complexity to target different degrees of impairment. Tyagi et al. [54] found that level of disability and increasing age affected patients' willingness to continue with using the device. Two studies stressed that patients agreed that acceptability and workability depend on the level of impairment and that eRehabilitation was not appropriate for all degrees of strokes [8, 7]. Another open code identified was *overstimulation*. Some patients saw the usage of the technology as stressful, tiring and daunting. The reasons identified for this effect were unfamiliarity and poor understanding of the purpose of the technology [23], stigmatisation [52, 7] and lack of personal contact due to digital substitution [8].

### 3.2.1.3 Organisational Factors

Organisational factors is an umbrella term describing facilitators and barriers involved in the following areas:

**3.1 Accessibility:** This is a sub-theme describing accessibility based on the period of access and financial factors. The studies identified did not find a clear picture of whether the cost of the product displayed an issue. Tomsic et al. [52] found that acceptance and usage of the product did not depend on the cost. Brouns et al. [8] found similar results: some patients perceived it as a barrier to pay for the product, others

saw it as an extra motivational factor. Furthermore, patients in the study by Tyagi et al. [54, p.2474] argued that TM was an advantage for the “not-so-well-off” as it is more affordable than standard treatments. Additionally, Brouns et al. [8] argued that, for a technology to be effective, it should be accessible during and after rehabilitation as well as be usable on multiple devices such as on a computer, smartphone, and tablet. Hoermann et al. [29] also concluded from their interviews that the technology should be incorporated in standard rehabilitation tasks.

**3.2 Consultation:** This is concerned about the patients' perspective on the development of the care system. In a study by Gibson et al. [23], patients described that TM was comparable to face-to-face treatments, and Amaya et al. [2] found that patients sometimes found it easier than face-to-face therapies. Furthermore, the patients felt engaged in the clinical and technical role. Nevertheless, the patients pointed out that the usage was still more challenging than face-to-face therapy - these concerns were also identified in two other studies. In the study by Brouns et al. [8], patients expressed their concerns that the technology was less personal than traditional treatments and that it cannot replace them. Patients in the study by Nasr et al. [39] had similar concerns of less interaction with real therapists. The patients accentuated the importance of human interaction to keep the user motivated to use the product. In the study by Tyagi et al. [54], most patients who preferred TM to traditional therapies, were comparably young and with varying degrees of disabilities.

**3.3 Privacy:** This sub-theme discusses patients' perception of safety and privacy of data. All studies identified in this theme had a positive attitude towards privacy. Patients felt comfortable, safe, believed the privacy was sufficient and found it comparable to face-to-face treatments [29, 23]. They also felt comfortable being videotaped [11] and with clinicians being able to see their data and even saw it as a motivational factor [8]. Patients did, however, highlight the importance of informed consent [23].

### 3.2.2 Quantitative Results

In extension of the qualitative analysis, seven descriptive papers were identified. Jenkins et al. [31] investigated stroke patients' willingness to use mHealth. The majority of the participants used smartphones (80%) and computers (70%). Almost everyone stated that they were comfortable using the devices. The financial factor was important for their attitude towards using the device; 75% would use mHealth if it was free of charge. Similar, Mah et al. [36] found that the majority of stroke patients had computer

experience, but that the usage decreased after they had a stroke. The majority (70%) of the patients confirmed the previous findings that the data protection was sufficient and that they were comfortable with having health-personel monitor their data. In the study by Guo et al. [25] they tested an app for decision support and education. Almost all patients (90%) found the app “easy, user-friendly and helpful” [25, p.1391]. Further measures revealed that their life quality and knowledge about AF increased, while depression and anxiety decreased in the patients. Five studies described that the majority of stroke patients showed acceptance towards the technologies used in their study [1, 33, 27, 4, 36]. They found the tool fun, entertaining, easy to use even though the tasks were challenging, and they showed eagerness to use it regularly [4]. In the study by Al-khathaami et al. [1], all patients were either satisfied or strongly satisfied as well as finding the TM useful. Further, 92% agreed that the presence of neurologists was not necessary and 98% recommended the adoption of the technologies. Lai et al. [33] found that all patients rated the effectiveness of the technology as either good or excellent, that patients had no preference between face-to-face and TM, as well as patients indicating psycho-social benefits through the technology. Additional, questionnaires to knowledge about stroke, a depression scale, and a self-esteem scale showed improvement in patients during the intervention.

### **3.3 Discussion**

The purpose of this qualitative systematic literature review was to find stroke patients' attitude towards technology. Analysis and synthesis declared three main themes with a variety of sub-themes. A recurring theme identified was the importance of devices being simple, clear, easy to use, engaging and fun. Enabling modifiable exercises and giving feedback to the patients was also highlighted. Issues with technical problems, unfamiliarity, over-stimulation as well as physical barriers, such as hand impairments, were recurring barriers. The findings of the studies indicated that the majority of patients knew how to use smartphones and computers or would be willing to learn how to use the devices; this was especially prevalent in younger patients, indicating a promising future for the usage of technology for stroke rehabilitation. Providing education and user manuals helped patients to use the devices and, thereby, improved their attitude towards them. There was a non-agreement on whether devices should cost; however, there was agreement that the devices should be accessible and available at home. Most papers identified that the technologies were comparable to face-to-face

Table 3.1: Studies Included in the Review				
Study	Research Question	Design	Technology	Sample
Al-khathaami et al. [1]	Determine degree of satisfaction and acceptance of stroke patients towards using TM technology in Saudi Arabia.	Questionnaire	TM	50 Stroke patients
Amaya et al. [2]	What is the view of participants and the impact of the intervention that they received in EVA Park?	Interviews	EVA Park	20 Stroke Patients with aphasia
Badia et al. [4]	Asses the acceptance and usability of the VR system, as well as the level of assistance on the task performance	Questionnaire	VR	3 chronic stroke survivors
Boone et al. [6]	Evaluate the perceived acceptability and practicality of metacognitive VR for motor impairment.	Interview	VR	5 stroke survivors, 5 caregivers, 5 therapists
Brandenburg et al. [7]	Investigate barriers, facilitators and ease of use experienced by people with nonfluent aphasia using CommFit.	Interviews	App	12 stroke patients with aphasia
Brouns et al. [8]	Which factors influence the uptake of eRehabilitation in stroke rehabilitation?	Focus group, Interviews	ICT-devices	53 stroke survivors
Chumbler et al. [11]	What is the effect of STeleR in-home intervention on falls related self-efficacy and patient satisfaction?	Interviews, Questionnaire	TM	23 stroke survivors
Ellington et al. [19]	Will people with stroke exhibit a positive behavioural intention to use a VR system to practise daily activities?	Interviews, Questionnaire	VR	14 stroke survivors
Gibson et al. [23]	What are patients' and carers' perception of TM in the assessment of acute stroke?	Interviews	TM	29 stroke survivors
Guo et al. [25]	What is the feasibility, efficacy, and safety of mobile Health for managing patients with atrial fibrillation?	Questionnaire	App	113 stroke survivors
Held et al. [27]	How safe, usable and accepted is TM by patients for balance and gait in the patient's home?	Questionnaire	TM	15 stroke survivors

Table 3.1: TM: Telemedicine, VR: Virtual Reality, EVA Park: Computer tool for aphasia, ICT: Information and communication technology.

Table 3.2: Studies Included in the Review - continued				
Study	Research Question	Design	Technology	Sample
Hoermann et al. [29]	How feasible is TheraMem for people with chronic stroke in a physio-therapeutic setting?	Interviews, clinical outcome measures	TheraMem	6 stroke survivors
Hughes et al. [30]	What are stroke participants experiences with the ILC system and how can the systems be improved?	Interviews, clinical outcome measures	ILC mediated by ES	5 stroke survivors
Jenkins et al. [31]	What is the attitude of stroke patients towards mHealth in general and more specifically for BP monitoring	Questionnaire	mHealth	69 stroke survivors
Lai et al. [33]	How feasible, effective and acceptable is TM for community-based stroke rehabilitation?	Questionnaires	TM	19 stroke survivors
Mah et al. [36]	How accepted is the NouseTM by stroke patients?	Questionnaire	NouseTM	10 stroke survivors
Nasr et al. [39]	What are stroke patients' experience of living with technology and how is their relationships with their environment and with the to-be-designed technology?	Interviews and Cultural Probes	mHealth	10 stroke survivors and 8 carers
Nijenhuis et al. [40]	How accepted is technology-supported training at home to conventional home exercises?	Diary, Questionnaire	SaeboMAS	20 stroke survivors
Skolarus et al. [49]	How feasible and accepted is the CarePartner programme by stroke patients	Questionnaire, Interviews	IVR	56 stroke survivors
Tomsic et al. [52]	What are the attitudes of stroke patients towards using assistive devices and technologies? And how are myths to old age expressed and addressed?	Interviews	mHealth	66 stroke survivors
Tyagi et al. [54]	To explore the perceived barriers and facilitators of TM by stroke patients	Interviews	TM	13 stroke patients, 13 caregiver, 11 therapists

Table 3.2: TheraMem: Augmented reality memory-game, ILC: Robotic therapy and electrical stimulation (ES), IVR: Automated interactive voice response, NouseTM: Nose-as-mouse, SaeboMAS: Dynamic wrist and hand orthosis and computer with touchscreen

treatments, as long as they did not replace traditional therapies. Patients did not see privacy as an issue; nevertheless, informed consent should be given before usage.

A limitation was that we did not perform a full quality assessment of each study due to lack of time. Because of the limited access to the second coder, only a small number of the papers were coded by him. If more time and money were available, the following could have been done to increase validity of the codes: firstly, a larger sample of papers would have been double coded. Secondly, the second coder would have created their own codebook, before using and comparing with the first coder, resulting in the first coder being less biased towards coding. Thirdly, a longer and more systematic back and forth process and comparison of codebooks would have been made.

This review has established several requirements (R) that we have to consider in the design and development process to create a prototype chatbot with worth.

**R.1:** The structure of the tasks should follow the TASK treatment, allowing to cover CBT themes (2.2.2). The chatbot should inform on the usage of the CBT exercises (1.1), the possible advantages (1.1) and give feedback (1.3) and, thereby, encourage the user (2.1).

**R.2:** The graphical interface of the chatbot should be simple and clear (2.1), and the instructions should be explicit and straight-forward to understand (1.2, 1.3).

**R.3:** The majority of the replies to the questions should be provided as buttons (1.2, 1.3), with options to respond with open text, if users cannot identify themselves with the buttons. This could potentially make it easier for users and not overstimulate them (2.3).

**R.4:** The personality of the chatbot should imitate a human therapist, showing empathy, reflection as well as motivate, entertain and engage users (2.3.2,2.1). This could be facilitated by including images and videos. Further, the chatbot could include modifiable exercises to make it more interesting (2.3).

**R.5:** The chatbot should highlight that it does not replace face-to-face treatments (3.2), but complements traditional therapies.

The future aim is to launch the chatbot on the TASK website of Chun [12] or create a separate app, thereby making it accessible during and after rehabilitation (3.1). These platforms should provide users with a support menu, where patients can easily receive technical help and access user manuals (2.2). The platforms should further inform about privacy and have informed consent forms (3.3).

# Chapter 4

## Development of the Prototype Chatbot

This chapter describes the development process of our prototype chatbot. The goal of our initial prototype was to implement the TASK exercises and modify them by the results of the values and worth stroke patients expressed in the systematic review. The design and implementation of the conversation will be based on the five requirements established in Chapter 3. The development environment used for the implementation, the documentation of the technical elements and the implementation phases will be described.

### 4.1 Development Environment

This section describes the two main software tools required to build the prototype. Python<sup>1</sup>, which is a free and open-source general-purpose programming language [55], was used for the pre-processing of the existing data. IBM Watson was chosen for the main development of the chatbot. By using an existing platform, the internal logic of the system is already given, preventing us from re-inventing the wheel and, thereby, making it possible to focus more on the design of the chatbot. Watson Assistant<sup>2</sup> is a software by IBM Watson, which is a computer system based on natural language processing and machine learning technologies for open-source question answering, knowledge representation, and automated reasoning. It gives developers an internal structure and cognitive tools to develop conversational agents for web-pages, applications, and IoT platforms. The Watson Assistant can be used for developing a conversational voice agent or a chatbot. The Assistant offers developers the option to add

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<sup>1</sup><https://www.python.org/>

<sup>2</sup><https://www.ibm.com/cloud/watson-assistant/>

intents and entities. By intents we mean the user's goal and intention, while entities help identifying relevant keywords in a sentence. A reply to a question "how are you feeling?" could be "I am feeling nervous", whereby the intention is to express a feeling, while "nervous" is the entity, specifying the intention. The chatbot needs several predefined intents and entities for training, to ensure that the chatbot understands the user and responds more accurately and realistically. The Assistant allows the developer to define these components or upload them from an existing conversation, as well as offering tools to structure the flow of the information and to analyse and improve the conversation.

## 4.2 Implementation of the Chatbot

### 4.2.1 Data Preparation

During the task intervention of Chun [12], anonymous data containing stroke patients' replies to the exercises were collected. Together with self-defined intents and entities, it was used to train the Chatbot. Two datasets from eighteen participants, containing open-ended answers for task one and six, were used. To prepare the data for usage, we cleaned and preprocessed them using Python. The different intents were separated and prepared according to the formats of Watson Assistant.

### 4.2.2 Initial Implementation

Appropriate intents, entities, and a dialogue-flow had to be designed to implement the flow of the chatbot. The initial development cycle aimed at implementing the first two tasks of the TASK treatment (R.1) adapted according to the results of the review. The pre-processed data were uploaded, and parts of the sentences were categorised into entities. Additionally, standard replies such as hello, yes, and no were defined as intents. Lastly, entities recognising the patient's feelings had to be defined. The following main intents (#) and entities (@) were defined:

- #yes, #no, #done, #hello, #nice\_to\_meet
- Task 1: #situation, #feeling, #action, #afterwards, Task 2: #thinking\_styles
- @negative\_feelings:subtypes(Anger, disgust, fear\_worrying, annoyed, sadness)
- @positive\_feelings:subtypes(happy, positive, relieve)
- @family, @public\_space, @health

- @sys\_name, @name

Figure 4.1 shows the dialogue-flow of the welcome nodes, task one, and its child nodes. The dialogue flow in Watson Assistant was developed to be rule-based, following an *If...else* structure. Each task of the treatment was introduced in a parent node with the sub-tasks presented in child-nodes. The parent node always introduced the task and explained the advantages and purpose of the task (R.1) (See Appendix C.4a). This was done to clarify the purpose to users and engage and motivate them to finish the exercises (R.4).

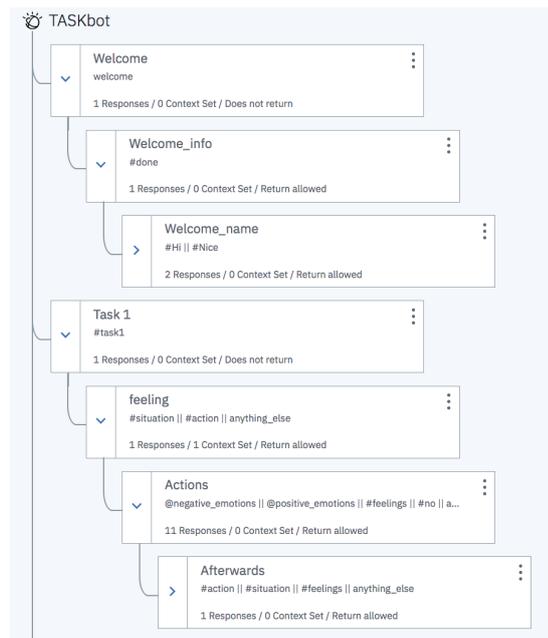


Figure 4.1: Dialog-flow of the welcome node and task 1.

The chatbot starts with a welcome node, where it introduces itself as “Yvonne”, to make it more personal (R.4) and informs that it does not replace face-to-face treatments, but offers complementary exercises (R.5) (See Appendix C.1a). After the introduction message, the users are always asked to provide free text or press a button to proceed. We will aim to give as many buttons (R.3) as possible, to make it as simple and easy to use (R.2). The following was done, to give the chatbot a therapeutic, human-like personality (R.4): Firstly, between a text output, a typing pause was implemented, to emulate a real chat with a human (See Appendix C.1b). Secondly, to personalise the conversation, the chatbot was designed to ask about the name of the user. This name was saved in a context variable and re-used in later conversations. This idea was inspired by Fitzpatrick et al. [22]. The predefined entity @sys\_name by Watson Assistant was used to identify the name and extract it from sentences such as

“my name is Maria” or “you can call me Maria” (see Appendix C.2a). At the current time, @sys\_name could only identify names starting with a capital letter. Therefore, a dataset consisting of 2811 names was uploaded as the entity @names in Watson Assistant to extend recognising names<sup>3</sup>.

In the first task, users break down each “anxious moment” into situations, feelings, thoughts, and actions. To help users to understand the goal of the task, users can follow a link to read examples of other stroke patients who have broken down their “anxious moment”. Additionally, we created responses based on the mood of the patient, to ensure that the chatbot shows empathy (R.4). The mood was identified through the “feeling” entity. To make the flow more straightforward and to help guide users, a button “Let’s continue” must be pressed to proceed. The succeeding child nodes were triggered when the corresponding task one intents were identified. When users completed all sub-tasks, they could choose to record another anxious moment, which ensured some variability in the tasks (R.4). Users could choose between the button “yes, record another anxious moment”, which triggers the intent #task1 and jumped to the beginning, or “no, continue” which triggered #task2.

Task two proceeded in an analogue way. Chun [12] created videos to clarify and explain the purpose of some of the tasks. As patients will have access to the TASK website and the chatbot might be launched on it, a link to a video on the website, explaining the idea and usage of identifying one’s thinking styles, was given (R.4). Thereafter, users could choose between four predefined thinking-styles from the TASK treatment and an additional option for defining its own thinking style was added (see Appendix C.3a). These thinking styles were provided as buttons (R.3) and for each a corresponding answer with feedback was created (R.1).

### 4.2.3 Second Implementation Phase

Iteration is important to identify difficulties experienced by users [17]. Therefore, two people (YC<sup>4</sup> and KL) tested the chatbot after the initial implementation. Testing identified the following bugs: Firstly, the feelings were not always detected correctly, making it difficult for the chatbot to provide appropriate feedback. A major reason for this was the small dataset. Consequently, the training was not effective enough. To ensure adequate feedback on the replies (R.1), we decided to provide predefined feeling buttons with an additional option “none of these feelings”, to allow users to

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<sup>3</sup>Source of the data: <https://www.kaggle.com/samrat77/baby-names-dataset>

<sup>4</sup>YC:Dr. Yvonne Chun

write their feelings in their own words if they did not identify with any feeling (R.3) (See Appendix C.2b). The multiple answers function from Watson Assistant was used to give feedback on users' selected feelings. The function provides the possibility to offer several replies to different feelings in one node (See Appendix C.5b,C.6) and, thereby, making the flow of the nodes less nested. Secondly, whenever the chatbot did not identify a reply, it jumped to the "anything\_else" node, notifying users that the chatbot did not understand the input and asking to rephrase the sentence. However, it was hard for users to rephrase some sentences, making it impossible to get out of the "anything\_else" node. Therefore, we changed the node in the following way: The "anything\_else" node included a second message informing users to type "task" followed by the number of the current task. Typing this would reset users to the beginning of the task. For nodes with open-ended answers, with no sufficient training data, an "anything\_else" condition was given for the "if recognition". It made it possible to automatically go to the child node without having to recognise the condition. When sufficient data are gathered to understand various sentences, we can remove the "anything\_else" condition. After fixing the bugs and making the adjustments, the remaining tasks were implemented and the pre-processed intent was uploaded. The following new intents and entities were defined:

- #task3,#task4,#task5
- #selecting\_answer
- #feared\_situations, #advice\_to\_family, #enjoyable\_activity, #goodbye
- @reasons\_types, @relationships
- @positive\_feelings:alright, @negative\_feelings:subtypes(sadness, annoyed, upset, depressed, tired, anger, anxious, worried, scared, nervous)

Task three was about challenging the user's anxious thoughts. It included eight sub-tasks, all having "yes" or "no" buttons, or choices with multiple option. The current version of Watson Assistant does not have the opportunity to select various buttons at the same time for a question. Therefore, the different options were provided, and users could type in the numbers of the options that applied for them in the multiple options tasks. The intent #selecting\_answers was created to identify the number of options.

Task four proceeded by getting users to confront their feared situation. An image from the TASK website was uploaded (see Appendix C.3b), and a link to a video, explaining the task was created (R.4). There was only one child-node containing an open question, in which the intent #feared\_situation was used to identify user's input. Task

five only included a relaxing exercise where users were encouraged to play a video with nature sounds. HTML tags were used to embed the video in the response box (see Appendix C.5a). The last task was about identifying and scheduling an enjoyable activity. We provided ideas for activities, after which users identified an enjoyable activity. A link to a video explaining how users could manage anxiety in the long term was given (R.4).

#### 4.2.4 Third Implementation Phase

Four fellow students tried the prototype chatbot and gave feedback. The following bugs and remarks were found and given: Firstly, not all students identified that they had to choose an option in task one. Some ignored the option and wrote their own feelings. An explicit text “please choose an option” was added to make the task more clearly. Secondly, the students did not understand the message given by the chatbot when the input was not recognised (“type in the task you are at, followed by the number of the task”). Thus a precise example of what users should type (For example, type “Task 2”), was given. Thirdly, although @sys\_name and @name was used to recognise names, one student wanted the chatbot to call it “shubborn”. As this is not a known name, the chatbot did not recognise it and jumped to the “anything\_else” node. Therefore, “I prefer first-names or nicknames” was added. Furthermore, an *or* expression was added. If @sys\_name or @name was not recognised, the input text would be saved in the context variable. Fourthly, one student pointed out that the messages were too long and that it could be exhausting for the patients to read. Therefore, longer passages were split up into several messages. Lastly, a student highlighted that the chatbot at times still felt more like a question answering system and that additional generalised response answers would make the conversation more naturally. Therefore, several sentences, e. “When I am tired, I like to drink hot milk with honey and listen to relaxing music.” were added, to make the conversation more natural and casual.

This marked the end of the prototype development. The chatbot was able to go through the entire TASK exercise questions and the requirements established in Chapter 3 were integrated. The next chapter proceeds with presenting the interview and evaluation of the prototype chatbot.

# Chapter 5

## Final Study

According to the WCD method, iteration and expressing the worth of the user throughout the design process is important for developing the product. Therefore, an interview was conducted. Our first goal was to further investigate people's attitude towards technology and chatbots. Secondly, people's experience and strategies with stroke and anxiety was investigated. WCD also highlights the importance of testing the usability at an early stage; therefore an additional usability study was conducted. The methods and results of both the interview and the usability study will be described and presented, followed by a discussion of the limitations and implications.

### 5.1 Method

Initially, the research aimed at recruiting stroke patients. Due to time constraints for this dissertation and not receiving ethical approval in time, it was decided to recruit healthy participants. Ten participants were recruited through "word of mouth" and interviewed during July 2019. Seven females and three males participated in the study (70% students, 30% employed), all having a university degree and a large age range (Mean = 32.9; Mdn = 26.0; SD = 13.8). Even though most stroke patients are aged >50, we argue that our mixed sample of participants can give similar useful and worthwhile information on technological use, attitude and usability, as a sample of older participants could have. There is a general misconception that younger people have more novice knowledge and are more skilled in using technological devices [48]. Prensky [43] labelled the generation born after 1980 as "digital natives" while adults are seen as "digital immigrants" who have to adapt to a new lifestyle after years without technology. However, an extensive review has challenged this perspective. In the review

by Selwyn [48], they found little evidence to “constitute a total disjuncture and discontinuity from previous generations” [48, p.375] and that empirical studies show a more convoluted picture of the usage and knowledge of technology in young people. Furthermore, the context and circumstances in which the technology is used play an important role in their knowledge. Young people search more often for online information about sports and entertainment, while older people tend to inform themselves more about other topics such as health and health-care [35, 18]. Even though the topics that are being assessed through the use of technology vary across age groups, it cannot be said that the experience of the usage of the technology itself differs across those groups and it is possible to find a substantial amount of people who dislike technology and struggle to use it in both age groups.

### **5.1.1 Ethics**

This study was granted permission by the Informatics Research Ethics Process, RT number 3920 and all data were anonymised. Each participant received an information sheet (See Appendix D.1) per mail and a hard copy informed consent form (See Appendix D.2). The content was explained by the interviewer and the consent form was signed before proceeding with the study.

### **5.1.2 Data Collection and Analysis**

The interview included a structured questionnaire with modified questions from the media and technology usage and attitude scale (MTUAS) [34] (See Appendix D.4), followed by a semi-structured interview (See Appendix D.5) designed by Maria Wolters. After the interview, participants tested the chatbot and evaluated it using the ‘Think-aloud’ method and the System Usability Scale (SUS). The semi-structured interviews and the ‘Think-aloud’ study were audio recorded and transcribed for analysis (See Appendix D.7 and D.8); whereof key points were quoted in the results. The total study lasted for 1.5 hours and a researcher script was developed to guide the interviewer (See Appendix D.3). The data from the structured questionnaire were imported to Python and a descriptive analysis was performed. The transcribed data from the semi-structured interview were coded using the QSR International’s NVivo 12 qualitative data analysis software [45]. Two interviews were double coded by KL and MM independently using thematic analysis. KL and MM agreed on a codebook from the codes and data were re-coded. In the first round of coding the transcribed interviews,

open coding was used, resulting in identifying 156 codes. Thereafter, axial coding was used to group similar themes and concepts together. The third round included theoretical coding (See Appendix D.9 for the codebook). Memo writing was performed during the coding process to help the research process and provide reflection during the coding. We aimed to conceptualise the participants' experience with technology and health as well as values and risks with technology and chatbots. The book by Saldaña [46] formed the basis of the analysis and synthesis of the qualitative method.

The SUS scale was analysed according to the associated scoring system and for the 'Think-aloud' study both qualitative and quantitative content analysis were used [46].

## 5.2 Results

The following section presents the results of the interview and the usability study.

### 5.2.1 Structured Questionnaire

Table A: Devices		Table B: Usage Subscales		
Technologies	Frequency <sup>1</sup>	Subscales	Median	IQR <sup>2</sup>
		<i>Usage Subscales</i>		
Smartphone	100%	Smartphone <sup>a</sup>	5.00	4.00-5.00
Computer	75%	Facebook <sup>b</sup>	3.50	3.00-4.00
IPad	9.7%	Text messaging <sup>a</sup>	4.50	2.5-5.00
Digital TV	8.7%	Phone calling <sup>a</sup>	3.25	2.5-3.87
FitBit	5.6 %	Media sharing <sup>a</sup>	3.50	3.12-3.87
Kindle	5.4%	Internet searching <sup>a</sup>	4.25	4.00-4.87
		<i>Attitude Subscales</i>		
Smartwatch	0%	Positive <sup>c1</sup>	4.00	3.62-4.00
Recorder	0%	Negative <sup>c2</sup>	4.00	3.00-4.00
Games	0%	Anxiety and dependence <sup>c3</sup>	3.00	2.00-4.00
Mobile Phone	0%	Multitasking preference <sup>c4</sup>	3.75	3.12-4.75

Table 5.1: <sup>1</sup>Table A: Percentage of people using technological devices daily to weekly. Table B: <sup>2</sup>Interquartile range. <sup>a</sup>Scale ranges from 1 ('never') to 6 ('several times a day') with higher numbers indicating more daily usage. <sup>b</sup>Scale ranges from 1 ('never') to 5 ('hourly'). <sup>c</sup>Scale ranges from 1 to 4 with higher scores indicating more <sup>c1</sup>positive attitudes or <sup>c2</sup> more negative attitude toward technology, <sup>c3</sup>more technological anxiety and dependence, and <sup>c4</sup> increased preference for task switching

Table 5.1 shows the descriptive analysis of the MTUAS survey were higher numbers indicate higher usage. According to Selwyn [48], the questions of the scale can

be summarised to six subscales describing the usage of the devices and four subscales about the attitude towards technology (See Table 5.1). Smartphone and computers were the most frequently used devices. Further, smartphones, Facebook, text and internet usage was moderately to high in the usage subscale. All technology usage subscales showed moderate to high usage, with smartphones showing highest daily usage. The results indicate that participants had both strong positive and strong negative attitudes towards technology. Technology only induced moderate anxiety and dependence in participants, but this varied in participants through a high IQR. Participants reported a moderate preference for task switching. All participants used apps weekly or all the time and eight participants used Facebook and had, on average, 456 friends of which they met very few people online ( $M=8.6$ ,  $Mdn =2.5$ ,  $SD =17.0$ ). Only two participants interacted regularly with people they met online. Everyone used social media to keep in contact with friends and family; four participants used it for getting information about events or academic purposes, and two used it out of boredom.

## 5.2.2 Semi-Structured Interview

Five main themes emerged from the analysis of the semi-structured interview. The themes are outlined below:

### 5.2.2.1 Usage and Experience

This theme describes the different technologies and knowledge in terms of years of usage and subjectively evaluated experience.

**1.1 Technologies:** Nine participants had either a Samsung smartphone or an iPhone and previous knowledge in either of those. Only one participant used a Sony smartphone. All participants used computers, of whom seven had a MacBook, and three either a Windows, Samsung or HP. The primary usage was for work, entertainment, social contact and for searching for information. Two participants had an iPad, finding it convenient and handy. Participants used apps mostly for social contacts (WhatsApp or Messenger). Apps for direction and work were also commonly used by participants. The following were the most typical technologies for managing their health used by the participants: Five participants used apps tracking their exercise level, three participants monitored their food intake, two participants used Samsung or iPhone Health, and one participant used a sleeping tracker. Participants, in general, had a positive attitude towards using these apps.

**1.2 Knowledge:** Unanimously, all participants expressed being knowledgeable with technology and familiar with using smartphones and computers. Participants above the age of forty had the longest experience with technology (20-31 years). They all detailed being very familiar both with Windows and Apple. Participants under thirty had 14.5 years of experience on average, all feeling familiar using smartphones and computers.

#### 5.2.2.2 Health

Health is concerned with participants' experience of stroke and anxiety, how they would inform themselves about strokes, and what strategies they have against anxiety. The majority of participants agreed that searching for information about strokes online would be the simplest and fastest way. One participant expressed always wanting to go to a GP first. Similar, four participants described preferring to go to a GP if it was more personal, for example, if they suffered from a stroke or traumatic brain injury themselves.

*“No, if I was personally affected by it, then I would be speaking to doctors first. And then online and then through other communities I guess.” (P9)*

Every participant described having experienced anxiety. All participants reported having CBT-related strategies targeting anxiety. They either tried analysing the situation or changing their thinking style, through thinking positive, rationalising the situation or changing their mind. Two participants highlighted having difficulties with these strategies in an anxious moment. One participant sought therapy for his depression and anxieties. Everyone also described using relaxation methods; Nine participants had experience with meditation or yoga, eight participants would take a time-out or redirect their attentions, seven participants described how exercise or going for a walk helped them, and four participants expressed how music was beneficial.

#### 5.2.2.3 Perceived Usefulness

This theme describes participants' subjective positive aspects of technology.

**3.1 Functionality:** This includes aspects of the quality and purpose. All participants commented on the high functionality of the current phones; being small, having good cameras and batteries. A frequent topic, expressed by nine participants, was the neutral, positive attitude towards technology; describing the phone as useful and essential but still highlighting that it is just a gadget.

*Just a phone. It's good. (P6)*

**3.2 Information and Education:** This involves codes related to information gain and educating through technology. Universally, participants saw the advantage of having quick access to information and, thereby, gaining knowledge and expanding their horizon. Two participants especially highlighted that people from different social classes and backgrounds could educate themselves through technology. A total of nine participants described the advantage of using technology to look up health information and symptoms online. Seven participants used it for pre-checking symptoms.

*So I use the internet as some kind of pre-doctor visit. I visit Dr. Google before going to a real doctor. (P1)*

Even though participants found it useful looking up symptoms, the majority also expressed scepticism and mistrust in the information. Six participants described how the internet search results often exaggerate the risks and cause them stress and anxiety.

*So, I think there does need to be better ways of presenting the information than Web-MD or Healthline or whatever. (P10)*

**3.3 Recognising Opportunities:** The most outstanding opportunity participants recognized was, keeping in contact with friends and families. Seven participants commented on the benefits technology had on their social network, and two participants commented on how social contact through technology was beneficial for supporting them during health problems. Moreover, specifically on anxiety:

*If I was anxious or stressed, and I talked to someone, I was close to via technology, that probably would have helped more, than if I didn't have that. (P2)*

Furthermore, even though P9 talked about risks involved with technology, the overall effect of technology on health was seen as beneficial.

*I think, for health, technology can be more of a solution than a problem. So there's, like so many examples of how technology has helped healthcare move forward. (P9)*

Lastly, participants mentioned the following as benefits of technology: its convenience, that it speeds up processes and reduces waiting time.

#### **5.2.2.4 Perceived Risks and Frustration**

Perceived risks and frustration refer to the users' subjective judgment of risks and frustration involved in using the technology.

**4.1 Addiction and Distraction:** This sub-theme refers to feeling addicted or distracted by their technological devices. Many participants mentioned how this affected their health negatively, causing frustration, stress or anxiety. A major effect inducing these feelings was the mindless behaviour, not able to stop looking at their phone or using it for procrastination.

*I feel like, sometimes, if I'm already anxious about something and then I just check mindlessly, it doesn't help. (P2)*

Additionally, two participants described their dissatisfaction of how certain apps and programs are designed to be addictive and others emphasised how notifications and ads stressed them and caused anxiety. Further, information from friends leading to social comparison was impacting several participants' stress and anxiety level. No one questioned that social networks or online information can be biased, but found it hard to recognise when information is trustworthy.

*But most of the anxieties that I would get from technology is not from the technology itself. But from the information delivered through it. (P6)*

Similar, fake political news was also seen by two participants as a frustrating development through technology.

**4.2 Software and Internet Problems:** Nine participants identified software and internet problems as a reason for frustration and stress.

*That's when technology is frustrating. I mean, I don't know how many times I've said to people, isn't technology great when it works? (P6)*

Similarly, not understanding how to fix the problems or how to find solutions was also highlighted to be frustrating.

**4.3 Privacy:** Half of the participants saw privacy issues as a barrier and risk. This was especially the case for technology and health. Two participants explicitly stated how they were concerned with privacy, data protection and being sceptical about how much people are spied on.

*So, as long as I know that everything what is spoken is protected and keeps to the privacy, then it's okay. (P3)*

#### 5.2.2.5 Attitude and Experience of Chatbots

The last theme highlighted participants' experience and attitude towards chatbots, as well as, what personality a chatbot should preferably have.

**5.1 Patterns of Experience:** This sub-theme is concerned with participants' experience in terms of usage and attitude towards chatbots. Nine participants had experience

in using a chatbot, of which the majority either used Apple's Siri [32], Amazon Alexa [32], or online customer service chatbots. Only one participant had used a therapeutic chatbot before and described the experience as positive:

*That one is cute. I always forget to use it, but it sends me reminders. (P2)*

Most participants using Siri or Alexa used it out of curiosity or for fun, rather than out of necessity and the described experience of chatting to a customer service chatbot was perceived as too simple and annoying. Four participants expressed general interest in using chatbots. They either liked the idea of computers talking to them, finding it fun, interesting or stress-relieving. However, most participants also expressed doubts in using chatbots, especially for therapeutic aspects; four participants found them too basic, without real emotions and leading to an empty experience.

*I think chatting to a chatbot for therapy would lead to the same empty experience that you get from social media. (P7)*

One participant expressed general dislike, and two participants said that they would rather talk to a human. The only person who tried a therapeutic chatbot found it too impersonal for regular therapy, but would have enjoyed having it added on top of therapy.

**5.2 Personalities:** Most participants agreed that the personality of a chatbot should be warm, friendly, helpful, showing empathy and imitating a human professional.

*But, if I would want to talk to a chatbot, it would be best, I think if the chatbot would react in a way that is suitable for the topic that we're talking about. (P1)*

Four participants preferred having a chatbot with a sense of humour, although one participant highlighted that, in a therapy situation, less humour probably would be better. Two participants felt that the chatbot should have a robotic personality, as they otherwise would feel fooled by the "fake" emotions.

### 5.2.3 Usability

Table 5.2 displays the SUS scores of the participants. According to the adjective rating score [5], an average SUS score above 70 can be interpreted as good usability and be seen as acceptable. Our prototype chatbot scored, on average, above this score, with one participant scoring the usability as poor. On average, the chatbot was easy to use, but with room for improvements. The 'Think-aloud' results were analysed using a qualitative and quantitative content approach (See Table 5.2 and Appendix D.10 for more detail). The barriers and facilitators found are described below.

Table A: SUS		Table B: Participant Experience			
Measure	SUS Scores	Barriers	No (%)	Facilities	No (%)
Median	78.75	Feedback and Wording	6 (60)	Ease of Use	8 (80)
Mean	76.5	Overload of Information	5 (50)	Design of Flow	5 (50)
Std	17.7	Speed of Messages	5 (50)	Chatbot Personality	10 (100)
		Suggestions	5 (50)	Fun and Engaging	9 (90)

Table 5.2: Table A: SUS Scores. Table B: Summary of participants' experience of using the chatbot

**Barriers:** In *Feedback and Wording*, three participants described being disappointed at not always receiving responses on what they wrote and highlighted that they found this especially important in the context of therapy. The one participant giving it a poor usability rating described the flow as being too scripted and found that the chatbot did not have an easy way to move on to the next topic. Further, the participant believed that, in therapy, patients would have little patience with it. Three participants also did not always find the response of the chatbot suitable.

*Wouldn't say "Nice to meet you", because I don't meet you. (P5)*

Participants commented on the number of tasks, exercises, and videos in *overload*. They felt it was tiring and having too much content. Participants mentioned that the *Speed* in task four was too fast for them, resulting in not having sufficient time to read all the incoming messages. Lastly, the following *suggestions* for future chatbot developments were given. P1 suggested to have different videos for different thinking styles and include more emojis and GIFs. P4 expressed wanting to have a button to be able to go a step back and change previous choices and P9 emphasised, being able to talk and discuss freely, instead of only exercises, would be beneficial. P7 commented that there should be more choices between the exercises and P10 thought the exercises could be told as stories and videos should look as if they were developed by the chatbot.

**Facilitators:** In *Ease of Use*, four participants described it as “*straight forward*” and well-explained. One participant commented on how it was good that the prototype chatbot gave clear instructions on what to do when the chatbot did not understand the input text. In *Design of Flow*, two participants positively commented on the introduction, and said that they liked it, emphasising that the chatbot does not replace face-to-face treatments. Three participants liked the aesthetics, functions and the CBT task flow.

*I'm finding myself wondering if you've got any behavioural scientist working with you, just because the format of it looks very good. (P7)*

In *fun and engaging*, three participants enjoyed that the task options varied, that exercises were modifiable, and videos were interesting and engaging. Six participants commented on how they would enjoy doing the exercises with the chatbot, as it is more “*interactive*” than doing them through a website or on paper. Participants described the *chatbot personalities*, among others, being positive, friendly, empathetic, personal, and formal. One participant expressed enjoying that the chatbot was reassuring and another thought it was good that it was “*rationalising*” anxious situations.

### 5.3 Discussion

The goal of this study was to deepen our understanding of how the TASK exercises should be designed when delivered through a chatbot. Five main themes were identified from the interview: *Usage and Experience*, *Health*, *Perceived Usefulness*, *Perceived Risks* and *Attitude and Experience of Chatbots*. All participants had experience with anxiety and used strategies similar to CBT methods. They described themselves as knowledgeable with technology and by agreeing to both positive and negative statements about technology participants showed their ambivalent attitude towards it. Participants indicated in the usability study that the chatbot was easy to use, engaging and had an overall desired personality. However, participants found the conversation at times too simple, wanting more adequate replies to their input and slower replies.

The following results support our findings from the systematic review: One of the main benefits emphasised by participants was using technology for social networking. Connecting patients, enabling them to exchange their worries and increasing their social network could be facilitated by our chatbot and, thereby, motivate the use of it [39]. Further, overload and overstimulation of information were also seen as a risk. The reasoning behind the overstimulation was, however, different to our previous findings [23, 52, 7, 8]. The results from this study seem to indicate, that the negative feelings which are related to technology are not caused by the technology itself, but, rather, by the massive flow of information. This overstimulation is partly caused by the design of the programmes, i.e. the lack of control over the amount and type of information which is being presented. In the current study, we asked participants to go through all tasks, easily causing overload of information. In therapy, tasks will be given over a period of time, minimising overstimulation. Future designs should be aware of keeping the messages even shorter and ensure that users have enough time between receiving them. In accordance to the findings of our review, software and connection problems were iden-

tified as a significant issue [23, 8, 7, 54], negatively influencing participants' mood. It is, therefore, utterly crucial for the acceptance of the chatbot, to make it simple and to test it sufficiently to avoid technical problems. Lastly, participants emphasised technology being convenient and reducing waiting time. Our chatbot is designed for home use and aims at reducing waiting time for therapy, thereby fulfilling the users' expectation. This is similar to our review finding technology *enabling treatments* [23, 8, 54].

A number of new findings were identified in the current study. Searching for information, i.e health, and pre-checking symptoms, as well as educating the user, were seen as a significant advantage that technology offers. Nevertheless, online information was perceived as often exaggerating symptoms, causing stress and anxiety. Future designs of the chatbot could provide access to better and more reliable information on symptoms and health, specifically for strokes and anxiety. Another risk expressed was addiction and distraction by technology, leading to distress and anxiety in several participants. The future design of the chatbot should be cautious with the overload of notification and have no addictive elements included. Contrary to our previous findings, half of the participants saw privacy issues as a barrier and risk. When developing the chatbot for people with minor strokes, data protection and privacy should be facilitated and communicated to the users.

In contrast to our review, this study identified participants' self-reported attitude not only to technology in general, but, more specifically, towards chatbots. Half of the participants described an interest in using chatbots; however, most also expressed general mistrust towards them, describing them as too simple and not having real emotions. Interestingly, the one participant previously using a therapeutic chatbot, showed general interest and motivation towards chatbots throughout the entire study. Participants outlined that they preferred a warm, friendly, helpful and empathetic human-like professional chatbot for therapy. This is in alignment with our proposed design and the design of previous therapy chatbots [22]. An interesting finding was that participants previously wanting a more robotic chatbot personality later favoured the chatbot having a name and being friendly after the usability study. Cockton [17] described that sometimes unfelt needs can be noticed through usage, thereby creating worth for people without initially recognising that a new technology could create these needs. It appears that the concept of using chatbots is still very new for many people resulting in general mistrust and not knowingly meeting any needs. The only participant having tried a therapeutic chatbot argued for the usage alongside regular therapy, but not replacing it.

In the usability study, participants indicated that the following requirements had been met: build a simple, easy to use and straight forward chatbot. The videos, links, and design flow were perceived as enjoyable and motivated participants. Similar to the findings in our review and interview, participants reported to enjoy doing exercises through a chatbot more than on a website or paper [19, 40, 30, 8, 6]. However, room for improvement was identified. We did not meet participants' expectations on creating a chatbot showing enough empathy and reflection. Participants wanted more feedback, more adequate replies and a broader functionality range. These factors were utterly important for the acceptance. However, due to our small training data, it was not easy to identify many entities and, thereby, always providing adequate responses. Further, the chatbot was designed to recognise stroke patients' answers, thereby limiting the quality of responses for healthy participants. Lastly, the current prototype chatbot was designed to go through the TASK treatment and not imitating a real therapy session. This seemed to be misinterpreted by some participants, resulting in expecting more from the chatbot.

A limitation to consider is that the behaviour and statements of the participants could have been influenced by several confounding factors. Sometimes, when participants were asked to think of moments in their life that were representative for behaviours related to technology or mental states such as anxiety, participants had difficulties remembering and naming examples or supporting their answers with detailed information. Consequently, the researcher gave ideas from her own experience or suggested words, which could have led to unintentional biases in the answers. The interviewer was, however, aware and careful of this factor during the interviews. Further, some of the questions touched on sensitive topics, which could have led to socially desirable responses [42]. Even though the interviewer had undergone previous training and experience in interviewing people with health problems and privacy was ensured, it cannot be guaranteed that sensitive questions may not have been affected by a response bias [53]. Nevertheless, in the usability study, the "Think-aloud" method helped us to get insight into the cognition and motives that underlie their actions in this part of the study. Lastly, due to time restrictions, the interviews were held with healthy participants whose opinions and experiences might differ from stroke patients.

We conclude that the chatbot is suitable to guide patients through the TASK treatment exercises and applicable alongside regular therapy. Our current chatbot could be used to gather data in order to train future chatbots in responding more adequately, thereby widening the functionality and obtaining new roles in the therapy context.

# Chapter 6

## Conclusion

### 6.1 Summary

This dissertation has reviewed literature on stroke patients' attitude towards technology, related experiences and factors influencing them. To deepen this understanding peoples' attitudes towards technology and, more specifically, towards chatbots were further investigated. Additionally, peoples' experience with strokes and anxiety, their anxiety related coping strategies, and how technology plays a role in helping people with their health has been discovered. We, further, designed and developed a chatbot facilitating the TASK treatment exercises modified by the requirements established by stroke patients' attitudes towards technology. The chatbot has been tested and evaluated on participants and new needs have been identified.

To uncover the wealth of information, we conducted a systematic qualitative review. We developed the chatbot using IBM Assistant, designed it using the WCD framework and modified it according to the attitudes expressed by the stroke patients in the review. We further conducted a structured and semi-structured interview with ten participants, as well as tested and evaluated our prototype chatbot.

This work has been undertaken to bring the TASK treatment closer to stroke patients. The trial by Chun [12] suggests that the TASK treatment might be effective for reducing anxiety in stroke patients. Anxiety in stroke patients is a significant problem and the prototype chatbot could reduce symptoms by guiding them through the TASK exercises and, thereby, increasing adherence towards the programme. The chatbot could become a central element of the TASK intervention and increase CBT's effect on reducing anxiety in patients and, thus, improving life quality and reducing health costs.

This work has shown the importance of the qualitative approach for unravelling the research question and for identifying factors influencing the attitude of stroke patients. A prototype chatbot that is aiming at meeting specific needs has been designed and developed on the basis of the findings. Our work has established the basis for future qualitative and quantitative work, targeting the factors influencing stroke patients.

Our final study indicated that participant had both positive and negative attitudes towards technology in general, but the majority of users showed acceptance and motivation towards using a chatbot to guide them through the TASK treatment exercises. The chatbot was, however, not perceived sufficient to forward full therapy sessions.

## **6.2 Future Work**

To increase the acceptance of chatbots in the context of therapy more research has to be done in discovering stroke patients' general needs and conditions. The conducted interview and the evaluation should be repeated with stroke patients, to find overlaps with the current participant group and to ensure that the chatbot fulfils needs specific for stroke patients. To discover how fast changes in scepticism towards technology can occur, future work could investigate people's needs before and after using chatbots. Another interesting research approach would be to investigate how adaptive the personalities of the chatbot could be made to flexibly please different user groups. Lastly, a longitudinal random controlled study could be carried out to explore compliance rates and the overall effectiveness of a TASK chatbot in reducing anxiety symptoms in stroke patients.

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# Appendix A

## Information for the Background

### A.1 Definition of Stroke and TIA

The following definitions are most commonly used in the clinical context for stroke and TIA:

**Stroke definition:** “a syndrome characterized by rapidly developing clinical symptoms and/or signs of focal, and at times global loss of cerebral function, with symptoms lasting more than 24 hour or leading to death with no apparent cause other than that of vascular origin” [10].

**TIA definition:** “a clinical syndrome characterized by an acute loss of focal cerebral or monocular function with symptoms lasting less than 24 hours and which is thought to be due to inadequate cerebral or ocular blood supply as a result of low blood flow, thrombosis or embolism associated with disease of the arteries, heart or blood” [26].

## A.2 Diagnostic Criteria for GAD and Specific Phobia

### Generalized Anxiety Disorder

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#### Diagnostic Criteria

**300.02 (F41.1)**

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- A. Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).
- B. The individual finds it difficult to control the worry.
- C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms having been present for more days than not for the past 6 months):
- Note:** Only one item is required in children.
1. Restlessness or feeling keyed up or on edge.
  2. Being easily fatigued.
  3. Difficulty concentrating or mind going blank.
  4. Irritability.
  5. Muscle tension.
  6. Sleep disturbance (difficulty falling or staying asleep, or restless, unsatisfying sleep).
- D. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- E. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., hyperthyroidism).
- F. The disturbance is not better explained by another mental disorder (e.g., anxiety or worry about having panic attacks in panic disorder, negative evaluation in social anxiety disorder [social phobia], contamination or other obsessions in obsessive-compulsive disorder, separation from attachment figures in separation anxiety disorder, reminders of traumatic events in posttraumatic stress disorder, gaining weight in anorexia nervosa, physical complaints in somatic symptom disorder, perceived appearance flaws in body dysmorphic disorder, having a serious illness in illness anxiety disorder, or the content of delusional beliefs in schizophrenia or delusional disorder).
- 

### Specific Phobia

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#### Diagnostic Criteria

- A. Marked fear or anxiety about a specific object or situation (e.g., flying, heights, animals, receiving an injection, seeing blood).
- Note:** In children, the fear or anxiety may be expressed by crying, tantrums, freezing, or clinging.
- B. The phobic object or situation almost always provokes immediate fear or anxiety.
- C. The phobic object or situation is actively avoided or endured with intense fear or anxiety.
- D. The fear or anxiety is out of proportion to the actual danger posed by the specific object or situation and to the sociocultural context.
- E. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.
- F. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- G. The disturbance is not better explained by the symptoms of another mental disorder, including fear, anxiety, and avoidance of situations associated with panic-like symptoms or other incapacitating symptoms (as in agoraphobia); objects or situations related to obsessions (as in obsessive-compulsive disorder); reminders of traumatic events (as in posttraumatic stress disorder); separation from home or attachment figures (as in separation anxiety disorder); or social situations (as in social anxiety disorder).
- 

Figure A.1: Diagnostic criteria for GAD and Specific Phobia [APA, 2013, p. 207 and 222]

# Appendix B

## Qualitative Systematic Review

### B.1 Keyword Search

- *((mhealth or ehealth or uhealth or ihealth or \*technology/ or mobile or App or phone or chatbot or bot) and (stroke or isch\*emia or isch\*emic or or haemorrhagic "mini stroke" or TIA) and (attitude\* or use\* or accept\*))*
- *(((((((((((((health) OR tele\*) OR \*phone(s)) OR mobile) OR portal(s)) OR \*technolog\*) OR cell) OR virtual) AND stroke) OR isch(a)emia) OR isch(a)emic) AND attitude(s)) OR use\*) OR accept\**
- *(((((((((((((health[Title/Abstract]) OR tele\*[Title/Abstract]) OR \*phone(s)[Title/Abstract]) OR mobile[Title/Abstract]) OR portal(s)[Title/Abstract]) OR \*technolog\*[Title/Abstract]) OR cell[Title/Abstract]) OR virtual[Title/Abstract]) AND stroke[Title/Abstract]) OR isch(a)emia[Title/Abstract]) OR isch(a)emic[Title/Abstract]) // AND attitude(s)[Title/Abstract]) OR use\*[Title/Abstract]) OR accept\*[Title/Abstract]*
- *(((((((((((((health[Title]) OR tele\*[Title]) OR \*phone(s)[Title]) OR mobile[Title]) OR portal(s)[Title]) OR \*technolog\*[Title]) OR cell[Title]) OR virtual[Title]) AND stroke[Title]) OR isch(a)emia[Title]) OR isch(a)emic[Title]) AND attitude(s)[Title]) OR use\*[Title]) OR accept\*[Title]*
- *((((((((((((((((((mhealth) OR ehealth) OR uhealth) OR ihealth) AND hasabstract[text])) OR \*technology[Title/Abstract]) OR mobile[Title/Abstract]) OR phone[Title/Abstract]) OR chatbot[Title/Abstract]) OR bot[Title/Abstract])) AND hasabstract[text])) AND ((stroke OR isch\*emia OR isch\*emic) AND hasabstract[text])) AND hasabstract[text])) AND ((attitude\* OR use\* OR accept\*) AND hasabstract[text])*

- ((((((((((((((((((spy) OR "conversational bot") OR chatterbot) OR "interactive agent") OR "conversational interface") OR "Conversational AI") OR talkbot) OR chatbot) OR bot) AND hasabstract[text])) OR (((((mhealth) OR ehealth) OR uhealth) OR ihealth) AND hasabstract[text])) OR technology[Title/Abstract]) OR mobile[Title/Abstract]) OR phone[Title/Abstract]) AND hasabstract[text])) AND ((stroke[Title] OR isch\*emia[Title] OR isch\*emic[Title]) AND hasabstract[text])) AND ((attitude\*[Title] OR use\*[Title] OR accept\*[Title]) AND hasabstract[text]))

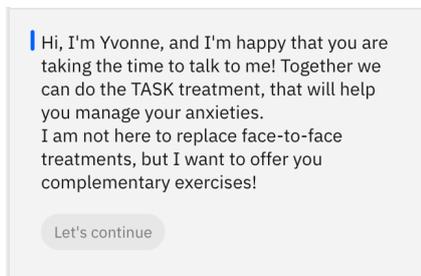
## B.2 Codebook for the Systematic Review

Name	Description	Files	References
Organizational Factors	Facilitator and barriers involved in the organizational aspects affecting the attitude of stroke patients	11	65
Accessibility	Concerned with the period of access and financial factors	6	20
Consultation	Development of the care system	5	16
Privacy	Patients perception on safety and privacy of data.	5	8
Personal Factors	Characteristics, values and criteria important for stroke patients when using technology devices	15	188
Barriers	Perceived barriers by stroke people	9	54
Overstimulation		5	13
Physical Barriers		6	15
Knowledge	Stroke patients knowledge about the technology	10	27
Educational component		3	7
Experience		9	13
Motivation	What motivated patients to use the product	11	54
Enjoyment		8	13
Independence		3	6
Social Network		4	12
Technological factors	Barriers and facilitators identified related directly to the technology.	15	70
Advantage of use	Added value of the innovation	11	19
Enabling Treatment		3	5
Physical and mental improvements		8	14
Attractiveness	Satisfaction and issues of the innovation and design	12	29
Satisfaction		9	12
Technological Issues		6	17
Design	Facilitators and barriers of the design of the innovation	8	22

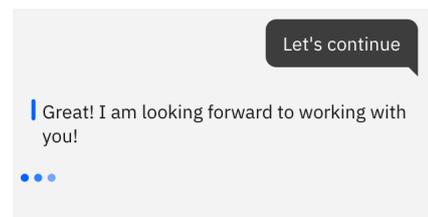
# Appendix C

## Development of the Prototype Chatbot

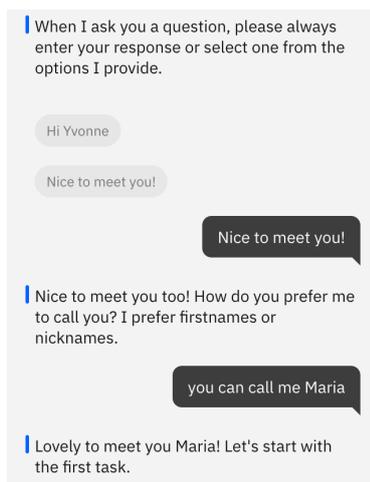
### C.1 Examples of the Chatbot



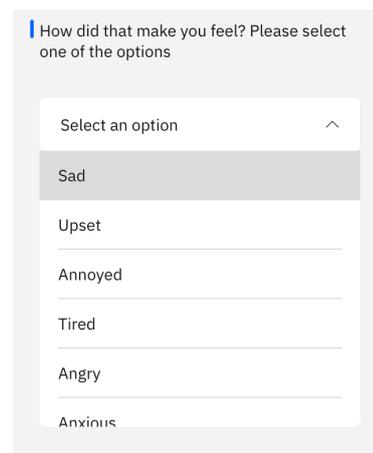
(a) Highlighting that the Chatbot does not replace face-to-face treatments.



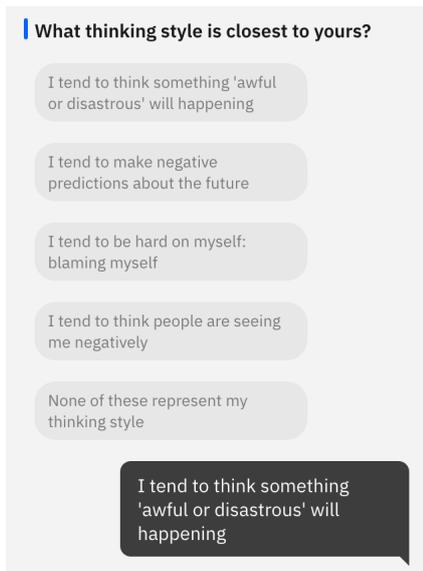
(b) Example of typing effect.



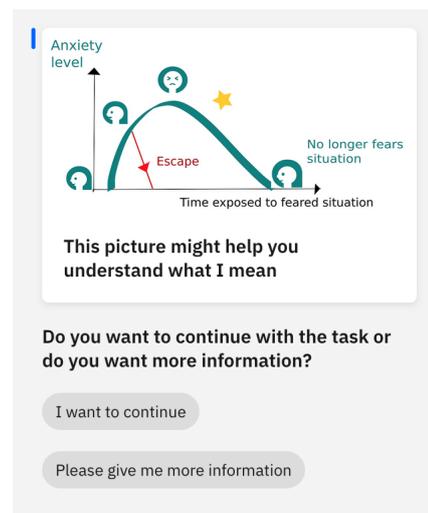
(a) Identifying and extracting name and saving it in a context variable.



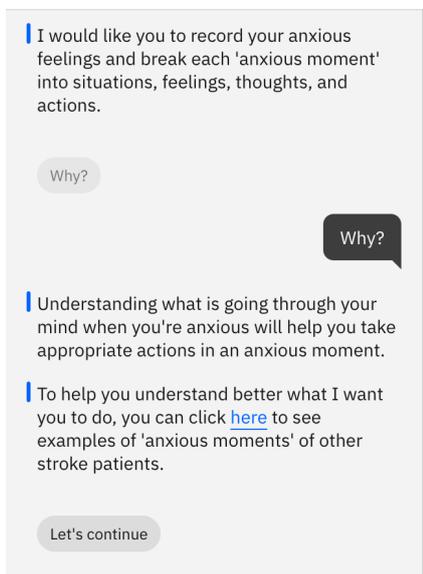
(b) Selecting different feelings.



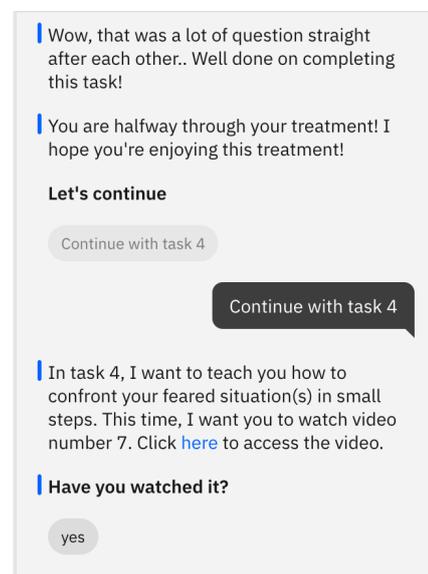
(a) The different thinking styles.



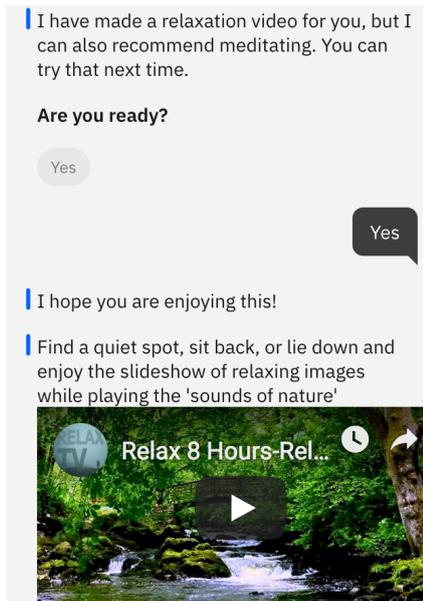
(b) Explaining how to confront a feared situation.



(a) Explaining how to confront a feared situation.



(b) Showing human traits in casual conversations.



(a) HTML embedded relaxation video

Then respond with

	IF ASSISTANT RECOGNIZES	RESPOND WITH	
1	@negative_emotions:sadness	Pause, Text, Pause, Text	⚙️
2	@negative_emotions:annoyed	Pause, Text, Pause, Text	⚙️
3	@negative_emotions:upset	Pause, Text, Pause, Text	⚙️
4	@negative_emotions:depressed	Pause, Text	⚙️
5	@negative_emotions:tired	Pause, Text	⚙️
6	@negative_emotions:Anger	Pause, Text	⚙️

(b) Multiple nodes in one node.

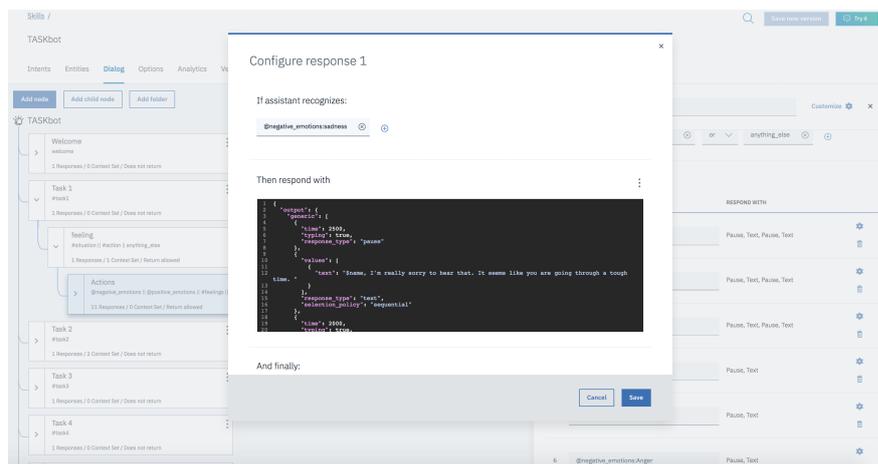


Figure C.6: Multiple responses of several conditions in one node.

# **Appendix D**

## **Final Study**

## D.1 Participant Information Sheet

### Participant Information Sheet

Project title:	Co-designing a Chatbot for Anxiety after Stroke
Principal investigator:	Dr Maria Wolters
Researcher collecting data:	Ms Kim-Morgaine Lohse
Funder (if applicable):	Dr Maria Wolters and Dr Yvonne Chun

This study was certified according to the Informatics Research Ethics Process, RT number 3920. Please take time to read the following information carefully. You should keep this page for your records.

#### Who are the researchers?

- Dr Ho-Yan Yvonne Chun MBBS BSc MRCP, Honorary research fellow, Specialist Registrar in Medicine of the Elderly, General Internal Medicine & Stroke, NHS Lothian, Centre for Clinical Brain Sciences, University of Edinburgh, 49 Little France Crescent, Edinburgh EH16 4SB
- Dr Maria Wolters, Reader in Design Informatics, School of Informatics, Academic Associate of the School for Philosophy, Psychology, and Language Science, University of Edinburgh, 10 Crichton Street, Edinburgh EH8 9AB
- Ms Kim-Morgaine Lohse, MSc student in Artificial Intelligence, School of Informatics, University of Edinburgh

#### What is the purpose of the study?

- We invite you to help us design a chatbot to improve the way we deliver support for people experiencing anxiety after stroke.
- A chatbot is a computer program that you can talk to – it asks you a question, and you type the response. We hope to create a chatbot that can help people after stroke with their self-help exercises.
- We are inviting volunteers to have one face-to-face interview with our researchers and try out a prototype chatbot developed for people with minor strokes.

- The interview will help us learn about:
  - the ways you use technology
  - the features you would find helpful in a chatbot treating anxiety

### **Do I have to take part?**

No – participation in this study is entirely up to you. You can withdraw from the study at any time, without giving a reason. Your rights will not be affected. If you wish to withdraw, contact the PI. We will stop using your data in any publications or presentations submitted after you have withdrawn consent. However, we will keep copies of your original consent, and of your withdrawal request.

### **What will happen if I decide to take part?**

- We will ask you to complete an informed consent form before you start with the study.
- There is one face-to-face interview with our researcher in this study.
- The interviewer will guide you through a series of questions on the ways
  - a. you use technology
  - b. how to make a chatbot useful for people with anxiety after stroke
- The interviewer will then ask you to test a prototype chatbot, followed by an evaluation questionnaire
- The study will last approximately 1.5 hours.
- Refreshments (fruit, and biscuits) and accessible toilets are available. We are happy to accommodate any special diets. There will be a quiet room for breaks, and you are welcome to bring somebody else with you - we have several very comfortable waiting areas.
- The interview will be audio-recorded using a digital recorder for transcribing into text for analysis in this study. transferred to a password-protected encrypted computer for transcription via SD card immediately after your session, and then deleted from the SD card immediately after transfer.

### **Compensation**

- You will receive a £10 One4All voucher for participation

**Are there any risks associated with taking part?**

There are no significant risks associated with participation. However, some people may find it uncomfortable to talk about anxiety or to think about stroke.

**Are there any benefits associated with taking part?**

- There are no direct benefits to you taking part in this study, but the results from this study might help to improve the healthcare of patients in the future.
- Many people enjoy taking part in research.
- The results from this study could potentially contribute to the future development of a new treatment. Your participation in this study will not entitle you to benefit financially from the commercial development of the product or treatment.

**What will happen to the results of this study?**

- This study will be written up as a publication for scientific journals and academic conferences.
- You will not be identifiable from any published results.
- Once published in a journal, we will also publish a public summary on our website: [www.task4stroke.org](http://www.task4stroke.org)

**Data protection and confidentiality.**

Your data will be processed in accordance with Data Protection Law. All information collected about you will be kept strictly confidential. Your data will be referred to by a unique participant number rather than by name. Your data will only be viewed by the research team including Dr Yvonne Chung, Dr Maria Wolters and Ms Kim-Morgaine Lohse.

All electronic data will be stored on a password-protected encrypted computer, on the School of Informatics' secure AFS file servers, or on the University's secure encrypted cloud storage services (DataSync, or Sharepoint) and all paper records will be stored in a locked filing cabinet in the PI's office. Your consent information will be kept separately from your responses in order to minimise risk.

**What are my data protection rights?**

The University of Edinburgh is a Data Controller for the information you provide. You have the right to access information held about you. Your right of access can be exercised in accordance Data Protection Law. You also have other rights including rights of correction, erasure and objection. For more details, including the right to lodge a complaint with the Information Commissioner's Office, please visit [www.ico.org.uk](http://www.ico.org.uk). Questions, comments and requests about your personal data can also be sent to the University Data Protection Officer at [dpo@ed.ac.uk](mailto:dpo@ed.ac.uk).

**Who can I contact?**

If you have any further questions about the study, please contact the lead researcher, Ms. Kim-Morgaine Lohse, [k.lohse@ed.ac.uk](mailto:k.lohse@ed.ac.uk) and Dr Maria Wolters, [maria.wolters@ed.ac.uk](mailto:maria.wolters@ed.ac.uk).

If you wish to make a complaint about the study, please contact:

Dr Maria Wolters, [maria.wolters@ed.ac.uk](mailto:maria.wolters@ed.ac.uk), and [inf-ethics@inf.ed.ac.uk](mailto:inf-ethics@inf.ed.ac.uk):

When you contact us, please provide the study title and detail the nature of your complaint.

**Updated information.**

If the research project changes in any way, an updated Participant Information Sheets will be made available on <http://www.mariawolters.net>

**Alternative formats.**

To request this document in an alternative format, such as large print or on coloured paper, please contact Kim-Morgaine Lohse, [k.lohse@ed.ac.uk](mailto:k.lohse@ed.ac.uk)

**General information.**

For general information about how we use your data, go to: [edin.ac/privacy-research](http://edin.ac/privacy-research)

## D.2 Participant Consent Form

Participant number: \_\_\_\_\_

### Participant Consent Form

Project title:	Co-designing a Chatbot for Anxiety after Stroke
Principal investigator (PI):	Dr Maria Wolters
Researcher:	Ms Kim-Moraine Lohse
PI contact details:	maria.wolters@ed.ac.uk

Please tick yes or no for each of these statements.

	Yes	No
1. I confirm that I have read and understood the Participant Information Sheet for the above study, that I have had the opportunity to ask questions, and that any questions I had were answered to my satisfaction.	<input type="checkbox"/>	<input type="checkbox"/>
2. I understand that my participation is voluntary, and that I can withdraw at any time without giving a reason. Withdrawing will not affect any of my rights.	<input type="checkbox"/>	<input type="checkbox"/>
3. I agree to being video and audio recorded.	<input type="checkbox"/>	<input type="checkbox"/>
4. I consent to my anonymised data being used in academic publications and presentations.	<input type="checkbox"/>	<input type="checkbox"/>
5. I understand that my anonymised data can be stored for a minimum of two years	<input type="checkbox"/>	<input type="checkbox"/>
6. I allow my data to be used in future ethically approved research.	<input type="checkbox"/>	<input type="checkbox"/>
7. I agree to take part in this study.	<input type="checkbox"/>	<input type="checkbox"/>

Name of person giving consent

Date

Signature



THE UNIVERSITY of EDINBURGH  
**informatics**

Participant number: \_\_\_\_\_

dd/mm/yy

_____	_____	_____
Name of person taking consent	Date	Signature
	dd/mm/yy	
_____	_____	_____



THE UNIVERSITY of EDINBURGH  
**informatics**

## D.3 Researcher Script

### Researcher Script

Hello, my name is: Kim-Morgaine Lohse

For my master thesis, I am developing a prototype chatbot for people with minor strokes. A chatbot is a computer program that you can talk to – it asks you a question, and you choose a button or type the response. We hope to create a chatbot that can help people after a stroke with their self-help exercises against their anxieties.

Today I will start by asking you general questions about your technology use. At the end, I will ask you to try out the prototype chatbot and after I will give you another short questionnaire.

The purpose of this exercise is to identify people's attitude towards technology and evaluate a prototype chatbot developed for people with minor strokes. Can you please read and sign this Consent Form if you are happy to proceed?

Do you have any questions before we start with the interview?

### Questionnaire:

I will now start asking you some general demographical questions and about your use of technology

*(Researcher opens REDCap to ask the structured questions)*

### Interview:

#### Coping with Stroke

How would you get information about strokes? (clinicians, other stroke survivors, carers, GP, online)

How would you get in touch with people who could help you? By Phone, letter, email ....

*(Researcher: If you want more information about strokes or if you have a stroke/traumatic brain injury)*

#### Coping with Anxiety

Do you ever feel anxiety and if yes, do you have any strategies for managing your anxieties?

*(Researcher: What works for them? Listen for any strategies that are covered in the treatment manual)*

#### Follow up on observations from Media Usage scale.

#### If people have a smartphone/tablet

You mentioned that you have a smartphone/tablet. When did you get the smartphone and can you tell me what make and model is it?

What do they like about it, what do they dislike about it?

What are your favourite apps?

Do you use any health-related apps? If yes, which?

*(Researcher: Mention as examples mindfulness, food intake, exercise tracker ... If the patient has an iPhone, check whether they use Apple Health.)*

**If the participant mentions gaming:**

What games do you play? Are any of those multiplayer games?

**If people have a computer**

You (also) mentioned that you have a computer. What do you mainly use it for and when did you get it?

What is the make and model?

How long have you used a computer for?

Do you access any health-related web sites? If yes, which?

*(Researcher: Mention as examples mindfulness, food intake, exercise tracker.)*

**If people have a Smartwatch or an activity tracker**

I want to follow up on your usage of a smartwatch. What do you mainly use it for, or did you stop using it?

When did you get it?

What is the make and model?

**Follow up questions from Attitudes subscales**

*(Researcher: Ask people to expand on the key positive attitudes that they subscribe to)*

When was the last time you felt that technology was helpful?

Has there been a situation where technology made you feel calmer and less stressed/anxious?

*(Researcher: Ask people to expand on the key negative attitudes that they subscribe to)*

When was the last time you felt frustrated with technology?

Has there been a situation where technology made you feel stressed or anxious?

How do they feel about talking to computers?

Have you spoken to a computer before, in what circumstances was that?

What personality should a talking chatbot have in your opinion?

**Testing and Evaluating the Chatbot**

Thank you for answering all these questions. I would now like you to try out our prototype chatbot.

I will shortly demonstrate how to use it.

*(Researcher is opening the chatbot on the computer and giving a short demonstration)*

This is our prototype chatbot. As you can see the chatbot will ask you some questions and you can either press a button or reply with text. The chatbot will explain what you are supposed to do. This chatbot, as I already mentioned, was developed for people with minor strokes to treat their anxieties. The exercises are based on cognitive behavioural therapy and were designed by Dr. Yvonne Chung specifically for stroke patients. We will

be launching the chatbot on this website (*Researcher shows the tasktreatment2 website*) and future plans involve making an app with the chatbot. The website or app will provide informed consent, privacy and further information about the usage of the chatbot. For now, the chatbot is only designed to perform the CBT exercises.

In this observation, we are interested in what you think about while you use the chatbot. In order to do this, I am going to ask you to talk aloud as you work on the chatbot. What I mean by “talk aloud” is that I want you to tell me everything you are thinking from the first time you start using the chatbot until you have completed it. I do not want you to try and plan out what you say or try to explain to me what you are saying. Just act as if you were alone, speaking to yourself. It is most important that you keep talking. If you are silent for a long period of time, I will ask you to talk. Do you understand what I want you to do?

Good. Now we will begin with some practice problems. First, I will demonstrate by thinking aloud while I solve a simple problem: “How many windows are there in my mother’s house?”

[Demonstrate thinking aloud.]

Good. Now, this problem was solved in our heads. However, when you are working on the computer you will also be looking for things and seeing things that catch your attention. These things that you are searching for and things that you see are as important for our observation as thoughts you are thinking from memory. So please verbalize these too.

Do you have any questions about the think aloud?

I would now like you to try out the chatbot for around 15 min.

*(When finished with trying out the chatbot)*

Thank you for taking the time to try out the chatbot.

Did you enjoy using the chatbot?

How would you characterize the experience?

Did you have any difficulties?

For the final task, I would ask you to fill out this questionnaire.

You are now done with the study. Thank you for participating in this study!

## D.4 Structured Questionnaire (MTUAS)

Confidential

TASK Chatbot  
Page 1 of 5

### Face to face interview structured questionnaire

Study ID \_\_\_\_\_

#### Face-to-face Interview questionnaire

**v1.0 30\_4\_2019**

sex

- male  
 female

Age in years \_\_\_\_\_

Time since last stroke

(Time since last stroke (days/months/years))

Highest level of education

\_\_\_\_\_  
(e.g. high school, university)

Occupation

\_\_\_\_\_  
(If retired, your last occupation)

#### Use of technology:

**Which of the following devices do you have? If yes, how often do you use it? (daily, weekly, rarely, never):**

	daily	weekly	rarely	never / don't have one
Smartphone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobile phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPad or other tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kindle or other eReader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smart Watch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Activity Tracker (e.g. FitBit)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video / DVD recorder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Games Console (e.g. Nintendo Wii)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**How often do you do each of the following activities?**

	all the time	several times a day	several times a week	several times a month	rarely	never
Watch TV shows, movies, etc. on a TV set	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watch video clips etc. on a TV set	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**How often do you do each of the following activities on your phone?**

	all the time	several times a day	several times a week	several times a month	rarely	never
Send and receive text messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make and receive mobile phone calls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check for text messages on a mobile phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check for voice calls on a mobile phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Read email on a mobile phone (never if no smartphone)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Get directions or use GPS on a mobile phone (never if no smartphone)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Browse the web on a mobile phone (never if no smartphone)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listen to music on a mobile phone. (never if no smartphone)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take pictures using a mobile phone. (ask always)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Record video on a mobile phone. (ask always)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use apps (for any purpose) on a mobile phone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search for information with a mobile phone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use your mobile phone while you do other activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**How often do you do each of the following activities?****(Mark as never if the person does not have a computer or tablet)**

	all the time	several times a day	several times a week	several times a month	rarely	never
Watch TV shows, movies, etc. on a computer or tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watch video clips on a computer or tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Download media files from other people on a computer or tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Share your own media files on a computer or tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search the Internet for news (can be on any device, including library computers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search the Internet for information (can be on any device, including library computers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search the Internet for videos (can be on any device, including library computers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search the Internet for images or photos (can be on any device, including library computers)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you use social media (Twitter, Facebook, Instagram, Snapchat, etc.?)  Yes  
 No

If yes, how often do you use social media?  
 never  
 monthly  
 weekly  
 daily  
 hourly

What is the main purpose?  
(e.g. follow interesting accounts, talk to friends, keep up with family)

\_\_\_\_\_

How many contacts do you have on social media?

\_\_\_\_\_

How many people have you met online that you have never met in person?

\_\_\_\_\_

How many people do you regularly interact with online that you have never met in person? \_\_\_\_\_

**Please state to what extent you agree with the following statements.**

	strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
I feel it is important to be able to find any information whenever I want online.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel it is important to be able to access the Internet any time I want.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think it is important to keep up with the latest trends in technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get anxious when I don't have my mobile phone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get anxious when I don't have the Internet available to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am dependent on my technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology will provide solutions to many of our problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With technology anything is possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that I get more done because of technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New technology makes people waste too much time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New technology makes life more complicated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New technology makes people more isolated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to work on several projects in a day, rather than completing one project and then switching to another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When doing a number of tasks, I like to switch back and forth between them rather than do one at a time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I like to finish one task completely before focusing on anything else.

When I have a task to complete, I like to break it up by switching to other tasks intermittently.

## D.5 Semi-Structured Interview

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### Interview Schedule

#### Coping with Stroke

How do you get information about stroke? (clinicians, other stroke survivors, carers, GP, online) Probe whether they are part of any online forums or support groups.

How do you get in touch with people who help you? Phone, letter, email ...

#### Coping with Anxiety

What are their best strategies for coping with anxiety? What works for them? Listen for any strategies that are covered in the treatment manual

#### Follow up on observations from Media Usage scale.

##### If people have a smartphone/tablet

What are their favourite apps? When did they get the smartphone? What make and model is it? What do they like about it, what do they dislike about it?

Do they use any health-related apps? If yes, which? Mention as examples mindfulness, food intake, exercise tracker... If patient has an iPhone, check whether they use Apple Health.

If participant mentions gaming: What games do you play? Are any of those multiplayer games?

##### If people have a computer

What do they mainly use it for? When did they get it? What is the make and model? How long have they been using a computer for?

Do they access any health-related web sites? If yes, which? Mention as examples mindfulness, food intake, exercise tracker.

##### If people have a Smartwatch or an activity tracker

What do they mainly use it for, or did they stop using it? When did they get it? What is the make and model?

#### Follow up questions from Attitudes subscales

Ask people to expand on the key positive attitudes that they subscribe to  
When was the last time they felt that technology was helpful? Was there a situation where technology made them feel calmer and less stressed / anxious?

Ask people to expand on the key negative attitudes that they subscribe to

When was the last time they felt frustrated with technology? Was there a situation where technology made them feel stressed or anxious?

How do they feel about talking to computers? Have they spoken to a computer before, in what circumstances?

What personality should a talking chatbot have?

## D.6 System Usability Scale

Participant ID: \_\_\_\_\_ Site: \_\_\_\_\_

Date: \_\_\_/\_\_\_/\_\_\_

### System Usability Scale

**Instructions:** For each of the following statements, mark one box that best describes your reactions to the website *today*.

		Strongly Disagree				Strongly Agree
1.	I think that I would like to use this website frequently.	<input type="checkbox"/>				
2.	I found this website unnecessarily complex.	<input type="checkbox"/>				
3.	I thought this website was easy to use.	<input type="checkbox"/>				
4.	I think that I would need assistance to be able to use this website.	<input type="checkbox"/>				
5.	I found the various functions in this website were well integrated.	<input type="checkbox"/>				
6.	I thought there was too much inconsistency in this website.	<input type="checkbox"/>				
7.	I would imagine that most people would learn to use this website very quickly.	<input type="checkbox"/>				
8.	I found this website very cumbersome/awkward to use.	<input type="checkbox"/>				
9.	I felt very confident using this website.	<input type="checkbox"/>				
10.	I needed to learn a lot of things before I could get going with this website.	<input type="checkbox"/>				

Please provide any comments about this website:

## D.7 Final Study Transcripts

Interviewer

I have some general question about strokes. Even If you might not have had a stroke, how would you go about getting information about what a stroke is? Would you go to your clinician? Other stroke survivors? Carers? GP? Or would you just look online?

P1

Yes, I would just look online, I think. I would just Google it, search the web and then probably read the Wikipedia article about stroke. This will provide me with enough information, I think.

Interviewer

Okay, thank you. How would you get in touch with people who could help you with finding more information? Would you phone them? Would you write them a letter? Would you write them an email? Would you go there in person?

P1

Yes, I will definitely go there in person. Because, if I would really need more information about a stroke, then there probably will be a reason for it and then I'd like the personal contact most.

Interviewer

Okay, thank you. Um, what about anxiety? I don't know if you ever felt anxiety? Is that something you feel sometimes? Maybe in some stressed situation?

P1

Well, I don't know if I really experienced anxiety in the classical way, like being anxious with not an apparent reason. But sometimes I'm very stressed out when the exams are close at University.

Interviewer

Yeah, it is quite normal to have anxiety at that time. Do you have any strategies with how you can deal with that anxiety?

P1

Strategies? Well, usually, I try to think positive. Because this is what helps me and also I do sports. If I feel anxious, and I feel capable to break the cycle of anxiety, then I go for a walk or go to sports. That is the best for me.

Interviewer

Yeah, do you ever try to change your thinking style at those moments?

P1

Yeah, that's what I mean with positive thinking. Because sometimes, I think, Oh, I will fail, or others will do better. This won't work out. I'm not good enough. And then, well, this doesn't help me. So I try to say, okay, whatever will happen, I learned something. And I try to change my negative thoughts into something positive. This will just boost my mood. If my mood is better, my anxiety is gone.

Interviewer

So, um, you mentioned that you're using a smartphone. Can you tell me what model you use and when you got it?

P1

It's a Samsung Galaxy S6, and I got it about a year ago.

Interviewer

Thank you. Is there anything specific you like about your phone? Or is there anything you really dislike?

P1

About my phone. Well, I must say that I like that the phone doesn't turn off so fast, like the phone I had before. It's good. The cameras are good. Yeah, but else, the touch screen works good, and it's stable, so it doesn't break when it falls on the ground.

Interviewer

Is there anything you don't like about it?

P1

Anything I don't like. Sometimes I don't like how much I use it, but I don't know if this has to do with the phone or with me. I think more with me. And I don't like the vibration sound I have to say it's too intense for me. I didn't find out how to change it yet. The vibration is very like an aggressive wasp.

Interviewer

That's funny. Thank you. Okay. Um, do you have any apps that you use? Do you have anything like a favorite app, maybe?

P1

Apps? Yeah. Well, nowadays, everything on the phone is an app, right? So even when I call someone, it's called. Is calling an app? I don't know.

Interviewer

I wouldn't consider it as an app.

P1

Then let's see what I use mostly is WhatsApp and my email application. And Google Maps or other maps programs.

Interviewer

Have you ever used any, like health-related apps? Maybe a mindfulness app? Or fitness tracker, like a running app? Maybe even a food intake app?

P1

Yes, yes. I've done quite a few. I've had a food intake app for half a year or so, a couple of years ago, which I use quite a lot. And I had some meditation apps for a couple of months. And also, I had an app that would measure sleep quality. But this didn't work, I think. And what else did I have? Health-related?

Interviewer

Um, you mentioned that you had an iPhone, you used to have an iPhone? Um, did you ever use Apple Health?

P1

No, this wasn't available at this time. But I wouldn't use it now either.

Interviewer

Why?

P1

I feel that health is something very personal and I would not enjoy those private companies have insight about the health of their users, because they already have lots of information, where I am, how fast I move, more or less what I do, but I don't want to feed them with more information. Which is not necessary for me to use the phone.

Interviewer

Yeah, I'm probably quite similar in that sense. Okay, thank you. Um, you also mentioned that you're using a computer, like most of us do today. Um, what do you mainly use your computer for? And when did you get it?

P1

Oh, my computer is quite new. I got it a year ago. It is a MacBook Pro.

Interviewer

What model?

P1

Pro? I don't know anything else. Just like the new one.

Interviewer

Yeah.

P1

MacBook air maybe. I think it's a pro. Yeah, I don't know exactly. And what I use it for is University. For reading, writing, and also entertainment. So I watch videos.

Interviewer

Yeah. Um, how long have you used a computer for? I mean not just the new one, but in general? Do you have a lot of experience using a computer?

P1

Sure. I mean, I have used computers since I was six.

Interviewer

Oh, since you were six.

P1

Yeah, I mean, not every day, right. But I played games with my friends. Or maybe I really started to play more games when I was eight or so when I could read a little more. But I remember playing computer games with my friends at a very young age. But of course, I didn't write anything on my computer at this time.

Interviewer

Um, do you ever access any health-related websites? I mean, again, as before, with the apps. Do you go on websites that inform you about mindfulness, maybe give you ideas on food intake, or maybe to track your running routes like Strava and stuff like that? Or online therapy exercises?

P1

Well, honestly, you ask for health-related information, right?

Interviewer

Yeah.

P1

So anytime I feel sick, I look for health-related information. So I use the internet as some kind of pre-doctor visit. I visit Dr. Google before going to the real doctors. And yeah, I think I spent a lot of time in my life looking for health-related information on the internet.

Interviewer

Okay, yeah. No, I also do that sometimes when I have anything. First, look at Google and look up stuff. Um, okay, I want to follow up on your attitude, your general attitude towards technology and I would like to know, the last time you felt that any kind of technology that you used was really helpful. Maybe not really, but just helpful.

P1

I must say, just a couple of days ago, I did a long-distance flight or a short distance flight, and I used my phone as my boarding pass, and I bought my ticket on my computer, I remember. This is compared to 50 years ago; this is a completely different way to travel. It's much less effort. This is the last time I remember.

Interviewer

So would you almost say that, that the phone nowadays takes a lot of the work from the computer?

P1

What do you mean?

Interviewer

I mean, we used to buy everything on the computer. But now you have enough apps for Amazon and flight companies to buy anything through that.

P1

Ah so you mean, no, well, what I use the app for was different than a computer, right? Because I used it as a boarding pass. I don't think anyone ever uses his computer.

Interviewer

Yeah.

P1

However, I think smartphones are replacing computers in many, many ways. For example, internet research, which should be just quick.

Interviewer

Yeah. Okay, thank you. Have there been situations where you thought this technology, let it be your computer or smartphone, have made you less anxious or calmer?

P1

Well, yeah, sure. Yes. When I listen to music, I feel relaxed, and often I listen to music from some websites. And also, maybe sometimes I Skype with a friend when I feel bad. Well, I usually call my grandmother through Skype, because this is cheaper. And this is always very relaxing. I have to say, it's maybe not exactly against anxiety, but it's relaxing.

Interviewer

You also mentioned that you used a meditation app.

P1

Right, yes.

Interviewer

Is that something that made you more relaxed?

P1

Definitely. Yes. It helped me, I think. Meditation in general.

Interviewer

Okay, thank you. And then to the opposite side. When was the last time that technology made you frustrated?

P1

Frustrated? Oh, that was just three days ago, I wrote something on the computer, and then the website crashed. I was applying for something, and it was only possible to fill in the information on the internet forum, which just crashed. My internet connection was fine; there was some issue with the server. So all the text was gone. That was quite frustrating.

Interviewer

And nothing was saved, so you had to rewrite it?

P1

Yeah, that was possibly my fault. I could have written it in Word or somewhere offline beforehand. But I didn't do it. I didn't expect the internet connection or website to crash. So this made me very frustrated.

Interviewer

Has there also been a situation that makes you, well, you just mentioned this made you stressed? But did it also make you anxious? Or did you have a different situation? I don't know if this made you stressed. It was more frustration.

Right, yes. So you're asking for a situation where?

Where technology made you stressed or anxious?

P1

Stressed or anxious. Yeah. Possibly. I don't know; this is a typical example. But I use my laptop and learning software, which is online to prepare for exams and the software gives you feedback on your level of preparation, and usually, my feedback is quite bad. So, unfortunately, this makes me anxious. However, I think I would be just as anxious when using a book or offline learning material. That's why I cannot really tell whether it's a technology or the learning. But it can be that the service providing feedback on your knowledge and your progress is stressing me out. Because it compares you not to yourself but others. So the social comparison can be quite stressful.

Interviewer

Yeah, I can follow you. Have you ever talked to a computer? And in what circumstances? Is that something you ever did?

P1

Like, speak to a computer?

Interviewer

Yeah or speak to your phones, such as Alexa or anything else?

P1

Oh yes, I've talked to Siri, I've talked to Alexa, just out of curiosity. Not because I was really interested in using the services provided, but I just think it's a funny tool.

Interviewer

Okay, so, getting back to developing a chatbot. A chatbot is also someone you talk too. What personality would you want to talk too? What kind of personality should a chatbot have, when you speak to it?

P1

Can I choose from different personalities? Or how do you mean that?

Interviewer

Do you want someone who's very caring? Do you want a professional

psychologist or something when you talk about serious problems? Or do you want, like, a funny reply?

P1

In which situation?

Interviewer

When you talk with a chatbot, let's say with your anxiety problems.

P1

Okay. Yeah. Well, if it's anxiety problems, then I think I would like it a chatbot to be professional. Probably.

Interviewer

A healthcare professional?

P1

Yeah, maybe but also like a friend. That will be nice with some jokes because I'm a funny person I like when things are not so serious. Especially when talking about very serious topics, like severe diseases. Yeah, I would enjoy it if a chatbot would be a little funny. However, I don't know if I could really take the funniness and the jokes as funny if they're from a chatbot. Sometimes, I don't know. The Google home chatbot jokes I've heard so far we're really not that good. So, but it also depends on the developer, right?

Interviewer

Yeah. And if it wasn't for anxiety, but just in general, someone you want to talk too? What kind of personality would you then want?

P1

Honestly, I don't know if I would. I would call a friend or someone if I would like to talk to someone so. But if I would want to talk to a chatbot, it would be the best I think, if the chatbot would react in a way that is suitable for the topic that we're talking about.

Interviewer

So it should be empathetic, replying to the mood that you are in?

P1

Yeah, that's exactly what I mean. I don't want a professional chatbot who is always professional. Otherwise, I won't just talk to him if I'm in a funny mood. Right? Which can also be good. If I chose to have an anxiety treatment chatbot, I would want it to be maybe only professional, for example, because then I can take it more seriously than if it is sometimes funny, sometimes very professional. Sometimes this, sometimes that, so I think for different services that might be useful to have different chatbots.

Interviewer

Thank you very much. Um, I would now like you to try out our prototype chatbot. I will shortly demonstrate how to use it.



Interviewer

Okay. I want to continue with the more open questions now. As I told you, we developed a chatbot for people with minor strokes, and I would like to know how you would get information about strokes?

P2

Just generally?

Interviewer

Yeah. Would you go to a GP, online..?

P2

My sister's a nurse. So I'd probably start by asking her. And then she probably tells me to look online, because she doesn't know that much about it. And then I'll probably, like depending on how personal information I would want, I would go to my doctor I guess, because it's more personal or gets my sister to direct me, who to ask. And then I would probably use Google.

Interviewer

And that's more in general. So let's say, if you had a stroke or traumatic brain injury, not at the moment, but afterward, would that be the same procedure you would go through if you need more information?

P2

Yeah, I think so.

Interviewer

How would you get in touch with people who could help you? So would you email them, phone them, go there in person? Again, there are two scenarios, if you want more information, or?

P2

I think if I would just talk to my sister, I probably just messaged her or something. But then, if it were more personal, I'd probably do want to go in person. I think. Yeah.

Interviewer

That will be the same for both scenarios?

P2

Yeah.

Interviewer

Okay, so we are developing a chatbot for stroke patients who have anxiety, and I would like to know if you ever felt anxiety?

P2

Yes.

Interviewer

Do you have any strategies on how you can manage your anxiety?

P2  
I kind of like take a step back from anxious thoughts, which really helps.

Interviewer  
Have you ever tried relaxation exercises?

P2  
Yeah.

Interviewer  
Which ones?

P2  
meditation apps.

Interviewer  
And have you ever tried to analyse the situation and change the way you think about it?

P2  
Yeah.

Interviewer  
Any other strategies?

P2  
Mmm, like relaxation strategies?

Interviewer  
Or in general, strategies.

P2  
Usually, I would distract myself from if I'm anxious, talk to somebody, probably who I'm close too.

Interviewer  
Okay, thank you. Um, so you mentioned that you have a smartphone. When did you get the smartphone? And can you tell me what make and model it is?

P2  
Get my current smartphone? Um, I got it, like, October 26. I think. It's an iPhone SE.

Interviewer  
SE?

P2  
Yes.

Interviewer  
And your previous one?

P2

It was a Samsung Galaxy. One of the lower numbers. I have that one for like two or three years, I think.

Interviewer

And to your tablet? What kind of tablet do you have?

P2

It's an iPad Mini 2, I think.

Interviewer

So when did you get it?

P2

Um like the summer of 2015.

Interviewer

Is there anything specifically that you like or dislike about your phone?

P2

The battery has become not very good. Nothing specifically, I think.

Interviewer

What about, do you like anything specific about the phone?

P2

It's small, so it's easier put in places. It's easy to use.

Interviewer

What about the previous one?

P2

What I liked and didn't like about it? It is a bit bigger, so it is a bit bulkier to put in bags and things. Cuz it wasn't an iPhone, you couldn't do certain things, that certain apps weren't available or certain different things weren't available. So that was annoying at times. Other than that, it was fine.

Interviewer

So do you prefer an iPhone?

P2

I guess so.

Interviewer

And now to your tablet. Is there anything specific you like or dislike about it?

P2

I like to read books on it. It's quite compact; I like that. And it's not really heavy. What do I mainly use it for? I like watching videos or for reading or skyping.

Interviewer  
Anything else?

P2  
I feel like those are the main bit. Yeah.

Interviewer  
What are your favorite apps?

P2  
Like, including social media or?

Interviewer  
Yeah, yeah.

P2  
There's an app I get books from that you can get library books from, I like that one. It's called Libby. I like that one. I have the headspace app for like meditation. I like that one. I try to think about what other apps I use frequently. I guess WhatsApp. Yes, that's the main once.

Interviewer  
Okay, so you already mentioned headspace, but do you use any other health-related apps? Maybe food intake, exercise trackers?

P2  
Well, there's like an exercise tracker on the phone. But I didn't really have to download it. But I use that sometimes just for steps. Like I don't really use a food intake one.

Interviewer  
Is that Apple Health?

P2  
I think so.

Interviewer  
Do you just like to track your steps?

P2  
Yes.

Interviewer  
Any other?

P2  
Specifically for health?

Interviewer  
Yes.

P2  
I have a couple of other meditation apps on my phone, but I don't

use them very much. Yeah, I think that's it.

Interviewer

Okay, so you also mentioned that you have a computer. What do you mainly use it for and when did you get it.

P2

I got it last August. And then use it for, usually for like reading papers for like articles for my studying. Writing, I have to write. And I use my email on it, and things and I usually talk to my family on it like on Skype, messenger, and things. And Facebook. Mainly, it usually just like saves all my stuff in one spot. Typically.

Interviewer

So, both for work, but also leisure?

P2

yes.

Interviewer

Okay, what make and model is it?

P2

It's a MacBook Pro from last summer.

Interviewer

How long have you used computers for in general?

P2

I think I used to have these desktop computers that my sister and I would play games on when we were little. But, we were probably, I don't know, eight, but then we didn't really do much on it, we just played a couple of games and then stopped. I think.

Interviewer

so like 17 years?

P2

Um, yes.

Interviewer

Do you ever access any health-related websites on your computer?

P2

Sometimes.

Interviewer

Which once?

P2

Like WebMD. I don't feel I have specific ones that I go to, I just Google it and see what comes up.

Interviewer

Do you sometimes go on mindfulness websites or food tracker or again exercise tracker websites?

P2

Not really, yeah.

Interviewer

It's mostly webMD or NHS?

P2

Yeah. Yeah.

Interviewer

Yeah. Okay. So these questions are a bit more general about your attitude. When was the last time that you felt that technology was really helpful?

P2

I skyped my family back home yesterday, that was nice.

Interviewer

So, you use it for social contacts?

P2

Yeah. And also like, if I'm using a map on my phone or something that's quite good. I get quite lost otherwise, that probably saves a bit of wandering around.

Interviewer

Do you ever find it helpful that you can look up symptoms or stuff like that? Because you mentioned that you sometimes go to WebMD.

P2

I don't know how helpful that is. I feel like it often; it always says you have cancer. I can always like, if you're anxious about something, I don't think it particularly helps me. I would ask my sister, and she'd be like, oh, it's nothing. Go to the doctor. Yeah, and I think that really helps.

Interviewer

Anything else you find helpful?

P2

About having technology?

Interviewer

Yeah.

P2

Like having access to like a lot of information, not just medical, but like, for studying, I can easily find things, or I could at least find where it would be. And that it's portable, it's quite good that you can take it anywhere with you. Yeah.

Interviewer

Has there ever been a situation where technology made you feel less stressed or less anxious?

P2

If I was, if I was anxious or stressed, and I was talking, I talked to someone I was close to via technology, that probably would have helped more, then if I didn't have that. Or if I had to look for a specific article or something, I could probably find it with my computer. Something like that. Having my computer be reliable, so it's not going to just die immediately. That makes me less stressed. Because it can be more stressful if you had to worry about your computer not lasting.

Interviewer

When was the last time you felt frustrated with technology?

P2

Sometimes when you have access to too much information. So it's kind of, you have to kind of filter it out or like choose where you want to focus your attention because you can't. And that gets a bit frustrating because it's there automatically kind of and then you have to choose to kind of ignore it. I think, often it's a bit frustrating because I think computers and apps and things kind of always pushing you to get the notifications for everything. That's a bit annoying at times because you don't want a notification for everything.

Interviewer

Yeah. Has there been a situation where technology has made you feel stressed or anxious?

P2

Sometimes, if I'm feeling anxious or stressed, I feel like technology sometimes doesn't help if I'm just checking things or just like being a bit mindless with it. I think.

Interviewer

Can you go more in-depth with that?

P2

Like, if I was anxious about something and I was just checking Facebook, or social media just kind of mindlessly, it typically doesn't really help if I don't have a purpose of doing it. It just doesn't make feel any better. Probably best to stop.

Interviewer

Yeah, that makes sense. You also mentioned that you feel anxious when you don't have your phone on you. Why is that?

P2

Because you kind of so used to use it when you have like. It's quiet, it's so easy to contact people now or to find out information easily, that when you don't have it, it seems like you can't do

certain things. It seems kind of. Yeah, I'm not sure how to. I guess it seems like you don't have something to do, that you normally would automatically have something to do.

Interviewer

Yeah. Okay, that makes sense. And why did you neither agree nor disagree with the questions, I get anxious when I don't have the internet available to me?

P2

Because I feel like sometimes if I'm already anxious about something and then I am just checking mindlessly, it doesn't help, but then other times if I want to talk to somebody, that it does help, so I think it depends on the situation now. Sometimes, you too like dependent on the internet; it gets a bit much.

Interviewer

Yeah. But then at the same time, you also agreed that it's good for you?

P2

Yeah, I think it really depends.

Interviewer

So, how do you feel about talking to computers?

P2

Okay, sometimes, I think there's one app I used that I think was like a similar chatbot thing for anxiety. That one was quite good.

Interviewer

Do you remember what it was called? Woebot?

P2

Yeah, yeah. That one is cute. I always forget to use it, but it sends me a reminder.

Interviewer

Do you like these reminders?

P2

Yes, sometimes, like, I think when I'm feeling stressed that does help, but then I think when I'm not feeling super stressed, I kind of ignore them, but yeah.

Interviewer

So you just said you spoken to computers before? Any other, maybe Siri?

P2

I rarely use Siri. Like there used to be those computer things where they would guess what you were thinking. They were like little games and things. I think I just did this for a couple of times when I was younger.

Interviewer

And Woebot you used when you felled anxiety?

P2

Yeah.

Interviewer

In your opinion, what kind of personality should a chatbot have?

P2

The Woebot one is cute. It sends you little gifts and videos. I think it's very like, it sounds like quite encouraging and sounds like the kind of like your mom or something. If my mom were a chatbot, It would sound a bit like my mom.

Interviewer

So friendly, maybe?

P2

Yeah and kind of just like warm, I guess. What else did Woebot do? It always seems happy. Yeah.

Interviewer

One more time, back to how you feel about it. Would you, in general, like to use chatbots?

P2

I think that I wouldn't like that to be the only thing I used because it's; still, it's a bit impersonal. That is the only thing. But if it was added onto something, then I think that would be okay.

Interviewer

Thank you for answering all the questions!

Interviewer

Now I would like to follow up on the questions and go a bit more into depth with it. So I would like to know, in general, how would you get information about strokes?

P3

I'm a medical professional, so I know quite a bit about strokes. But for any further details, I would probably check up the recent literature, for example, pubmed.

Interviewer

Would you ever google it, would you use online services?

P3

Sometimes. So if I'm a little bit lazy, I just Google it. But normally, it will lead me to other websites like up to date and pubmed?

Interviewer

How would you get in touch with people who could help you? Getting more information about strokes? So you kind of already said that you would ask a colleague, but how would you get in touch with them? Would you phone them? Would you write them a letter? Would you go there in person? Would you write them an email?

P3

Um, there are several options, but I would prefer the direct contact either by phone or by talking to them.

Interviewer

And the next question is, I would like to know a bit about, if you ever feel anxiety, and if yes, if you have any kind of strategy how you can manage your anxieties. Anxieties can be everything, if you're stressed, you might feel anxiety.

P3

It's not very often. But I think that it's rather appropriate to take a step back and have a timeout and think about solutions.

Interviewer

Uh huh. When you say you're going to think about solutions, do you also think about why you feel stressed? Do you try to figure out what made you feel stressed in that situation? And how you can change it next time?

P3

I'm quite used to stress, so it doesn't make me anxious.

Interviewer

But anxiety doesn't necessarily only come when you're stressed. Anxiety can also be in other situations. For example, if you have to take an aeroplane and you're nervous about flying, then you can feel anxious.

P3

Okay, so this may be a good example, so I tried to control it. Previously, I controlled it by taking some alcohol and relax. Nowadays, I'm just trying to relax by rationalise the problem. That keeps me calm. Understanding the mechanism, the problem with flying and the risk, that calms me down.

Interviewer

Okay, that's a very good example. So you're actually trying to rethink the way you are thinking? I mean, you try to understand that you over saturating the way you think about this problem and it's not really that dangerous, maybe?

P3

Yes, that's definitely the way it is.

Interviewer

Okay, thank you. So I want to follow up on the observations from the scale that I just asked you. So you mentioned that you're using a smartphone and a tablet, but mostly a smartphone. When did you get the smartphone? And can you tell me what model it is?

P3

So you asking me about the time of purchase?

Interviewer

Yeah.

P3

Okay, the recent smartphone, or the first one?

Interviewer

Let's start with the recent.

P3

Okay, I purchased this one in 2013 and it is an iPhone 6+.

Interviewer

6+. Okay and your previous?

P3

That was an HTC and I probably purchased that one in 2008. Yeah, I think so.

Interviewer

Okay, good. Um, I would like to know, what you like or dislike about your phone? Can you tell me a bit more about it, maybe there are certain functions, maybe that you really like or dislike.

P3

It works like my big computer, like my mac. I dislike that it is so small and I need very often my glasses.

Interviewer

Follow up, do you think the functionality, using the buttons and so on works well for you?

P3

That works pretty well for me. No worries.

Interviewer

Do you have anything else to add, something that you really dislike or something you just didn't remember in the beginning?

P3

Yeah, I dislike that Apple has the monopole on getting any apps you have to more or less purchase them through the apple shop. So they are free of charge, but even though it's free of charge it's kind of purchasing it. So I would rather get them through other channels. For example, they control you and when you live in different countries, you have to switch from one apple shop to the other one because it's not available in other countries.

Interviewer

Okay. Do you have a favourite app? Or favourite apps?

P3

I do all my home banking. So the home banking apps are quite convenient and my favourites and then the weather forecast. I also use News and TV apps. So these are most likely my favourite ones. I can look which I have on my phone. The PDF reader and the calendar and contacts. And of course, the mail programme.

Interviewer

Okay, perfect. Do you use any health related apps? Maybe you have an app for migraine or you have an app for mindfulness, exercise tracker, or running apps.

P3

I got the the exercise tracker as part from Suunto. It's called lose count, but it's just to track my trips, hiking, skiing. Other wise, I have to check. I'm not using any apps for myself, but I use apps to get medical information just for professional purposes.

Interviewer

You mentioned that you have an iPhone and the iPhone has Apple Health? Do you ever use that?

P3

No, I've deactivated this one. I like to protect my privacy. So I don't want to get anybody else to know anything about my health.

Interviewer

Yeah.

P3

I don't want to share with anybody with any internet provider my health information.

Interviewer

Yeah. Okay. So you also mentioned that you have a computer? What do you mainly use it for? And when did you get it?

P3

Um it's a MacBook Pro. And I purchased this one in 2009.

Interviewer

What do you mainly use it for?

P3

It's hard to say. So it's both for work and for leisure time. And, yeah. Yeah, it's mainly for professional purpose to do presentations and to read journals and to download some of the relevant literature. And I use it to administer my pictures, mainly from, you know, from leisure time activities. And to track up my diary about my pleasure time doing two or three trips.

Interviewer

How long in total have you used computers for, I'm not just talking about this MacBook, but in total?

P3

Um, I got my first computer in, I think 1993.

Interviewer

Okay, that's a long time.

P3

Yeah. I think so.

Interviewer

So would you say you are knowledgeable about how to use a computer?

P3

Yes, as a user, not as a programmer. Strictly as a user, I'm pretty okay, pretty good. So I'm quite familiar with the programs that I'm using. Either apple based for my private work, in privacy, or at work, windows based.

Interviewer

When you use your computer, do you ever access any health related websites? So again, it could be about exercise trackers, food intake, mindfulness or general knowledge about health?

P3

I'm accessing, of course, health related website for professional purposes, like databases on antibiotics, databases on medicine for prescription, databases on research and for medical journals, which I've been tracking or keeping up for my own profession.

Interviewer

Do you ever use any health related websites for private use?

P3

Um, no I don't think I've ever used it before. So no, so far never.

Interviewer

Okay, so you said that have an activity tracker. Um, what do you mainly use it for?

P3

So I've got a Suunto watch with a GPS, where I'm tracking all my tours. And I can keep track with how many calories I've used. But it's just to document my trips, either in the wintertime or summertime. But it's not for health related purpose. So just to see where I'm gone, and which routes I used.

Interviewer

Okay, when did you get it? And what is the make and model?

P3

It's called the Suunto mbit3 Sephora and I bought it in 2014.

Interviewer

Okay, perfect. Okay. So I want to follow up a bit on some more of the questions I asked in the beginning. I want to know, when was the last time you felt that technology was really helpful?

P3

I can't remember, because I take the technology and the help I get through it as granted. So I'm just maybe irritated when it doesn't work. But otherwise, I expect it to be helpful. For example when the computer system doesn't work as I want and it causes my time, I'm pretty much annoyed. So I expect that it works and it works as quick as possible.

Interviewer

Okay. You also said that you feel it's important to be able to access the internet at anytime and find information whenever you go online. Can you elaborate on that?

P3

It's pretty convenient, when I've got a problem to solve, and I need some information about it, then it's very convenient to do it instantly. But it must be on my premises. So I want to access it when I want to do. And so therefore I don't need internet access all the time. But when, I want it of course instantly. Especially work related, when I have a question and I need some information about a case or so then I would like to get the information as quick as possible to get a solution for my problem. Or get the relevant information, for example, about drug dosing, drug interference and so on.

Interviewer

And that's why you also think that it's important to keep up with the latest trends in technology, so you can use it accordingly.

P3  
Definitely.

Interviewer  
Has there ever been a situation where technology made you feel calmer or less stressed or less anxious?

P3  
I think it's not applicable. I can't remember that it ever made any impact on my mood, unless it didn't work and I got annoyed about it didn't work. But the opposite. Again, I take it as granted that it works.

Interviewer  
So for example, if you use your activity tracker to track the route, maybe it makes you more calm that you have the route afterwards?

P3  
No it's just a pleasure to see it and what was done and how many kilometres, and how many calories I have burned. That's quite nice. It's nice to have. But it's not necessarily. So it has no impact on stress and so on. Maybe on my mood, because it's fun to see afterwards.

Interviewer  
Okay, thank you. When was the last time you felt frustrated with technology? So you mentioned when it doesn't work you get annoyed.

P3  
Well, what was the question, when was the last time I felled frustrated with technology?

Interviewer  
Yes.

P3  
Maybe a week ago, when I couldn't come on the internal intranet at my work place and I had to change the password a couple of times, that was a little bit frustrating and time consuming. It was due to a technology called failure in the local internet.

Interviewer  
When you feel frustrated, do you also feel that that technology sometimes makes you stressed or anxious? Like when you're receiving too many messages? Or if it doesn't work that it makes you stressed?

P3  
Um, yeah, when it gets time consuming, and it wastes my time, then it might cause stress. But the solution is just to skip it and continue with other things while waiting until it works again. The information can cause some stress, when coming back from holidays and having 100 new emails, or even more in my account. It's not stress, but it's a kind of irritation and time consuming because you

have to sort out which is important and which is more or less useless. Yeah. So yes, it can increase the time pressure on the rest of my work or even during leisure time, and waste time, I could have used otherwise.

Interviewer

So you said that you neither disagree or agree in whether technology makes life more complicated. Can you elaborate on that?

P3

Yeah. So again, when it works, it's very convenient. So you get quick access to information you need for example, doing home banking, you can do it whenever you like. You don't have to go to your bank, for example. But if it doesn't work, then you have to use your time to get it on run and that makes it more complicated. The thread about misuse of the internet and that you have to be very allured for fishing and so on, that makes it a little bit inconvenient or complicated. So you can't always trust the internet.

Interviewer

Okay, thank you. So we would like to know how you feel about talking to computers?

P3

I think it can be an advantage, because when your eyesight is becoming worse, it's better to talk then to listen, then to read and write. So this is the positive side, I would like. The disadvantage or the possible problem is the privacy. So as long as I know that everything what is spoken is protected and keeps to the privacy, then it is okay, but if anybody can listen to it, um, I wouldn't like it. But it's the same whether you write or you speak. It can be tracked as well. Yeah, in principle it's not a problem. So I would rather talk and listen, then read and write.

Interviewer

Okay, so have you ever tried to speak to a computer before? And if yes, in what circumstances?

P3

I've never done it before. I haven't used Alexa.

Interviewer

But have you maybe tried the chatbots on websites from companies or so?

P3

Yes, I have used chats. For example, when getting some problems fixed with the home baking so I can chat, but I can chat to a person. This is a real person. So I've never chatted to a robot or a technology, but to real person through technology, and that's very convenient. So I prefer that actually. When I've got a problem, rather than writing long emails, I would rather prefer talking to a person and get it fixed at once.

Interviewer

Yeah. But if that was a computer would you do that as well?

P3

As long as the computer, the robot can fix my problems, and understand what I need or want, then it would be fine for me. Um, the only voice I use, but it's just a one way direction is my GPS in my car. So there I get some information about the road by voice. But it's not the other way around. Yeah, on my phone there's Siri. I might have tried it a couple of types just for fun, just to try it. But I don't pursue Siri on a regular basis, or use her on a regular basis.

Interviewer

So I want to know what personality should a chatbot have, in your opinion, like when you chat with someone about some topic, would you want it to be friendly, fun? Professional? Yeah, just in general, if it was a general chatbot?

P3

Um, yeah, of course, the main issue is that the voice of the person should be professional. And it's okay. Yeah. A friendly voice would be the best. But I don't think they have any real emotion. So yeah. And probably the mood will always be the same.

Interviewer

If you are chatting and you have different moods, do you want it to respond according to your mood?

P3

It's probably very nice if you've got a problem and you are in a bad mood and there's someone who can calm you down. If this technology can do this, it's fine, in this situation, but there's no real person behind. So actually, yeah. So when I know this is not a real person, it's a robot and it's playing different moods. I think it seems a little bit artificial. So it's just a question whether this will respect me as a person when it's just playing with me. So I rather prefer someone who's straight professional and trying to get the solution for any questions, any problems. In a neutral voice.

Interviewer

What if it was a chatbot for medical reasons or therapy. Would you still want it to have the same kind of personality?

P3

In principal, it should be the same. But of course, when you're in a bad mood and you need some help, it's nice to have a person who is talking nicely to you, even though you know, this is not a real person. So it's like an actor or something like that. Yeah. But of course, if you're don't have your full mental capacity, it's maybe nice having one. So if you don't discover there's not a person, then it's okay.

Interviewer

Okay, thank you. Thank you for answering all these questions. I would now like you to try out our prototype chatbot

Interviewer

So, we are building a chatbot for people with minor strokes. So, we would like to know in general, how would you get information about strokes?

P4

Strokes, I mean, um to be honest, even though I study psychology, I don't think I have that much exposure to strokes. I only know a little from my grandparents, because they both had a stroke but they passed away already, but, yeah, like all I know about strokes will be only from them.

Interviewer

Would you also get information by going to a GP or going online, if you really want more information?

P4

I would go online, like, I don't know, I find putting an appointment to a GP and the whole process is kind of, like, it takes time to actually get to them, you know, the internet is just there, you can just google it.

Interviewer

If you would go and get in touch with people who could help you, physical people, would you then phone them, write them an email, write them a letter, go there in person?

P4

I would write an email, I think.

Interviewer

Let's say, hypothetically, if something happened to you, either a stroke or a brain injury, how would you then afterwards get in touch with people who could help you.

P4

Then I would prefer meeting in person, like, seeking for help in person.

Interviewer

Okay, thank you. So how about coping with anxiety? Do you ever feel that you have anxiety?

P4

Yeah, from time to time.

Interviewer

And do you have any strategies how you can manage your anxiety?

P4

I normally like, whenever I sense that I am starting to get some anxiety, I just try to talk about it with people around me. Just like, I prefer to let it go by talking about it externally to maybe suppress it and then, normally my flatmate or boyfriend give me

advice and then the fact that I just like shared it with others, calms me down, I think, because normally it's not striking me or it's not severe anxiety, but like you know, a minor anxiety that gets me a bit nervous or anxious.

Interviewer

Do you ever try to analyse the situation and then try to think, what could I do different next time or do I have any thoughts that are dysfunctional or something like that?

P4

After talking with people that I find helpful to talk with, I kind of, introspectively think why did I get this sensation. The situation itself isn't that bad or it's not worth being that anxious. I just try to make myself look at the situation from the third person and you know, not involved in the situation, so that I can just be more okay or neutral about it. Because, actually, even for myself, even though it's my own situation, when you get out of the situations, it's kind of easier to just objectively look at it. So yeah, maybe I try to kind of reanalyse it. Outside of the situation or after.

Interviewer

Yeah. Okay, cool thank you. Okay, so you mentioned that you have a smartphone. When did you get your smartphone and can you tell me what make and model it is?

P4

Like the very first one?

Interviewer

Let's start with the recent one.

P4

This one I think I got a year ago and this is an old model, like, galaxy 7.

Interviewer

Samsung Galaxy 7?

P4

Yeah.

Interviewer

And when did you get your first one?

P4

It was, I think 2011. So, it's quite late, right. Yeah. I mean, I think I tend to. I mean, I don't really think it's very, very important to keep the technical devices up to date. I mean, it's okay. As long as it functions for me. Yeah. And like, I just got my first smartphone by 2011, just because, in Korea, where I'm from, we have really high competition in high school education. Parents usually don't really let their child have smartphones or electronic

devices, that can distract them.

Interviewer

Oh, one of my best friends is from Korea. She went to Germany to study.

P4

Oh, you're German?

Interviewer

I'm half German. I studied in Germany.

P4

Oh Okay. So you met your Korean friend in Germany?

Interviewer

Yeah. She went to Germany to study, but she grew up in Korea.

P4

Oh, cool. Are you still in touch with her?

Interviewer

Yeah.

P4

Maybe through SMS? Haha

Interviewer

So do you remember what model your first one was?

P4

Also galaxy. I think it was, Galaxy S2.

Interviewer

Yeah. So can you tell me what you really like about your phone or what you dislike?

P4

About my current phone? To be honest, I am not fond of it or dislike it. I just use it, I mean, because it serves its purpose, it let me search things I want to know more about, browse some YouTube videos. So yeah, I mean, I think, whenever I'm not working on uni stuff I just find it entertaining to go on my phone and browse memes on YouTube.

Interviewer

You said you're not really that fond of it. Is there anything specific you're not fond of?

P4

To be honest, this is not really the up to date cutting edge phone. And I don't usually seek for it, because like, you know, smart devices are just devices, it doesn't really matter if it's a really new one or old one. As long as it functions, the speed of the phone

or the function itself goes really slow or like kind of bugging me, then I might start not liking it. Maybe I'll be up for changing it, but for now, I mean, I don't really find a reason to be very fond of it. It's just neutral, it's just there.

Interviewer

And the functionality of the phone, is there anything specific you like or dislike, for example with the touchscreen? Is it convenient?

P4

I mean, I think my phone right now has good enough speed and functionality, but I'm not really happy with the camera. When I first got this, I was okay with it, but now, the latest models are so much better. The only thing that I kind of like from the latest models of the smartphones is the camera stuff and the resolution of the photos that you take and the functions in the camera is way more advanced than what I have on my phone. So maybe that one I might not be really happy about, but other than that, I think its functioning okay.

Interviewer

What's the main reason that you wouldn't buy a new model?

P4

Main reason? Price first of all. I think to change what I have if it's still functioning, is a waste. It's still like a whole device and if you just throw it away, it's a waste. So I prefer to just make use of what I have as long as possible until it really starts acting out and then I'll be ready for changing my phone. Before that I wouldn't buy a new model just because a better one is out there.

Interviewer

What is your favourite app or your favourite apps?

P4

Actually, I downloaded one app very lately, which is called 2good2go. Have you heard about it?

Interviewer

Yeah.

P4

Yeah, I mean, I currently fell in love with that, it's really cool. And I really liked the, how to say, like, the ethics of the app, to get rid of all the fighting against the food waste and it's good for the customer and the stores or the shops that are using the service. So I really find it very ecofriendly, smart and at the same time, very innovative.

Interviewer

Do you use any health related apps?

P4

I use runningTracker or runkeeper for running.

Interviewer

What about apps about mindfulness or for food intake?

P4

Oh actually I use the food diary app. I just like it for recording, to keep track of what I eat every day. Yeah, that one tracker. I used to use the app that introduces workouts, simple workouts for abs and that sort of things, but lately I'm not really using it.

Interviewer

So you also mentioned that you have a computer. When did you get it and what do you mainly use it for?

P4

Oh, okay, so, to begin with I didn't really used to use my laptop or computer, unless I had specific purpose of it, because you can basically do anything that you can do on your computer on your phone right now right? So I initially got it in 2015. Yeah, it's like a very old unhealthy laptop right now. But I usually only use it when I'm working on my uni assignments or for workstuff. I don't really use my laptop to watch videos that much, compared to other people, I think. So I mainly use it for work. Maybe aslo for searching purposes.

Interviewer

And what make and model is it?

P4

Actually It's a Samsung laptop. I don't know about the name of the model

Interviewer

Okay. So you used this computer since 2015. Did you have a different one before?

P4

Yes I did. One from LG. It's like a small one. Now I have like more or less the same size as yours, maybe a little bit bigger. Because I prefer, even if it's bigger, it got better spec, in terms of, I don't know much of the terms, but the CPU speed and the capacity the laptop has. I didn't really mind the other size. Before, I had a smaller and lighter one, ironically. But that one didn't really last long. It started acting out after one or two years, because the fan on the laptop wasn't really suitable for working on your bed or on your couch. It didn't really circulate the heat, so it started kind of burning the internal structure. So I didn't use that one for long, just maybe one or two years and then I got a new one because it was making weird noises. I was so worried if it would explode.

Interviewer

Yeah. So you got it in 2012.

P4

Yeah, yeah, when I just got into university.

Interviewer

Do you ever access any health related websites on your computer? Maybe online doc or again meditation websites or some self help websites?

P4

Um, I don't really use any health related apps on my laptop I think.

Interviewer

But websites? Do you go on any websites?

P4

Actually I've lately tried one website, like a meditation website, wanting to try a trial meditation. I haven't been like regularly using it. So yeah.

Interviewer

Have you ever visited any yoga websites maybe?

P4

Just to book a session, but not for actually doing yoga.

Interviewer

Okay so you do mostly all this on your phone?

P4

Yeah literally.

Interviewer

Okay. So, um, when was the last time that you felt that technology was helpful for you?

P4

Oh, actually during my dissertation project, masters dissertation project. There was this thing where, literally, I had to process all the output data from the text file into an Excel file to process it. Then, initially, I didn't know how to automatically do it, how to automate the whole process. So I was manually doing it. One of my, no actually, my boyfriend, started out, like, he wrote a programme with Python and it literally took 10 seconds, which, if I had done manually could have taken 20 hours. So I just thought this is technology, this is why we need computers. Because before that I wasn't like, I mean, obviously it's very useful, you know, like you find it very helpful, like having internet on your computer. Before that, I thought it was more optional to have it. But after that one, I just wanted it. If we know more about programming or using Python for writing a programme, it would be amazing to make all the work process a lot easier.

Interviewer

Yeah, definitely.

P4

Do you use it aswell?

Interviewer

I use it quite a lot, especially for data processing, because else it would take too long.

P4

I really admire people who can easily use it.

Interviewer

Yeah, yeah. So I guess that's also why you previously said that you strongly agree that technology will provide solutions?

P4

Yeah. Yeah. It's a really fresh experience for me. It does help.

Interviewer

Do you remember any other moments where it was helpful for you?

P4

Maybe for directions. From time to time I think that, like, I wonder how people used to find places and location direction without these kind of GPS sort of apps. I think, I find it really useful, especially when you're travelling around even if you're in a place that you have ever been, you still can kind of find directions through Google maps for example, because it has everything, so those functions, I really find useful.

Interviewer

Do you also sometimes look up stuff when you feel sick? Or is that not something you do?

P4

On my phone? Like when I have physical symptoms? Sometimes, you know, when I suddenly feel a bit of cramps in here or there or some sort of headache that I've had, that I've never experienced, then I just go and search what it could be.

Interviewer

Do you find that it is useful for you? Do you find it helpful?

P4

It is helpful to a certain extent, to get baseline information about what the symptoms are that I'm going through. But when it comes to like really get a solution about it or to find, which steps to take in terms of the symptoms, I don't think it's a smart move to follow everything that I find online. Yeah. So, this could be just limited to me. Like my mom is a pharmacist and she knows a lot of medical information. So I kind of initially search it online, and then kind of ask her more about, what I should do or what it could actually be.

Interviewer

So its kind of a pre-screening? A pre-doctor?

P4

Yeah, kind of. Yeah, like a screening.

Interviewer

So, have you ever had a situation where technology made you feel less stressed or less anxious?

P4

Less stressed, less anxious? Um, when I'm really stressed and I'm just working, working, working throughout the whole day. It's not the stress that I can't cope with. But it does help, kind of, how do you say, redirecting my attention to something entertaining on my phone. Yeah. And I currently find it a bit detrimental though, because when the working process is not really enjoyable, I just get to be more dependent on being on my phone. Sometimes it's not controllable to a certain extent, so I try not to be too dependent. Yeah, it does help relieving the stress, I think.

Interviewer

Yeah. So it's like a little break for you?

P4

Yeah.

Interviewer

Okay. Have you ever felt frustrated because of your technology? And if yes in what situations?

P4

Oh by the technology itself or the way I interact with the technology?

Interviewer

That the technology made you stressed or frustrated, something didn't work as you wanted it to work or maybe you got too many messages, that stresses you out? Well, that's more about stress, this question is more about frustration, the next question is about stress.

P4

Oh, yeah. This is more about frustration. Well, I think because you have access to all sorts of information from your friends or from the ones that are online. Sometimes you just get to know more than what you want to know, especially through social media. I think, it inevitably affects the way you perceive your own life or things that are going on around you, because you get to compare yourself with other people and like, when you're not really in a good shape or things around you're not really going okay, I think it's kind of harder to keep yourself from being frustrated, I think. For example, when I'm in the most depressive time of the year, working on, I don't know, the dissertation or looking for jobs and not really having a good time, then other people, like, you get to see what

other people are up to through these technology apps, that they're getting a good job in their summer holidays from some amazing places. I wouldn't like to perceive those to make myself frustrated, but like, it kind of subconsciously affects me.

Interviewer

For example, Instagram, where people just take the most beautiful pictures online?

P4

Yes. I mean, I myself would do that because I normally don't post that many that frequently. So the only times that I actually post something is when I'm really enjoying the moment. So I kind of see that and that's the purpose I think, that's sort of a purpose of using social media. That in contrast, make other people on the other side kind of feel a bit bad.

Interviewer

Do you ever have situations where the internet or the software didn't work as you wanted to. Or is that not really anything that makes you so frustrated?

P4

So, if I had a specific purpose of like opening it up or you trying to use an app and then, if it acts out, that would really get on my nerve. And to be honest, other than like an app, not really working. I don't remember anything else. I think like once when WhatsApp wasn't letting me download the photos and kind of stuff and back when I was waiting for a result about my job application. And my friend was my referee, so she could update me with how the process was going. And she sent me some photos and then it didn't let me open it, it didn't process the photos. That really really irritated me and I was like, this is nothing to be annoyed about, because in a couple of hours it'll work, but literally in five minutes I got irritated.

Interviewer

So you want it immediately when you get it?

P4

Yeah, and those sort of things, when you like, really want to watch, I don't know, for example, YouTube videos and the internet is not working for a while then that might really get to me.

Interviewer

yeah, that makes sense. So now to the next question, as I already mentioned, did you ever feel more stressed or anxious because of the technology?

P4

So, notification I just said, I think that made me feel a bit stressed. Especially when I just woke up in the morning. Because, lately, you get notification from your email for this and that app. And like, because I've been looking for jobs lately, there were so

many different job seeking websites and application that I downloaded. And it literally fills up the whole notification box, literally, the new one appears every minute. And even though I kind of signed up for it, because I needed it, when it's literally intruding your daily routine in the morning when you're just pick up your phone to see what time it is and there are just tons of notifications, that gets me a bit overwhelmed, I would say, yeah. I think it does make me stressed, maybe in those situations, and I think it's always too much information flooding into me.

Interviewer

So too much information makes you stressed?

P4

Yeah. Sometimes it's better to not know everything. But then, technology usually let's us stay away from the information that you don't really need.

Interviewer

Okay. So as I mentioned, we are building this prototype chatbot. How would you personally feel about talking to a computer? Have you had any experience with that?

P4

Does that also include the one you have on your phone? How do you call it, Siri?

Interviewer

yeah.

P4

I find it really interesting. I don't have any negative feelings towards it. I don't know if you have seen the movie 'Her'?

Interviewer

Yeah.

P4

I really liked that movie. I mean, that made me think a lot about AI, talking to a computer, perceiving AI as a holy individual existence. I don't know. I think that's not too bad as long as you're not abusing it and then I think we're still in the process of kind of improve them more and I personally find it really fun to talk and people do try, can I talk to your phone and see if they actually got what you just said. It kind of gives you the sort of satisfaction. It got what I said and yeah, I find it quite casual and fine.

Interviewer

Okay. Um, so I guess yeah, the next question, have you spoken to a computer before? And under what circumstance? So you spoken to Siri?

P4

Yeah, yeah. Yeah. But just for fun not really for information or for

a serious things.

Interviewer

Have you ever spoken, I don't know with any chatbots? I mean, some websites have chatbots.

P4

Actually, like lately, a lot of companies like especially the booking companies, or like banking companies, like Moonzo or Revolut sort of companies, they do have the service where instead of an actual person you get to go for a live chat. For basic inquiry stages, they give automatic responses for some basic stuff, requesting for refund or when I had problems with building my account then they kind of gave solutions automatically and when it causes to the extent that the automated system couldn't answer them, they kind of directed me to the actual person. And I think a lot of companies do that with phone services as-well.

Interviewer

So you just said, okay, you find helpful, so you would use them or do you also experience that they just don't work and stuff like that? They are too basic?

P4

Yeah, they are too basic and sometimes when I finally get in touch with them when the situation itself is not that simple. It's so complicated already, so that I needed actual help from the service provider, or, you know, the shop that I'm trying to get in touch. But then when the automated system just gives uniformed answers, I will be like, I mean, I need something more, but sometimes they don't really even let you go further and as long as your inquiries, like fits, somehow fits that category, I found, I remember finding it quite annoying in a sense.

Interviewer

But you never ever used a chatbot for therapy or something like that?

P4

No, no.

Interviewer

So in your opinion, what kind of personality should a chatbot have?

P4

Hmm, actually warm and welcoming. Have you used headspace? So like, I haven't properly used it as well. But the the voice or the I don't know, the personality that I get to imagine from the voice, that's commonly used in headspace, It's not like one of those typical, like, stereotypical AI voice or steorotypical computer, chatbots voices where you go like, that's not how people actually speak. But when you actually kind of have that, I don't know, pinch of warm, relaxed, kind of edited in the way they speak or the way they respond. It would be really great.

Interviewer

And would that be the same, if it was a written chatbot?

P4

Yeah. Yeah, warm and friendly. Yeah exactly.

Interviewer

So also, ideally, if it worked well, it should also respond empathetically, according to your feelings.

P4

Yes.

Interviewer

And that was for the general purpose. So if the chatbot was specifically for therapy, would you add anything else? Should it be the same or more professional or?

P4

I think it definitely have to have some, like database about specific intervention for certain symptoms or conditions. Especially when it's about anxiety, depression or mood disorder, I think there will be a optimised way of replying or responding to what the service user just said. So that one, definitely, I think, have to be based on professional sort of interventions or therapies. Rather than just giving like baseline, emotional support. Even in terms of replying in the line of emotional support, they will be therapeutic or evidence based or in a more empowering way that's proven by the literature and empirical things rather than just giving random like emotional support comments.

Interviewer

So, you might not have had a stroke, but how would you in general get information about strokes. Would you go online, go to a GP, go to other stroke survivors?

P5

You mean like if I was in the moment or in the future?

Interviewer

Let's say, firstly, if you just want to have some information about it, maybe you'll have family members who had a stroke, and you want to have more information about it.

P5

So I actually know someone who had a stroke, a family member, but he actually wrote a book about having a stroke. So I'll ask him, but that's probably just like, if I didn't know him, I would probably just go to a GP. I probably wouldn't Google it. I might Google it if I was really nervous, but I don't want to fall into a trap of WebMD where you think everything is a stroke?

Interviewer

Oh yeah so that's why you wouldn't Google it.

P5

yeah, I probably just call my GP and ask directly. Yeah, I think it's important to get the right information with things like that. Yeah.

Interviewer

Yes, okay. Okay, let's say you had a stroke or brain injury, it might be hard to imagine right now, but then afterwards, who would you get in contact with to get more information?

P5

After I had the stroke?

Interviewer

Yeah.

P5

A GP definitely.

Interviewer

Okay and how would you get in touch with people who could help you? So you kind of already mentioned, that you have a family member, but how else would you get in touch with people to get more information about this topic. Would you write them? Would you phone? Would you write them a letter? Would you write an email? Would you go in person to get in contact with them?

P5

I probably send them a message to say, hey, I have some questions about strokes. And I know you've had experience with them. Do you

want to meet up and talk about it, because I feel like that's something I'd rather like hear from him face to face rather than like having to like type something out. So probably message him to set a date and then like you know buy him a drink or something. But yeah, I think probably like in person rather than, you know, typing it all out and explaining it that way.

Interviewer

And then to the second scenario, if you had a stroke or brain injury and afterwards you need information. Would you also go to the GP in person?

P5

Yeah, I think especially if like, that would change my medical history, right. So I definitely want to let them know.

Interviewer

So our chatbot is for people with minor strokes with anxieties so I like to hear a bit more about if you ever felt anxiety?

P5

Yes, definitely.

Interviewer

And if you have, do you have any strategies, what you can do in that moments? Change your thinking style or something like that?

P5

Yeah, I usually try to talk to myself and not out loud, but in my brain and try to tell myself that It's okay that it's not a big deal and kind of being kind to myself rather than negative or, you know, getting frustrated with the fact that I'm having that emotion. I try to kind of accept the emotion. Kind of like, indulge it a little bit like to say I'm not like pushing it away and it gets bigger. But then usually do something about it. But then, I guess like, the other thing I do without realising it usually just like procrastinate on it. So like, my natural instinct is to procrastinate when I get anxious. Yeah. But which usually leads to me being like, it's okay. You don't have to worry about it right now and then you procrastinate. So, um, but right so like all that in terms of like strategies for make it better I usually like I try to talk to a friend or like call my parents or go for a walk or usually, I try to watch a show or something to get my mind off things. Those are like a quick fix I can do. And I found that like, drinking a cup of tea is also really helpful just like calm like physically calm down. Like sometimes when you callm your body down physically, like your mind can kind of follow. So that, I think, those will be my strategy specifically, I don't like you know, like eat or something like that. I usually try to regulate myself in some way.

Interviewer

Yeah. Do you ever do some relaxation exercises?

P5

Yeah, I am, do a little bit of yoga. So if I would be feeling anxious or like, you know, tight, do a little bit of that. I really like to walk, so I usually walk outside with like music or something. And I put on relaxing music to like, if I'm dealing with like a crazy deadline and then just sort of calm myself down. You know, I'll make a cup of chamomile tea and put on some like relaxing music. Sometimes I'll put an air diffuser on or something. I found that helps quite a bit.

Interviewer

Yeah. And do you ever try to analyse the situation? Why?

P5

Yeah all the time. What is this, I want to make it better. Yeah, a lot.

Interviewer

Okay, thank you. Um, so you mentioned that you have a smartphone. Can you tell me when you bought the smartphone and can you tell me what make and model it is?

P5

Oh my god, I couldn't tell you, I usually I'm so bad at technology that I usually just aske my parents because my parents are engineers. My sister's an engineer, so I usually, I'm like, I need a new phone. Because the last one broke. What should I get, can't you just get it for me. I'll pay you back. So it's a Sony. Um, I don't really use iPhones or any of that stuff. It's a Sony Xperia. I want to say it's like an AIX or something only because I have to look for this phone case. I don't really, I wouldn't know otherwise. But I think I must have gotten this at least two years ago. Yeah, I think atleast, unlike the screen is cracked and everything. Just because it's like a pretty good phone.

Interviewer

It just happened two months ago with mine.

P5

Really?

Interviewer

But mine is very cheap.

P5

I mean, this is the first time that happened with mine. I've never had a phone that had like the screen break before so I was like kind of shocked. I was like what happened, so yeah, so dumb.

Interviewer

Can you tell me what you like about your phone or dislike?

P5

Um, I think I like that it is, I mean, I don't know. I don't really

like, I don't love technology, like I am like okay, it's useful so I take it. I mean, what I like about it is that I can listen to music on the go. And I like that I can stay in contact with my friends. But I think, I like I'm really addicted to it. So I kind of, I wouldn't say I like it, so much as I'm like, oh my god, I need it or anything. Well, I guess what I like about it is I like a phone that's lightweight. I probably wouldn't. I think this is probably like the ideal phone for me because it's like, not too big. Not too little. But honestly, like, I think for me, the only requirements are that it's like, lightweight, not heavy, has a good camera and it has like a lot of memory for like phone photos and stuff. Like, that's literally it, I could not care less about, like, you know, facial recognition or anything. I just like, I actually think that's super creepy. So it doesn't have that it's even better. So I'm not the kind of person that's like always looking for the next new phone. I want one that isn't like embarrassing, obviously. But at the same time, I just know it's not really a thing I care about.

Interviewer  
Okay.

P5  
One more thing, I guess the only thing that would be important to me is that it looks pretty.

Interviewer  
Oh Okay.

P5  
It's like, aesthetically pleasing. I would I want a phone that's like, pleasing. That's probably the most important thing actually now I think about it. Everything else kind of goes with all the other phones I've ever had.

Interviewer  
Why is it so important for you?

P5  
I think because I, again, like I don't really have a lot of technology around me I have like a laptop and a phone. And like, I think I have an air diffuser I guess then like that's it. So the few things I have they're so expensive already that I want to make sure they're like as pretty as possible. I think that's probably why it doesn't have to, like match my outfit or anything, I just want to, like, when I look at it, I want to feel like you know, kind of aesthetically fulfilled.

Interviewer  
Yeah. Any more things you dislike maybe? I mean you said no face recognition. Do you have some issues with privacy?

P5  
Yeah, huge, I mean, I haven't noticed that so much with my phone as much as others but you know, like talking about something with your

friend and then your phone giving you an ad for it like a minute later, I find extremely unsettling. I don't really like how certain apps are designed to like be addictive. They're specifically designed to keep you on that I find that like super manipulative and creepy. I, what else, I think I don't feel like my hand is getting misformed, you know from scrolling and stuff. I feel like it's giving me bad posture because I'm always like hunched over looking at it. But I would say I would prefer, I think this is like the better type of product, like I wouldn't want to get a chip in my brain, I think that's super fucking weird like, or like the google glasses like I don't want anything literally obstructing me.

Interviewer

In Sweden they have something like that. They have this chip and then you can use it as your key, as your credit card, as a social security card. Yeah, they put it underneath the skin.

P5

They're already doing that? That's fucked up. They can like, I mean, I don't mean to, like turn into like, like, you know, a conspiracy theorist, but like, they can track you with that. Why would you do that, you could at least, I can throw this away somewhere. Yeah, stuff like that. And the other thing I don't like I think is you know, like, I heard this story I think on NPR or somewhere where like, location devices, how they like track where humans go for like ad purposes and stuff like that and how, like, Google had traced, I think you can access it somehow. Google had traced this woman's walk like, for like, weeks, and she just like didn't know, you know, it's like, why would you even think about that? I think that's well, I think that's unethical, first of all, like you shouldn't do that. But also, I think that some of that information is even worse. Like, I understand it's a free service, but like, there's a difference between a free service and something like a free service is just like a map, okay, like I shouldn't have to give you all of my, my literal life in change for a fucking map. I'll just buy a map if that's the option. So I think all of that combined with the fact that like everybody has a phone now it's kind of like if you don't interact with it, it kind of feels like you're kind of out of the loop or out of society and in so many ways like kind of out of a job if you work in marketing or something just increasingly becoming like a huge field. You don't have social media we don't have like an Instagram people feel like they don't know who you are so they don't really like hire you for jobs at least for like the kind of jobs I go for. They're more like, you know, artistic jobs or something. I mean, like a social media presence is super important. Stupid, like just asked me for a portfolio if you want that. So this idea that your life is kind of for sale, I think is being like pushed out. I don't know if like the phone itself is the problem or like, it's more the companies behind these apps that are doing it. But I think having it so close to you at all times being so portable, and the fact that like it is an object that can be traced, is like hugely problematic, and I don't think it's like, I think a lot of people realise that I don't think like people are like, oh, like, I just don't know. Everyone's like, I don't think anyone's like, uh, thank

god they pinged me to let me know that the shoes are on sale. Like the first thing people think are like, eww, why did you know that I wanted that? So I feel like sometimes AI ignores the fact that humans are like a bit mistrustful.

Interviewer

I guess a lot of things are about money. So.

P5

Yeah. Huge. Hugely.

Interviewer

Do you have any favourite apps?

P5

Um, I like, let me think, I'm going through it. I like Goodreads a lot, because if I'm in a bookstore and I want to buy a book and I can't remember which book I wanted to read, I will usually find it there. I quite like Hopper. It's an app that tells you, well you basically say like, I want to travel to Madrid and you put the dates in and it alerts you when there's like a cheap flight that's going there. Yeah, it's pretty. It's pretty cool.

Interviewer

That sounds cool!

P5

Yeah, so that was that's really helpful.

Interviewer

Did you say hopper with two p's?

P5

Yeah, it's like it's this one here. And another one I really like is Libby, which is a library app. So I think it's mostly in the US or it might be in the UK. But essentially, if you have a library card, and you sign on to the app with it, it allows you to borrow ebooks and audio books. So I use that a lot for like listening to audiobooks and things like that. And I really like, I mean, I like Spotify, because it has access to like, all of the music. I'm trying to think if there's anything else.

Interviewer

Do you maybe have any health related apps?

P5

Oh I used to have a period tracking app called Clue. But then I think I forgot to update it. And it was kind of kept asking me weird questions, like, it would ping me and be like, anything to tell me and I'd be like, okay, bye. So that was the one, but I don't, yeah, not really a lot of health apps.

Interviewer

What about mindfulness, food intaking, exercise?

P5

I have a mindfulness app that I keep forgetting to use. It's called Feeling good. And it's through the University.

Interviewer

Oh, yeah, I know that.

P5

Yeah. So that one's one. I would probably have like that meditation up. What's that one called? The really cute one with like, the shapes. I don't know, like a meditation, but like you have to pay for it. So I don't have it, but it's called, like mindful or something like that. So I think probably anything that I could listen to, would probably be more helpful, because I want to avoid screen time as much as I can especially before and that's when I would be like, trying to calm down.

Interviewer

Okay, cool. Okay, you also mentioned that you have a computer. What do you mainly use it for?

P5

Um, so I'm studying creative writing. So I use Word like all the time. I mainly use it to type. The other thing is probably Netflix. So watch, like entertainment, watching things. And then just like browsing the internet. I think that would probably be for like everything, everything from like, keeping in touch with the world, like intense sense of like Facebook and like seeing the news and things like that. And then like online shopping or researching things I think are cool. So a lot of like, I guess, weird research or stuff like that.

Interviewer

So you don't only use it for work you also use it for pleasure.

P5

Yeah, yeah.

Interviewer

When did you get it?

P5

My computer. I actually got a couple months ago, I got it, um. When did my parents come to visit? I think I got it in May. So it is a pretty new one.

Interviewer

Yeah. What make and model is it?

P5

It's a Yoga.

Interviewer

Oh it's the yoga, It's Lenovo?

P5

Probably Yeah. It's pretty good. Yes, Lenovo, Yoga 730-13IKB. Oh, sorry. Yeah, model name is. Do you need the model name?

Interviewer

No.

P5

Okay, cool. That's the kind of yoga it is. It's a Windows.

Interviewer

Yeah. How long have you used computers in total for?

P5

Um, probably since I was 11. I think.

Interviewer

So 16 year?

P5

Yeah.

Interviewer

Did you buy it back then or your parents?

P5

No. It was my parents computer. It wasn't my own.

Interviewer

So you just used it.

P5

Yeah, it was like a family desktop. Yeah.

Interviewer

Okay, so what about on your computer? Do you ever access any health related websites?

P5

Um not really.

Interviewer

Nothing doc related or?

P5

No, I just, yeah, I don't know. I'm super waste with my health. That's probably why.

Interviewer

Thank you. Okay, so when was the last time you thought that technology was helpful?

P5

Um, oh, probably this morning, because I signed up for that master class website. It's kind of the service that, well, it's like an Education website or something. And they do like online classes. But like, the cool thing about it is that the instructors are like really famous people. So there's a class with like, Margaret Atwood, who's like one of my favourite writers. There's a class with Neil Gaiman like a lot of just, like a class with like an astronaut, so they teach you everything, they teach you like space exploration, how to write like a script, cooking things like that.

Interviewer

Is it through the university?

P5

No no it's like a it's like a private website. It's really cool actually, I mean, you have to pay for the subscriptions, it's kind of like a Netflix for like online classes but It's like really amazing, because it gives you access to someone who you would have like, never met in like your entire life, but it seems like they're talking to you. So I think today I was watching like one of Margaret Atwoods classes, she's a writer, and she wrote The Handmaid's Tale. And I was just sitting there going, like I'm just like so amazed that she like I could hear from her and literally, I mean, they're all pre recorded.

Interviewer

So do you feel like, technology makes it possible that you maybe get access or get closer to something you might not have ever experienced before?

P5

Yeah, I think access is like the main benefit is given. A lot of disadvantaged people or people with no money, like me. So that was that was really helpful in that case, especially because I'm writing my dissertation. And whenever I feel stuck, I kind of like turn on one of those classes. And it's helpful to have that kind of look.

Interviewer

Is that also why you said, that you strongly agree that it's important to be able to access the internet anytime. Is it maybe the same idea that you just have the possibilities to get knowledge of like or what is the idea behind that?

P5

Yeah, I mean, I think um, well, I'm from the US and one of huge news storey that was happening at like when Trump first got elected, was that they were going to replace the head of the financial bureau or something. Our financial Consumer Bureau with this guy who used to work for like, a lot of internet companies, so like, I don't know, like Comcast or Verizon and places like that. So and his first, like his first like order when he, like got into office, was to get rid of like net neutrality, which is in the US is just the idea that like your internet provider can't slow down your network if you ever

access like a site that they don't like. So, you know, they do this a lot and like, I assume in like China, or somewhere you know, we're like the network provider has like a huge power over what you can access, then you can't, which is hugely profit, like it's problematic in so many ways. But mostly it kind of it can slow down access to the internet in certain areas, maybe disadvantage or others, which is like completely unfair because you're still paying the same amount. But you're still not getting like the best service. So to me, that was just like a huge reminder that like the internet is a huge equaliser in the sense that you can really educate yourself as long as you're like you know, careful about where you like get your information from, make sure it's a good source. Um but you are able to go and find that information on your own, kind of like a library. So that's what I liked the best about it. And I think that's really important because I mean, I think a lot of the opportunities or like ideas I have for projects, I wouldn't have been able to fully bring to light without the information that I find online. Because, I mean, also like I'm just like a pretty nervous person. So I would never like contact an expert like right away, I probably try to do like a little digging for us and then contact an expert, but except for like, on health, and like whatever. You work for me. But like if I was writing a book or something, right, I wouldn't necessarily go to like, I was writing a book about like, I don't know, a doctor. I wouldn't necessarily feel comfortable tracking down adopter and asking them questions right away. I probably try to like do a little research on my own first and then kind of check off everything with them. And I couldn't do that without the internet. I couldn't write that well without the internet. Yeah.

Interviewer

Um, has there also been situations where the technology has made you calmer or less stressed or less anxious?

P5

I think when I'm watching a show or something. I think um, I've had, yeah, I've had like, moments where I.. Well I read a lot of online magazines as well. Not necessarily like the new york times but like New York magazine or something that helps a lot like reading like long articles, like in the Atlantic or something. Feels like kind of making sense of the world, but that can be helpful.

Interviewer

Yeah. And do you have some things like when you can listen to music or use related apps, meditation that makes you calm?

P5

I think music is probably the most one.

Interviewer

So on the other side, have you ever felt frustrated with your technology or when using technology?

P5

I guess when the internet doesn't work. Yeah, then I get very frustrated. The other part is I mean, as I said, like targeted ads. I hate ads. I just hate them. Everything about them. I hate them. So if I can avoid it, I will let me do that.

Interviewer

Do you remember any other situation where you felt frustrated? You said like, when the internet does not work, is that the same thing when the software has some problems or stuff like that? Is it always when there are just disfunctions that are not working proper as it should?

P5

I think, yeah, like dysfunctions. Slowing down of things, but that usually has to do with the internet, because the software is usually kind of all right. Yeah. It's just like the internet connection, that's the most frustrating thing. I guess one is also, when there is no access to things I want to watch, like if you're on Netflix and there's like a certain show that's available on the US but it's not available in the UK, like stuff like that, but not necessarily like I think that would probably be the only frustrating thing but or I guess if I like forgot to save something.

Interviewer

And has there been moments where technology has made you stressed or anxious?

P5

Um yeah, I think when I am working on something, I procrastinate a lot with the internet, like a lot. And then I realised I'm procrastinating with that and get more and more anxious because I feel like I can't stop looking at it. So that's definitely like, I think the main one where I get anxious as well, I get stuck in this loop of like, just reading the internet and get really distracted and not be able to like, focus on what I'm supposed to do and time passes so quickly. Yeah. And so in that way, I kind of feels a little bit like an addiction. Yeah. And I it's frustrating that like, I've tried to block some sites and stuff, if I like really need to focus but it frustrates me that it's up to me to block myself rather than these things. Yeah, maybe not being so addicted.

Interviewer

There are apps that help you.

P5

Yeah, that's what that's what I like to do. I can't believe that like there's like an app for that, too. So yeah, that's what I'm usually doing.

Interviewer

But on the same time you also mentioned that you feel that you get more done because of technology.

P5

Yeah, I mean, I get more done, but my mental status is not the best. I guess I would also depend on like, what I consider to be like, things to get done worthwhile, you know, cuz like, I could get a lot done in the sense that I could like, online shop abundance and like, I saw a lot of things. I learned a lot of things, but in terms of like, producing things, like not so much.

Interviewer

Yeah, yeah. And you also said that new technology makes life more complicated. Can you elaborate on that?

P5

I think it makes people overly dependent on technology, to the point where they can't really take care of themselves. I don't think that's a good thing. You know, like, of course, I think it depends, like if you're elderly. Yeah, that's tough, you know, if you like, need a little robot vacuum to clean you because he can bend over like that stuff perfectly fine. But, you know, I think sometimes I feel like humans do everything in their power to like, avoid working hard, you know. But it's like, you know, cleaning or, I don't know, gardening or something. But it's really these tiny little things that are good for you, you know, it's like a little exercise. It's like time away from the screen. It's kind of like time your brain has to really think. So. If you just outsource that to a machine. Like, yeah, you have more time for whatever you want to do, but like you don't have anything to do because everything's kind of taken care of for you. So I feel like it's kind of a slippery slope. So in that way, I think that makes life complicated in the sense that, like, You, yourself, might not feel as fulfilled because there's just like some natural processes your body needs to enable in order to like, be a human person. Like when I write I'm like, constantly, like hunched over my computer, there's days, I just like, don't leave my room. And then I'm like, Why do I feel so weird? Why aren't I tired? It's because I didn't live today, you know? So I feel like, as technology increases, that gets more and more taken away, and I don't, you know, which would be fine for some people. Like if some people want to, like, you know, have everything automated, that's fine. But I think the way the market works is that eventually every product becomes like that. Like, I'm really worried that like the facial recognition thing is going to become a thing for all phones, and it's going to be a thing of like, boy, you there have a phone with this thing or you don't, and I just don't think that's a fair thing to ask of a person, so that's what I mean by making it more complicated, it just like kind of takes away your freedom in ways that feel quite helpless. You know, this is kind of like more black mirror esque but you know it's hard not to think about it.

Interviewer

Yes, I mean that's the reason why they make the show.

P5

Yeah exactly.

Interviewer

Okay, so how would you feel about talking to computers?

P5

I don't like it. I don't like it. I know you do AI, but I don't like it.

Interviewer

It's fine, it's fine, it's better that you are honest. What about chatting to a computer?

P5

I don't like it either, I don't like anything like that.

Interviewer

Have you ever tried it before?

P5

I mean, people have talked to like Siri in front of me and stuff like that and they are always like, Haha like she's said something funny. I'm like, I'm just like, okay, it just doesn't interest me. I don't know why, I prefer to talk to a person. Oh, I mean, the times that I have tried it, is when I have to call a line and it goes like state your name and you're like, you know, did you mean Margaret? You're like, no. kind of dumb thing.

Interviewer

So, okay, so you just used it a bit for companies. Have you noticed that some companies also have some chat functions online? Have you tried that?

P5

I've never tried that. No, no.

Interviewer

Okay, I know you don't like talking to a computer or chatbot. But in your opinion, what personality should a chatbot, like a good chatbot have?

P5

Um, I think probably, like a human personality, I guess, helpful if the most obvious one, but I just I feel like I wouldn't even want a friendly one. You know, I just, I wouldn't even. I think I'm a weird case because I just like I really just hate the idea of robots. But like, if they were like, Oh, that's sad. Like, let me see what I can do. I'd be like, Oh, just tell me, I think literally, the most robotic possible, would be good. If I was like, Hey, I have this problem, they just be like, here's the answer. That's it. No need for more communication. I think just like the clear, like, maybe the person should just be like a really efficient assistant. You know, you just be like, hey, I need like, the figures, here they are, like, that's it. This kind of sort of interaction. Because I also don't want to like be, how are you today? I'm fine. Like, how do I respond to this? I'd rather just like get my answer and go, yeah.

Interviewer

Okay. But let's say, how would you want the personality to be if it was a chatbot, specifically for therapy? Because, I guess that's a bit of a different case.

P5

That's right. Um, I probably would have the kind of, I think, I guess, like, polite and kind, you know, that's the thing with therapy, you sort of need something from the other person. I got some sort of approval. Yeah. Something saying like, oh, that's hard. Like, I'm sorry to hear that or whatever. You know.

Interviewer

So a bit empathetic and according to the mode as well?

P5

Yeah, it's just tough because every person needs a different energy right? I would say empathetic, well, um sorry. Um maybe like, now where I think about it, I quite like, online questionnaires. When they ask you like specific questions and then you can say like, yes, no yes, no whatever and then they give you like an answer. Exactly. I feel like that's something that a human doesn't really do. I mean, I guess that little questionnaire, but I'm, like, a lot of my friends really like like those online quizzes where you're like, Okay, choose this, this is this, you know, and then in the end, they have that explanation of like, Well, it seems like you have, I don't know, this thing. I think that's what the feel good app does, actually. Yeah, you open it up and they're like, depressed Are you do you want to find out you're like, Okay, so in that way, it's kind of nice because like, I mean, obviously with like some empathetic like, oh okay, well what about this, but then you kind of like, feel the satisfaction of getting some kind of like diagnosis or like some kind of explanation for it. I think that might that might be quite nice. I know kind of like a quick checkup other than like, a long thing to talk about. Yeah, yeah.

Interviewer

Cool thank you. So now we ready to try out the prototype chatbot.

Interviewer

Now we're gonna get a bit more into depth with the questions and because we're building a chatbot for people with minor strokes, we would like to know, how would you get information about strokes? Would you go online, would you go to other stroke survivors, GP?

P6

I would go online.

Interviewer

How would you get in touch with people who could help you? And there's two scenarios? So in general, if you want more information, so would you phone them, write them a letter or maybe email them?

P6

Email, always. Yeah.

Interviewer

And the second scenario is, if you had a stroke, how would you get in contact afterwards with people who could further help you?

P6

Probably through the doctor.

Interviewer

In the first question, about how would you get information about strokes, would you also go online if you actually had a stroke?

P6

yeah, yeah.

Interviewer

Okay. And then, we would like to know, if you ever felt anxiety? And if yes, do you have any strategies for managing anxieties?

P6

I have. Yes, I have had patch of anxiety. Um, meditation. I hate to say it, but drink.

Interviewer

Do you ever try to analyse, why were you getting anxieties?

P6

Oh yeah, I analyse myself, all the time, every day. So that's just kind of, yeah.

Interviewer

And do you try to change the way you think in those moments? Or afterwards?

P6

yes, but if you're suffering from anxiety, that's not really possible to just change it. Because if you could change it, then you wouldn't be suffering anxiety.

Interviewer

Exactly, but is that something you think about afterwards that maybe this situation was actually not that bad or?

P6

The situation I'm thinking about was when when the girls were born, I went through a patch of about, I had basically about a three month panic attack. Really very, very, very strong anxiety. And there's nothing I could have done about it, because they were there. So I couldn't have really. I mean, if I was in that situation again, it would be different, because I've already got kids. Yeah. So yeah, I couldn't really have changed anything then. And it wouldn't happen again. Yeah. I imagine if I had a stroke, maybe I would be very, very, very, very anxious. But then you know, you have a second stroke and you're like, well, I know where I am now.

Interviewer

And do you do meditation to relax? Is that maybe the goal of it or?

P6

yes. Yeah. But not regularly.

Interviewer

But at least you do it. That's good. Okay, so you mentioned that you have a smartphone. When did you get your smartphone and what make and model is it?

P6

It's a Samsung GalaxyS6 and I got it 18 months ago. I always get hand me downs.

Interviewer

What?

P6

I get hand me downs.

Interviewer

What's that?

P6

It was a friends phone. When my friend gets a new phone, I get her old.

Interviewer

Oh, ok. Ok.

P6

I'm always about two years behind. Yeah. It works.

Interviewer

Is there anything that you like about it or dislike about is?

P6

I like Samsung's because you can drop them in water. They survive. But apart from that, it's just a smartphone. You know, it's just, they're all the same really, they give you access to the internet and it's that really.

Interviewer

But maybe is there anything you dislike with the functionality, sometimes it doesn't really work when you touch it or everything is fine, it's just a phone.

P6

Just a phone. It's good.

Interviewer

Okay, do you have any favourite apps?

P6

What do I go to most.. Facebook Messenger, Whatsapp, Airbnb, BBC I clear radio and Audible.

Interviewer

Do you use any health related apps?

P6

Oh I've got Samsung health on there, but I kind of drift back and forward. I did have noom. It's a diet app. and I used that religiously for three months. I lost six pounds and now I don't use it.

Interviewer

Um, what about a meditation app? Because you said you did meditation?

P6

Yes, I should download one of them, but I don't have them.

Interviewer

And yeah, exercise app?

P6

Samsung health, it counts your steps?

Interviewer

Ok. Ok. Cool. So you also mentioned that you have a computer? What do you mainly use it for? When did you get it?

P6

That particular computer I got two years ago? And it's used almost entirely for typing reports.

Interviewer

So for work?

P6  
Yeah.

Interviewer  
What would you say you use your phone mostly for?

P6  
Facebook messenger.

Interviewer  
What is the make and model of your computer? And how long have you used computers for?

P6  
30 years?

Interviewer  
30?

P6  
Yeah. So I go back to my first job. Well, that was in the 90s. Yeah. The first computer I used, I was six years in school and that was 1987. First computer I used and in my first job, there was a computer in my office, but we all had to share it.

Interviewer  
It really changed quite a lot.

P6  
Yeah.

Interviewer  
I remember when I grew up, I think my parents only got a computer in 90, Yeah, 93 or something. And I still remember it and there was just one computer and now and then we were allowed to play a game on it. That was quite exciting.

P6  
Yeah yeah!

Interviewer  
Um, do you ever access any health related websites?

P6  
Oh, yeah.

Interviewer  
Yeah. What kind of website do you access?

P6  
Um, if I have a health issue, I'll look at the NHS website and WebMD is quite good sometimes. But generally, if I have a health issue, there's no specific websites that I'll go to. I'll put in a search and see what websites come up.

Interviewer

Do you often search for symptoms online if you have any health issues?

P6

Not often. I have maybe once or twice.

Interviewer

Okay. When was the last time you felt that technology was helpful?

P6

Yesterday?

Interviewer

Why? In what context?

P6

I was at work. Just um, I'm looking after a couple of projects at work. And it's a question of getting in touch with people quickly. And getting written answers quickly and also planning. I don't know how we would plan projects without technology now.

Interviewer

Is that also why you said, you agree that it is important to be able to find any information whenever you want online or be able to access the internet whenever?

P6

Yeah, but that's not just to do with work. That's, that's a whole life thing. I think we're all, we're all used to having the whole world of information at our fingertips now. You have a question? There's the answer. And I feel lost without that now.

Interviewer

Do you think it's good that we always get the answers immediately?

P6

yeah, yeah, I do. I think people are a lot more educated now. Although, politically, there's a drift away from that now. But but yeah, I think it's, I think it's astonishing, when I was a child, that didn't exist. And if I wanted an answer, well, we had a set of encyclopaedias in the house. But the answer was more often than not, not in the encyclopaedia. So you'd have to go and ask people or you go to the library, but finding a simple answer to a simple question could take weeks. And now, it's there.

Interviewer

Yeah. Um, do you remember any other situation where you thought technology was helpful?

P6

I now think all the time, But I'm trying to pinpoint a situation. Yeah, when I was trying to lose weight at the beginning of the year

and I was using an app that was there all the time, every day, counting calories, counting steps, and putting me in touch with a group of people who were doing the same, but they were in America. And there was one in France, they were all over the world. And we were able to talk to each other. How are you doing? Keep going!

Interviewer

That's nice and then you get like feedback from the others?

P6

Yeah, it was really, really supportive. Yeah. It's like, you know, people do Weight Watchers, but you have to go to the club every week. And that's where you see everybody that's like, Oh, God. I can't deal with that. In the evening go out, go to the thing, I don't want that. But it's like having this group of people with you all the time. Being positive.

Interviewer

That's quite nice and it's quite flexible I guess.

P6

Yeah. I think maybe that's, I mean, apart from sort of organisational and logistical things in which technology is obviously very helpful. I think one of the things I love most about technology is that it puts you in touch with people who are in the same situation, or who think the same. For example, I had a hysterectomy. And, um, for a few months afterwards, because it was unexpected. I was quite devastated that it happened. And I found a website full of other people in the same situation. And they were all talking about it and saying things about it and talk about health issues and psychological issues. And it, that website helped me get over it really quickly. Hold on to technology. Just amazing.

Interviewer

Following on that, is there any situation where technology made you feel calmer, less stressed, or even less anxious?

P6

Actually, I'd say that particular situation. Yeah, it was a real support. But also when the girls were born, and I was going through that kind of permanent panic, attack, tight, constricted feeling, just panic all time. And I was using my phone all the time to keep in touch with people and when you see young mom's walking along the street, and they're pushing a buggy and they got a phone in their hand, and people say what's she doing on a phone? And she should be looking after a child? No, she is calming herself down by keeping in touch with the world. Yeah, yeah. Brilliant.

Interviewer

So could that be anything you did on the phone? Just to distract you for a little bit just to calm yourself down or was it specifically that you talked with other people?

P6

It was specifically keeping in touch with people. Yeah. Yeah. But but also finding information. I mean, if there was any little thing at the time for, why is she throwing up? Why has she got a rash? There is the answer. That's okay. She's just a baby. And I would stop worrying. Yeah.

Interviewer

Um, when was the last time that you felt frustrated with technology?

P6

Yesterday, we have a very important system that we use at work, and it just went down. We didn't have it for like, half an hour. We use it all the time.

Interviewer

Is it in general, I don't know, when the internet doesn't work, when you're doing something or the software doesn't work or something like that?

P6

Yeah. Yeah. That's when technology is frustrating. I mean, I don't know how many times I've said to people, isn't technology great when it works? Yeah. But I do have another frustration about technology. The fact that we are fed information, the we like so politically, that polarises people. That's all down to technology. Because we're no longer just getting a big newspaper where everybody gets the same information. We're all fed the information that we like, exactly. We're in a little comfort zone being pushed further and further away from the people on the other side. Which is, that's entirely down to technology.

Interviewer

Okay, you said that you very much agree that technology makes people waste too much time and technology makes life more complicated. Can you elaborate on that?

P6

Well, I'm currently playing this great game, great game on my phone! And I'm totally addicted to it.

Interviewer

They actually make these kind of games similar addictive as in gambling halls.

P6

Yeah. I know. And I can, the game that I've been playing. I know. I can see how they've made it addictive. Yeah, and yet still. Yeah, yeah. What was the other question?

Interviewer

New technology makes life more complicated?

P6

It does. It does. Because everything happens so fast now. Because

you want answers, you get them. You want to speak to someone, they answer. So everything happens so fast.

Interviewer

It speeds up life a little bit?

P6

Yeah. When we go down to Galilee, and there's no internet, and there's no mobile phone signal, life just feels much more straightforward. Everything callms down. Everything slows down. And it's almost as though the human brain is hardwired to live a lot slower than we do. And when you have the opportunity to do that. And it's just taken away from you. You can't access it. It's kind of like a piece of slot into place. Oh thats better.

Interviewer

Okay, that makes very much sense. I often feel like that.

P6

Yeah, yeah.

Interviewer

Okay, it speeds up your life. But have you also felt that technology makes you stressed? I mean, I guess if it speeds up your life? It maybe makes you..

P6

yeah it does.

Interviewer

But do you have other situations where it makes you anxious? I mean, that might be a bit different.

P6

Well, um, not technology itself. Unless it's a new piece of technology. I never used to feel like this, but I think maybe as I'm getting older, where if I'm handed a new piece of technology, I get a little bit anxious because I've got to learn how to use it. But most of anxieties that I would get from technology is not from the technology itself. But from the information delivered through it.

Interviewer

So when you get a lot of messages?

P6

Yeah, too many messages or just listening to the news, or seeing terrible storeys on Facebook.

Interviewer

Okay. Do you remember any other situations?

P6

No not that I can think off.

Interviewer

Have you ever tried to speak to a computer?

P6

Yes.

Interviewer

Yes. Okay. What situation? And when?

P6

I wanted to try and speed up my typing. So, rather than copy typing, I thought I'll read it. And I have to tell you that the dictation facility within MS Word is not very good. I would go as far as saying shit. So yeah, I tried that for like two minutes. But I've also ended up, you know, hitting a key on my keyboard and switching on the dictation facility within Windows by mistake, and then I just switched this off. Yeah, yeah, I don't find it very good. But then I like typing and I touch type. And I'm used to doing that. It's what you're used to, I guess. Yeah.

Interviewer

Have you ever tried, you know, like, how companies nowadays sometimes have like a chat on their website and sometimes it's automated. Have you ever tried those?

P6

How do you mean?

Interviewer

So it's not a human that's behind the chat. But it's more like automated answers.

P6

I have a couple of times. But I hate that because it purports to be an individual you're talking to. But you can tell whether it's an individual or not. So when it's, when it's clearly not an individual, I'll start asking stupid questions. Because I want to catch it out. And you start getting stupid answers, like talking to a machine.

Interviewer

Have you ever tried talking to Alexa or Siri? Or something like that?

P6

I have. Alexa, a friend in America has got it.

Interviewer

Ah, yeah. How did you find that?

P6

It's fun. Yeah, and I was watching them as a family use it. And we'd be talking about something and think, well, I don't know what you think we might do this, you might do that? Well, I don't know,

what's the weather going to be like and I get my phone out and start looking up the weather. And Dan would just go, 'Alexa, what's the weather like later on'? And she just tells it and I put my phone away then.

Interviewer

Would you ever use it yourself?

P6

I think it's a novelty. But no, no, I wouldn't. I don't know why. I'm just a little bit suspicious of technology that.. I mean, it's not intrusive, but I'm a bit of a luddite when it comes to that.

Interviewer

That's fine. So you don't feel like, you wouldn't really want to talk to a computer?

P6

Um not really, I wouldn't want to talk to a computer, I want to talk to a person. Yeah. Which is crazy. Because you know, every time I type a question into the internet, I'm talking to a computer. Yeah. But yeah, from having an actual conversation with a person.

Interviewer

But let's say you would use a chatbot. What personality would you prefer it to have? Would you want it to be, I don't know, like, friendly? neutral?

P6

Professional, but friendly. Yeah. I would not want it to be informal.

Interviewer

Would you want it to imitate a human personality? Or would you want it to staid clear that is't a computer?

P6

I'd want to know clearly that this is a computer. Not that. Because you can get caught out and feel a bit foolish, if you think it's a person and then realise it's not.

Interviewer

What if it is for therapy? Would you want it to be still professional and friendly?

P6

Yes.

Interviewer

But should it still be clear that it's a computer?

P6

Yes, for the same reason, yeah, I would never want to, I would never want to be thinking, Oh, I'm talking to a person, oh, I've got this

connection to a person and then be disappointed. If you can guarantee that you could be fooled all the time, then great. But that's never the case.

Interviewer

Do you have anything else to add?

P6

I don't think so.

Interviewer

Thank you for answering all these questions.

Interviewer

So we are developing a chatbot for people with minor strokes with anxieties. So we would like to know, how would you get information about strokes? Would you go to a GP or online or?

P7

online.

Interviewer

online. What if you had a stroke? Would you afterwards, if you need any more information, also mostly go online or?

P7

online.

Interviewer

online. How would you get in touch with people who could help you? First, to get more information? Would that be by phone or letter, or if you wanted to get in touch with someone in person or by email?

P7

The only person I think that I would want to get in touch with for more information would be my GP so I would have to call.

Interviewer

Okay. Yeah. And that will also be the case if you had had a stroke and you needed more information?

P7

Yeah, yeah and because a GP doesn't allow text or email

Interviewer

Um. Yeah.

P7

I would probably email if they would allow it, but they don't.

Interviewer

Do you ever feel anxiety?

P7

Ever? Yes.

Interviewer

Yeah. Yeah. And if yes, as you just said, Yes. Do you have any strategies for managing your anxieties?

P7

To turn off social, turn off the computer and social media. Go for a walk. Analyse what's causing me anxiety and work out a strategy to address it.

Interviewer

Do you ever do any relaxation exercises?

P7

Um I do yeah. So I meditate. But I do that as a practice rather than as a strategy.

Interviewer

When you analyse your thoughts do you so sometimes try to changing your thinking styles in that moment or afterwards? Maybe you have a certain thing that wasn't so useful for you, and then you try to change it. Or is that not something you do?

P7

Being a psychotherapist, I'm always analysing and self reflecting. So I think I naturally, I'm naturally self reflective, and seeking healthy habits mentally.

Interviewer

Okay. Thank you. Um, so you mentioned that you have a smartphone. When did you get your smartphone?

P7

I think not this one, but my first one was probably about eight years ago.

Interviewer

And this one?

P7

This one actually was three years ago.

Interviewer

Hmm what make and model is it?

P7

An Apple? I don't know, do you want me to just guess? Are we at six now?

Interviewer

I never had an iPhone so I actually don't know.

P7

It's not a fancy one. But it was the newest regular model three years ago. Trying to find out. Wait a minute. I don't know. I think it's 5C or 6C? I don't really care.

Interviewer

Okay. Did you have an iPhone before aswell?

P7

I did. I've always had iPhones.

Interviewer

Is there anything specific that you like or dislike about your phone?

P7

Um I'd like that it works. I don't have to fight with it. And I think that's why I've continued with iPhones because they work for me, they don't tend to glitch. And I like the, I use the photograph taking elements a lot. And I like the way that it uses its photographs.

Interviewer

Is there anything you dislike? Maybe some functionalities? I don't know the touchfield?

P7

No, it's fine. I'm not really. I just want something to work. I'm not really that invested in it working in a fancy way.

Interviewer

Yeah, Okay. Do you have any favourite apps?

P7

Um I wouldn't say it is a favourite app, but one I use a lot is Facebook. I love hipster matic.

Interviewer

hipster matic? What is that?

P7

Hipster matic. It is a camera app or photograph app. So it can do very stylized photographs. So you take it through there. I'll show you afterwards. It's really good. It's very arty. I use Safari or Chrome to search the internet. What else do I use? Use some of the other ones. Right? Not at, not regularly, Twitter and Instagram and things.

Interviewer

Do you ever use any health related apps?

P7

I use the, the walkie one, that tells me how much I walked.

Interviewer

Yeah. And what about something like mindfulness, food intake or exercise apps?

P7

I have a meditation app on there that I use regularly. Not any kind of mental health or mindfulness apps. And what was the other one? You asked about?

Interviewer

Maybe food intake, exercise tracker?

P7

No. I probably. I've wanted a Fitbit. And I haven't got another one

since then. Yeah. So it's probably my future to get a Fitbit. But I don't have one right now.

Interviewer  
Have you ever used Apple Health?

P7  
I tried to, but I couldn't get it to link up. So I just gave up.

Interviewer  
Um, you also mentioned that you have a computer? What do you mainly use it for?

P7  
Um work.

Interviewer  
So you don't do so much leisure stuff? I don't know, watching movies or anything else?

P7  
No, I don't watch movies on it.

Interviewer  
Um what make and model is it?

P7  
It's a Mac something.

Interviewer  
How long have you used computers for?

P7  
20, no how old am I? About 20 years?

Interviewer  
20 years. How long have you used this one?

P7  
So I have this one for six years. That's why I like the Mac. Just because they seem to not, all the other ones seem to self destruct, these don't.

Interviewer  
You said that you mainly use it for work? But have you ever accessed any health related websites?

P7  
No, no, I might do research on it. Like if I have, I don't know, a health condition or something that I'm worried about. I'll research.

Interviewer  
Yeah. Okay. So you would go on sites like webMD.

P7

Yeah. Yeah. Yeah.

Interviewer

Is that something you do often? Like, if you have any symptoms, then you first Google and then you go to a doctor?

P7

No, I definitely. It's not a good year to ask because I've had some health problems this year. So I've been googling it a lot. But yes, I would tend to go to the internet first before I go to the doctors.

Interviewer

Okay. Yeah. When was the last time you thought that technology was really helpful.

P7

Today.

Interviewer

Today?

P7

Yeah.

Interviewer

In what situation?

P7

I have a health concern. So I was trying to Google it and find out about it. I don't know. You probably don't want to go into too much detail, but I had an operation last year. And I've had some complications. And I've just been told misinformation from doctors.

Interviewer

Oh I had that once as well.

P7

Yes!

Interviewer

Yes, it was really stressful. I mean, I didn't have a surgery, but I had like skin problems.

P7

Yeah.

Interviewer

And I was probably at six different doctors telling me different stuff. And then I googled it.

P7

Yeah, Yeah. So I'm in the same place. So I'm quite cross that I've been told to, so I had a hysterectomy. And I've been told to take

paracetamol and swim. And I've got a mass that is blocking my ureter. So yeah, so it's quite serious.

Interviewer  
Yeah.

P7

And yeah, but I wouldn't have known if I hadn't been able to go online and be like, why does my stomach hurt so bad.

Interviewer

Oh, wow! And then you went to the doctor again with the information?

P7

So I've been to the doctor, over 10 times in the last year with this and the emergency room three times. And finally my last emergency room visit, they did a CT scan, and they're like, Oh, you've got a mass in your stomach. And it's just leftover from the operation. It's nothing scary. But they said it is. That's why your kidney is swollen. But then I was able to come home and be like, okay, well, so what is this? What does this mean? Where's it coming from? What do I need to do? What's going to be the outcome? Yeah, so I didn't find out what was wrong. But before that, I was like, okay, I need a better match. I need to do some yoga. These are the positions that I need to do. This is the swimming that I need to do. This is the pain management that I need to do? So yeah, I definitely rely. I don't know if I trust the internet more than I trust doctors.

Interviewer

Yeah, it's hard to say because I also sometimes think that when you go online, there's so many, it's sometimes a bit difficult with forums.

P7

To be honest I don't go to forums, because..

Interviewer

I stopped doing that as well, after I had my skin problems.

P7

Yeah, well, I've worked in physical health. And there are certain mental health conditions that gravitate towards certain physical health conditions. Yeah. And people are, tend to be very drawn by like, why don't people believe me and all of these things, so I don't want to, so I tend to use the NHS websites, the WebMD, but also go and look at the physical journal, the journals physical health online, because I have the access.

Interviewer

So you go directly on PubMed and stuff like that?

P7

Oh, yeah. Yeah. Yeah.

Interviewer

I think that's also the best source.

P7

Yeah. Oh and I don't go to forums. Sometimes they pop out. Oh, that sounds similar. But usually, there's lots of drama involved with forums.

Interviewer

Yeah, yeah. Um, I guess. Okay. The next question is, has that been a situation where technology made you feel calmer, less stressed, or less anxious?

P7

Yes, but through information.

Interviewer

Mmm. So through the access of information?

P7

Through the access of information but actually also my meditation app, I do feel better after doing that. Now, in the States, I don't know if this is going to skew your data. But in the states where it costs so much money to visit the doctors I have used like online doctors.

Interviewer

Yeah. Is that real doctors or is that?

P7

Apparently so. I mean, it can. I mean, it's apparently a verified sign, but I don't know. Yes, it is real doctors. But they're reluctant to commit to anything online. So they just like, that sounds like it could be something, it sounds like, they don't really give you..

Interviewer

But they can't give a diagnosis because they are not allowed to?

P7

You know, they just say, you know, you pay your \$20 and they say, that sounds like it means further investigation. Please go to your doctor. So really, it's a waste of money.

Interviewer

Okay, okay. Is that a big thing in the US?

P7

Yeah, because healthcare costs are enormous in the States. Yeah. So if you can pay \$20. Or you can pay \$100, you're going to go and do the \$20. And actually emergency room access, if you don't have insurance, you're looking at the thousands to go.

Interviewer

But do you have insurance in the UK?

P7

No, I'm a UK resident.

Interviewer

Oh, so you are from the US?

P7

I am from the US. But my mom's English. And I'm married to a british person and I've lived here for many years.

Interviewer

Okay. Okay. Yeah. Um, you said that, in the question, if it's important to be able to find any information whenever you want online, that you strongly agree? Can you elaborate on that? I mean, maybe it's already what you said that you can Google..

P7

Um, I find that no matter what it is, usually that information is now available online from finding out if there's a gluten free pizza place in the south side of Edinburgh to weather, student experience, documents are available online, I can apply to my job, to a good hotel on the other side of the world. So everything and I think it's something that I really appreciate.

Interviewer

Yeah. On the other side, when was the last time you felt frustrated with technology?

P7

Probably yesterday

Interviewer

Why?

P7

I was trying to access a document on my iPad that I knew existed, I just don't know where it existed. But I know it's in my framework. But I don't know what that means. Like, I know I've done it here. But where it goes from here, I don't know if it was on the web, or on a iCloud or just on my Mac. I don't know where it was.

Interviewer

Yeah. So would you maybe say that it always frustrates when it doesn't work as you want it to work? Or when there is an internet problem?

P7

No, it's more, sometimes I don't understand my software in data structures like I should. Or maybe it's not working, as I feel It should.

Interviewer

Can you think of any other situation that made you frustrated?

P7

No, no that's it really.

Interviewer

Um, has there been situations where technology made you feel more stressed or anxious?

P7

Yes. Having constant access to work, communications is not beneficial to my levels of anxiety.

Interviewer

There's a bit like an overload sometimes?

P7

Yeah. And and work is quite stressful and it's continuous access to that. I'm going on annually leave in a week and a half, so I'm gonna have to find a way of blocking it from my phone.

Interviewer

I think that's quite healthy. Go somewhere maybe without internet access.

P7

Yes, I know. Yes. I have friends in the States, and they have remote cabins. And the reason it is so successful is because they'd have no WiFi.

Interviewer

Hmm, yeah. I think a lot of people need a break.

P7

Oh, no doubt. It makes your life easier. But it also can link you to things that make you anxious as well.

Interviewer

So is that maybe also why you agreed to that technology makes life more complicated? Or did you think about something else at that time?

P7

Life is complicated. life's complicated. There's so many factors. So technology makes it easier, but also you get more information. So that plethora of information also might make you anxious? So everything is multi layered, isn't it?

Interviewer

Yeah.

P7

And so it's not the technology that makes me anxious. But if something is wrong with my work, then that would make me anxious,

but knowing that I can access via technology would.. Technology is the avenue, but it's not the tool that makes me personally anxious.

Interviewer

Okay. Okay. Um, so, I don't know if you ever tried that. But how would you feel about talking to a computer? With either voice or chatting, but to a computer?

P7

I would feel great about it.

Interviewer

You would not?

P7

I would.

Interviewer

Okay. yeah. Why?

P7

So I'm thinking that you're thinking of anxiety related things. And so I've just with my work, access to computer and online counselling is something that comes up a lot. And a lot of people are very private. And they don't have to travel an hour or half an hour across town. So a place where you could be in your own privacy, and discuss your fears and your anxieties. I personally don't know if I would like a bot, but I might like a person. Yeah. So yeah. So yes, I really support that. I think that it's the way to go in, I think it's shows a lot of promise for the future. And yeah, I don't know about the bot part. I think that it got some issues that will come out in the wash. But actually, I think it's the way that things are headed.

Interviewer

Would you think it's nicer to talk or write? Or do you think that really depends on the person?

P7

If it's a bot? I think I would rather write. If it's a person, no, I would actually still. I don't mind writing or talking. I do think that the social way of working is actually working more towards typing.

Interviewer

Why?

P7

I think it's less personal. I think there's a certain level of hard work that comes with talking, there's judgement and inflexions, and a bit more of a personal communication, which comes with its own benefits. And I think in a setting where you can show empathy via voice, it can be more beneficial. But I think the next generation are moving more towards that depersonalization.

Interviewer

Hmm. Do you think that's good?

P7

I don't know if my opinion really matters?

Interviewer

It's just curiosity.

P7

I mean, I don't know, I don't think it's good. I think, it is going to be a phenomenal mental health crisis. Because what makes us human, it's, you need your stones polish, you need to have difficult conversations, and you need to interact with people, you need to look at people in the eye. And, but that's hard. The more people avoid that, the easier it is, but actually, it leads to more mental health problems, and it leads to more isolation.

Interviewer

So because I was wondering, you said that you disagree, that new technology makes people more isolated.

P7

It's both. Because you are more connected. I'm connected with all of my friends in the States by Facebook, and I can see what's going on with their families. But it also has the ability to isolate people. So I don't, I actually think the older generation, it has the ability to connect, because they've already got their structures, but I think the younger generation will become more isolated as a result of social media.

Interviewer

Mmm Yeah. Have you ever tried to speak with a computer before?

P7

I've spoken. I haven't spoken to a computer. I've spoken via computer to other people. So it was Skype or, but if it were to be like an online site where I'm looking for a good mortgage rate I would use typing.

Interviewer

What about, a lot of companies nowadays have online, these chatbots that give you automatic response.

P7

I have.

Interviewer

How was the experience with that?

P7

I find that I'm looking to see if it's a real person or not. And if I get empathy, and then I realised it's a bot, I'm quite cross.

Because it's in genuine, isn't it? Oh, I am so sorry to hear that you are struggling with this public? Skrew you! haha. Your a computer, but if it was a person, then I do feel like, okay, they understand me. So depending on clever, you make your computer, just because you call him Angela, doesn't mean..

Interviewer

Have you ever tried to speak with Alexa or Siri?

P7

Yes.

Interviewer

How was that experience?

P7

Siri and I have a complicated relationship. Siri can be quite sassy. Don't like it. I don't want attitude from my computer software. And she doesn't understand me sometimes when I'm trying to speak. But actually, if I'm driving, and I don't have Bluetooth, or it doesn't work, I appreciate that I can say, you know, the Hey s word, and ask her to make a phone call and she'll do it. I won't it now she'll join the conversation.

Interviewer

So, in your opinion, what kind of personality should a chatbot have, for you to talk with it?

P7

So if it's a bot and not a person, I want it quite a bland personality. I don't want..

Interviewer

bland?

P7

Yes. Should I elaborate?

Interviewer

Yeah.

P7

So I don't want any sassiness or attitude. I just want the facts.

Interviewer

What if it was specifically for therapy? Would it have the same personality?

P7

Ohh you choose the wrong person to ask about a chatbot in therapy. So, I think that. Yeah, I probably will skew your data. But I don't think, I think chatting to a chatbot for therapy would lead to the same empty experience that you get from social media. And actually it leads to. What's when you have a foundation you end away

underneath the foundation, it would compromise the foundations that are human connection.

Interviewer

Yeah. But what if it was just as an additional thing?

P7

Yeah

Interviewer

Not for the main therapy, but for like information, or to do CBT exercises?

P7

Great. Yeah for that, absolutely.

Interviewer

What kind of personality would you want then? Like a funny or more serious or professional or?

P7

So for me, if I'm just getting information, I would like a lighter and fun that might be open to interpretation. I don't want to be too enthusiastic for me, because that will make me go in a different direction. So if she were to say, hey, P7, I know you just had a stroke, but let's work out. I'd be like screw you Angela? So I what would I want? I would want to be open to my responses. So I would want, P7 do you think it would be, you would want to work out today? And if so, would you like to do some light exercise some some words? So if I'm directing Angela, then I feel like she's more listening to me. Really analysing my relationship with Angela here.

So light, not too enthusiastic and not sarcastic either.

Interviewer

Okay, cool. Perfect. So that was the interview and I would now like you to try out the chatbot.

Interviewer

So we are developing a chatbot for people with minor strokes and therefore we would like to know, how would you in general get information about strokes? Would you go to other stroke survivors? Would you go to your GP, online clinicians?

P8

I think I'll do online first. Then, I do have some background of stroke, just because some of my family has like stroke. So yeah. So mostly online I would say.

Interviewer

Mostly online. Okay. Let's say, in a situation if you had a stroke. Would you still first go online or only afterwards when you need more information about it? Would you go straight to your GP?

P8

GP, GP, yeah.

Interviewer

Okay. How would you get in touch with people who could help you, if you didn't go online? Would you phone them, write them an email, or meet up personal?

P8

Phone them.

Interviewer

And would that be the same if you either just want more information or?

P8

Mhm Yeah.

Interviewer

So this chatbot is specifically for stroke patients suffering from anxiety. So we would like to know if you ever felt any anxiety?

P8

Yes.

Interviewer

Do you have any strategies for managing your anxieties?

P8

Breathing.

Interviewer

Breathing?

P8

Yeah. Really just breathing, telling yourself to breathe. Go for a walk. Talk to someone, so someone can calm you down. Do something mundane, drink water?

Interviewer

Do you do any relaxation exercises?

P8

Yeah, I do meditation. Or I just go to the gym.

Interviewer

And do you ever try to change the way you think in that moment?

Maybe not in the moment, but afterwards, like, try to analyse the situation and then maybe, okay, and then next time do this and that instead?

P8

Yes. yes. But at the same time, I don't think it's always possible when you're in that state of mind when you go out of it then yes, but when you're back in it, it is not always easy, but yes, I do try to change my mind. Yeah. Like doing CBT to myself.

Interviewer

Ohh okay, perfect. So you mentioned that you have a smartphone. When did you get the smartphone and what make and model is it?

P8

Um you mean the latest one I got? I got it in June last year. So June 2018 and thats 8+ iPhone.

Interviewer

iPhone?

P8

Yeah.

Interviewer

Which model did you have before?

P8

That's 6S, so that's before. 2015 I think.

Interviewer

Yeah. How long have you in generally used phones for?

P8

Like per day?

Interviewer

No, no, I mean, like, when did you get your first smartphone?

P8

Yes. 20.. I'd say 2012. Yeah.

Interviewer

So now to the recent one. Is there anything specifically that you like or dislike about it?

P8

I don't like Google search engine. I don't like cookies. I don't like anything that tracks me and knows what I'm doing. What I like about it, it's convenient. The fact that you have Apple Pay and all that sort of thing is quite nice and handy.

Interviewer

Is there anything maybe about the functionality that you dislike or like?

P8

Um, I don't think iPhones are most duable. But not really, because they're really good, I think. I think smartphone have become very good at like, in terms of like functionality.

Interviewer

Do you have any favourite apps?

P8

Um, I think just the general, instagram, messenger, IMessage, WhatsApp. Just like the general. Unlike news, Twitter and stuff.

Interviewer

Do you ever use any health related apps?

P8

Yeah, the Iphone health and fitness

Interviewer

What do you like about it?

P8

They track you in walking, like how much do you, like, your walking distance per day. And your steps and the steepness and your calorie counts. I think yeah. But normally I do focus on like the distance, how much I walk. So I don't know.

Interviewer

Why do you specifically like that one compared to other ones?

P8

Just because then I know that I have done exercise. And also, it's quite nice when you see like, on one day when you're at home, you've only walked like a kilometer and the next day you walk like 15 kilometers.

Interviewer

Do you use maybe any meditation apps or food intake apps or?

P8

I used to use meditation app just to like, but they kind of track your record. And you kind of do five minutes and they kind of remind you every day to sit down and do five minutes and they have like the

audios on.

Interviewer  
Did you like that they have reminders?

P8  
Um yeah, I quite like it.

Interviewer  
So you also mentioned that you have a computer.

P8  
Yeah.

Interviewer  
What do you mainly use it for?

P8  
For uni work, for Netflix and to search information. You can easily find loads of like health related or exercise related information. It can be quite like handy. Yeah, yeah, I do on my smartphone as well.

Interviewer  
Yeah. Okay, so you're saying that you do sometimes visit health-related websites?

P8  
Yes, that's right.

Interviewer  
What kind of websites do you visit?

P8  
The NHS. Yeah, the NHS. So like, there's a lot of like National Association of like the American ones, to kind of just like look at nutrients, health related stuff and what you can do to improve this, like, maybe if I have like a low calcium intake, what do I do about it? Or like if I go, because I go to the gym quite regularly. So I do like look into what exercise they have and watch it through youtube or just read about it. Yeah.

Interviewer  
It's quite convenient, yeah. Do you also visit mindfulness websites? Or some other?

P8  
No, not recently, but when I did, I kind of just read more about like what different types of meditation there are.

Interviewer  
So you use it a lot to get information?

P8

Information, yes. The rest I kind of just improvise with lot of things. Yeah. Because I don't like focus or fixating on like a thing.

Interviewer

Yeah, cool. Um, back to your computer. When did you get?

P8

2013

Interviewer

2013? And what make and model is it?

P8

It's a makker. A MacBook air. Yeah.

Interviewer

How long have you used computers for?

P8

Since I was like, wait, since I was 13. So that would be.. 9 years.

Interviewer

Did you always use a Mac?

P8

No before that, I had like Windows computers. So they're like Sony and HP.

Interviewer

Do you prefer a Mac?

P8

Yes.

Interviewer

Why?

P8

Because I'm used to it. Yeah and Apple is just terrible. Because they then kind of brainwash you into their product. And because, yeah, I kind of, I think it's just like much more handy and it's light, well it's not really lighter now, there are so many computers out there. Like, yeah, I just kind of got used to it. Yeah.

Interviewer

So when was the last time that you felt that technology was helpful for you?

P8

Um an hour ago.

Interviewer

Okay, in what context?

P8

Because I checked how long does it take for me to get here and then like you check how long does bus, cuz like buses are really good with Google Maps now. They very accurate. Yeah.

Interviewer

Do you remember any other situation where you thought it was helpful?

P8

Um, for information, when you really need to contact people.

Interviewer

For information, so again, you also find it quite helpful to find information for health related factors?

P8

Yeah, yeah.

Interviewer

That's also a factor, okay. But is that also why you said, you feel it's important, that you strongly agree, that you feel it is important to be able to find any information whenever you want to?

P8

Yeah, yeah.

Interviewer

Is there anything else you thought about at that question?

P8

I think it's really, it's really good, when you need information straight away, when they have internet or yeah. But also Google maps is really good. So if you want to do a 36 minutes walk, your like, do I take the bus or walk, you kind of go all that about a kilometer, like 1.6 kilometres, so I walk it. Yeah. So that's like another way of, oh I'm doing exercise today. Yeah, yeah.

Interviewer

So maybe also to keep you healthy?

P8

Yeah.

Interviewer

And I want you to elaborate on that you said you neither agree or disagree in, I think it's important to keep up with the latest trends in technology.

P8

Just because a lot of people are so bogged down with the latest technology, and I don't, personally, I don't think we have to be like, going for the trend, just because it's just like how business

works. And they kind of just like they're just having a new product. So they want everyone to try it out in order. But, I don't think people should be like so fixated on what's new. Because that's like, gratifying. That's just really, that's just really rapid gratification. You don't yeah, it just goes against the most organic way of humanity and the mind yeah.

Interviewer

Okay, yeah. Has there ever been a situation where technology made you feel calmer, less stressed, less anxious?

P8

yes, say if I need music, or if I need something to distract myself, but normally I switch my phone off actually. It really depends, there are times when I kind of like took a break from all the social media, took a break from my phone. And I felt calmer after, because I was more like connecting with the world, rather than being so fixated or like the things that are coming in me. But at the same time, sometimes I do need the music. I can't put it on flight mode, so I don't get anything.

Interviewer

Yeah. Okay. But then, I guess those health apps made you calmer or did they not?

P8

No, I wouldn't like think about them.

Interviewer

Okay. When was the last time you were frustrated with technology?

P8

Um, yesterday

Interviewer

In what contexts?

P8

Oh, you mean, technology in general? I was just having conversations with people about 5g and hallway. And It just really frustrated me in so so many ways

Interviewer

Why?

P8

The sustainability. The energy and how because, yes, it's good and it's very fast. But at the same time, there's a lot of like spying on people. Yeah.

Interviewer

And now specifically, when you use the technology, do you remember any situation that made you frustrated?

P8

Because it tracks everything.

Interviewer

But it's never been, I don't know when something didn't work? Then you don't get..

P8

No I'll just switch it off and then turn it back on. But yeah, it doesn't. Because most of time it's really when you kind of want to watch a video, but they kind of they know what you're doing. So a year ago I was in Turkey. On my computer, one day, there was an advertising saying that, there's like the airline and like all the flights to Turkey and I was like, this so weird. I don't like that. Yeah.

Interviewer

Has there been a situation where technology made you feel stressed or anxious?

P8

Yeah, when there's so much information.

Interviewer

So information?

P8

Yeah. And there's so much information coming in. And there are certain things that you don't want to like, be seeing at the moment. Yeah. It doesn't always, it's a really convenient thing and I do like it in so many ways. But same time, mentally, I would say it doesn't always help a person, especially if they're like very, if they're quite anxious about things. They, they overthink a lot, which most people do. Yeah.

Interviewer

So you said that you feel that I get more done because of technology. Why do you think is that?

P8

Because it's like, I just have to go on Google and just search things, read about it. And if I don't understand that thing, there's, I don't really have to like think about it. I just have to Google again to figure that out. But I know back in the days, which is when I was younger, when technology is not the like the mainstream thing, just yet. It's not like a daily thing, like a millisecond thing. We can't just go on a dictionary, figure that out. Or like, we don't use the calculator, but we can't do mental math. That kind of thing, so I do think it does. In a way, I know it can make a person, I do neither agree or disagree, because then you get more information and knowledge, in that it makes you learn better, about the same time don't know about if I was put in a situation, if I was put on an island, what do I do? A lot of people do not know, a lot of millennials don't. A lot of millennials go,

what do I do now? And I'm like, use your brain. But most of time, they're just so, they're just so fixated on that.

Interviewer

Is that also why you said that, you both disagree and agree that life can get more complicated with the technology.

P8

It's more convenient, but at the same time I think mentally it's not always the best thing to seek for when it comes to, because there's so much social media and stuff. And there's so much of like social construct, that's like pairing in front of you.

Interviewer

Do you also think that it can be stressful sometimes when you have like all these social contacts, and you see what they do, and you're comparing yourself?

P8

I have spoken to a lot of people as well about, how, because they see what's in social media. That's why they're like, oh, I'm not good about this. I'm not good enough in this. All my friends are not invited me to this, this and that. So that's a mentally thing. You're like, oh, this is happening, but I'm not involved. That kind of conversation, I had it with a couple of people, which strikes me, because personally I'm not and I don't really care if somebody like once you invite me or not. I'm not very, like, fussed about, but I know with a lot of people, they are. Yeah.

Interviewer

Okay, so, back to the whole chatbot thing. How would you feel about talking to computers?

P8

I don't know. I rarely speak to Siri. I've done it a couple of times. But I find it, maybe because setting an alarm by myself, is not too difficult. Or I'm not, like, I'm not stressed to a point that I need someone to set an alarm. So that's why I have not used the function? Yeah. But I don't know.

Interviewer

You don't know. Okay. You know how some websites nowadays or companies have chats online...

P8

Omg yes, they annoy me. They annoy me a bit, just because, it's very, it's not. When it comes to a robot, or when it comes to an AI, they, it's like the emotion the connection. You just don't feel that. Or like, when you, when there's something a little bit more, like, frustrated or awkward. The response is a bit. It's not as like, natural. I just like sometimes when I'm talking on the phone, even when there's an AI, I'm just like, Can I now get a person? It's just like, I like it. And I know how because like, because of population because of employment and all that. That's why it's a

good thing. But at the same time, personally, I prefer, I think some people as well. Do you prefer talking to a person? Because then we get things quicker? I think? Yeah.

Interviewer

Okay, so yeah, you basically already told me that you spoken to a computer before and the circumstance. Are there any other circumstance where you spoken to a computer that you remember?

P8

It's just normally when you kind of like ring Amazon or when your ring like apple and they kind of get someone to like talk to you for a good 5 minutes. Yeah.

Interviewer

Okay. Yeah. In your opinion, if it was a good chatbot, what kind of personality would you want to have?

P8

A flexible personality

Interviewer

What do you mean by that?

P8

So they're flexible in terms of, they're flexible in terms of what I'm saying. Or what I'm expressing. So rather than kind of following what they have to say, because sometimes I feel like they have like, they kind, their system are mised into a way where they kind of speak, whatever they have to say, if this goes this direction, so sometimes it doesn't give the best information. Yeah. It doesn't say what I want to ask. Yeah.

Interviewer

What if the chatbot was specifically for therapy? What kind of personality, would that be the same or would add anything?

P8

I still quite like it flexible. I think in terms of the tone of the voice is very important.

Interviewer

What kind of tone of the voice would you say, I mean, a friendly, professional health care or?

P8

friendly.

Interviewer

Would you want it to reply adequately to your mood or should it just be...?

P8

I think I would like it to reply to my mood, yeah. Cuz then you kind

of feel the connection, it's the same as the tone I think. Yeah.

Interviewer

Would you be comfortable with that it would kind of feel your mood and?

P8

yeah, yeah.

Interviewer

Okay, perfect. I would now like you to try out the chatbot.

Interviewer

Ok. Now we will have a bit more open questions and as I told you, we are developing a chatbot for people with minor strokes and we would like to know, how would you get information about strokes? Would you go online, would you go to a GP or go to other stroke survivors?

P9

Um, I would definitely go online, just because it's more accessible. I wouldn't go to a GP.

Interviewer

Why?

P9

Because the GP, I feel like the GP is there for your own personal medical issues and it's also quite difficult to access the GP as well, like, in terms of appointments and so on. So then my next stop would be, maybe finding like an online community of individuals with stroke and so on. Yeah.

Interviewer

Let's say, in case you had a stroke or traumatic brain injury, obviously not in the moment, because then you would call the ambulance, but afterwards, to get more information, would that still be the same for you? You would first go online, and then?

P9

No, if I was personally affected by it, then I would be speaking to doctors first. And then online and then through other communities I guess.

Interviewer

So, how would you get in touch with people who could help you? Do you phone them, write them an email, always go in person first?

P9

Um it would depend on how I find them, I guess. But, I feel like through social media, you can find groups that people are part of. And so I guess, emailing or through social media would be the best form of, like, communication. And then once you developed the report, then I guess you can start phoning, but I would say the phone call, would be the last. Yeah.

Interviewer

Okay, good. So we're building this chatbot to treat stroke patients with their anxieties. Have you ever felt anxiety?

P9

Yes.

Interviewer

Do you have any strategies on how to manage your anxiety?

P9

Um, I guess time management for me is quite good. If I get too anxious, I exercise, I try not to talk about it as much, because I find that makes me more anxious as well. So it's more of like just not talking about it. And then time management, exercise, also this is also why I like to break down tasks a lot. Because when it's all in one go, it becomes overwhelming. And then it's easier to get through and then it relieves your anxiety once you've ticked a few lists off.

Interviewer

Have you ever tried relaxation exercises?

P9

Yes, meditation, and yoga. But I did that before, when I was in undergrad uni. Yeah.

Interviewer

Why did you stop?

P9

I didn't feel like I needed it anymore. Yeah.

Interviewer

And do you ever try to analyse what kind of situations make you anxious, and then try to maybe change the way you think about the situation. Or is that not really something you do?

P9

Yeah no, I do, I do often do that. So shall I give you an example?

Interviewer

Yeah.

P9

So when I have a lot of deadlines, or I'm like stuck in a project and I'm finding it hard to move forward, then I tend to, what was the question again?

Interviewer

If you analyse and change the way you think about it?

P9

Oh yes, right. So if it's something that I really can't help in the moment, then I try to, like, just be like, well, there's nothing I can do. So, let me move on to this, work on another project, if I have another project going on, or just call it a self-care day. Yeah.

Interviewer

So you mentioned that you have a smartphone. When did you get your smartphone and can you tell me what make and model it is?

P9

When I first got a smartphone?

Interviewer

Let's start with the recent one.

P9

So this smartphone is a Samsung Galaxy S7 and I got it, I would say, two and a half years ago. Yeah.

Interviewer

And the one before?

P9

the one before, like, I don't really remember. But they're all pretty much the same. I've been using phones for two and a half to three years and then changing them.

Interviewer

When was the first time you got a phone or smartphone?

P9

The first time I got a smartphone, I think was when I was, so a smartphone, something that can access the internet. Um, I would say I was 11. Yeah, when I started secondary school

Interviewer

Is there anything specifically that you like about it or dislike about your phone?

P9

I like that there are a lot of apps, keeps you connected. I don't like that, because we use it so much, it has like physical side effects, like hurting your eyes, you know, disrupting your sleep if you look at it before going to bed. And also, I don't like, because, it's good in relieving anxiety, because it keeps you connected, you can check your emails, you can sort out your problems if you have any arising. So it makes you more like, instantly responsive. But at the same time, I don't like that you have your work or problems that can follow you around 24/7, so you can have an email notification at 11pm. And it's difficult not to look at the email at 11pm, whereas if you didn't have your phone, you wouldn't know that until the next day. So yeah, I think it kind of blurs, like, especially for work. it blurs the lines in when work time is over. Yeah.

Interviewer

Anything else you really like or dislike?

P9

Cameras, good cameras. Yeah. Good cameras, good video quality. Especially with the more recent, like newer phones. You don't need to buy like a fancy camera that costs over 1000 pounds, because a phone can kind of live up to that almost. Nothing else really.

Interviewer

Do you have any favourite apps?

P9

Favourite apps? Um, I obviously like Instagram. I like messenger more so than Facebook. And I really like Twitter, just because it keeps me more up to date with news and stuff. Those are the three apps that I use the most and Spotify for music. Yeah.

Interviewer

Do you use any health related apps?

P9

No.

Interviewer

no, not even mindfulness app or a food tracker?

P9

No

Interviewer

What about Samsung health?

P9

No I have disabled that.

Interviewer

Why?

P9

Because it was using too much of my battery. But it's pretty cool. It's nice to like, see your steps and so on. I used to use it and then because my battery was like being drained, I don't use it anymore. But if they found a solution to that, I would use it. Just saying.

Interviewer

Um so you also mentioned that you have a computer, what do you mainly use it for and when did you get it?

P9

So the computer I got in September 2018. And I mainly use it for work. So you know, accessing work data, writing up things in word. I also use Netflix a lot and other apps to I guess access TV shows. Those would be the. Yeah.

Interviewer

What is the make and model of your computer?

P9

It's a hp elite book 850G

Interviewer

How long have you in generally used computers for?

P9

Since like before secondary school. In primary school, I would use computers as well. But I guess in primary school, it was for like for paint and stuff. And then in secondary school, it was more. Yeah, YouTube. What we had like messenger, what was it, MSN Messenger and stuff like that. Yeah.

Interviewer

When was primary school?

P9

So I would say 10, yeah, from age 10, maybe even before that.

Interviewer

Do you ever access any health related websites?

P9

Yeah, like MD.

Interviewer

WebMD?

P9

WebMD yeah.

Interviewer

And NHS?

P9

Yeah. Those are more for, you know, when when you're feeling ill or whatever. Let's say those are more immediate, like checking symptoms and stuff. But yeah.

Interviewer

What about, again, mindfulness, food intake or exercise websites?

P9

Um No. I mean like, if I work out on my own, which is like, a couple times a month, then maybe I would look up like an exercise routine. But because I go to classes, I don't really need to do that. Yeah.

Interviewer

Okay, so when was the last time that you felt that technology was helpful?

P9

Not today, yesterday.

Interviewer

In what context?

So just through emails and stuff, being able to sort out a problem, that would have been difficult to resolve if I didn't have access, like, if I wasn't able to access three different people at the same

time. Um also, you sometimes don't know who people are, and people can refer you, they can be like, you can check out this person's email. Yeah.

Did you ever feel it was helpful when you had any health problems? That the technology was helpful? In what situations?

P9

Um, A, I think it makes you, let's say you're ill and you've got problem. And you've, you have time before your next appointment with your GP, you can kind of start googling what illness you have beforehand.

Interviewer

So you use it as a pre checkup?

P9

Pre checkup? Yeah. And then also, like, if you're feeling slightly ill, and I don't know, like nauseous then you Google things like, what to do when nauseous, what to eat when nauseous and so on. And, and also, I use it after I am diagnosed with anything, so like, for tips and stuff, that would help.

Interviewer

Is that something you do often, like, maybe Google your symptoms?

P9

Um whenever I'm feeling unwell, yeah.

Interviewer

Has there been a situation where technology made you feel calmer, less stressed, or less anxious?

P9

I think that happens more, like, rarely. And the opposite effect is seen more often. Yeah.

Interviewer

How's the opposite effect seen more often?

P9

Because once you Google stuff, and then it could be like, it could be a malignant growth, I don't know, for example, or like you, you could die.

Interviewer

Like these forums are quite scary sometimes.

P9

Or in the middle of a night, when you're like, really, really unwell and you Google stuff, and they are like, seek immediate help from the doctor or so on and it's just a lot of like, yeah, stress. I think, yeah, it hasn't really made me feel calmer. Not in the recent times, anyway.

Interviewer

Yeah. Okay. When you used to do meditation, did you do it through your phone? Or did you go to places to do meditation?

P9

Um I would do both. Yeah.

Interviewer

Did it make you less calmer when you used it through your phone?

P9

Oh no, that was probably the time I can remember now. Yeah. I do meditation before going to bed. So yeah

Interviewer

Do you still do it?

P9

No.

Interviewer

Okay, do you remember, because, now you already told me a situation where you felt more stressed or anxious. Do you have any other situation where technology made you feel more stressed or anxious?

P9

Um, just thinking, I find it, I find being able to, so someone being able to message you, seeing when you're online, seeing when you're last online is quite stressful. And if you don't want to talk to that person, you can't access the app without having them know that you're online and like deliberately ignoring their messages. So I find that, like, aspect of it just always, where you can't pick and choose who to engage with, anymore, like you can choose to not respond, but they will know that you're choosing not to respond, for example. Yeah.

Interviewer

I was wondering, you said that you very much agree that I get anxious when I don't have my phone on me. Can you elaborate on that?

P9

So I find receiving, for example, having my phone with me and then receiving emails, makes me anxious. If it's like, I can't do anything in the moment. And it's like 9pm at night or 11pm at night, but not having my phone and not seeing those emails is more anxiety inducing. Um, and I think it's because it makes me feel like less in control of what's going on or less aware of what I have to deal with the next day. So I guess, when I do have my phone, I'm like, Okay, the first thing I will do, I can start planning my day beforehand, because I know like what I need to address. So it just helps me like plan more than anything.

Interviewer

I guess that's also why you very much agree that it's important to be able to have access to the internet all the time?

P9  
yes.

Interviewer  
Okay. When was the last time that you felt frustrated with technology?

P9  
Wednesday.

Interviewer  
Wednesday. That's concrete. What happened?

P9  
So I was just using a coding programme R to deal with my work and my data. And I couldn't figure out what I needed to do. I couldn't because I'm still learning like this new coding stuff, and so on and so I just found that very frustrating and it's also frustrating when you have to like Google a million things. It's just not easy or straightforward.

Interviewer  
Yeah. Do you in general get frustrated when technology doesn't work?

P9  
Yeah.

Interviewer  
Okay. Can you also elaborate on why you think that you get more done because of technology?

P9  
Of course. So I think it reduces your wait time. So let's say you have a problem, you need someone to solve that problem out, you would, if you didn't have technology, you would probably or had like limited technology, you would call them and you'd say this is a problem that I have, can we, you know, schedule to meet up and then you have to make sure that you've got all the information that you need in that moment. And whereas with technology, it's all instant, if you forget something, you can attach something, that one person has access to different forms of information, just through an email. Um, and it is pretty much instant. So you can sort out a problem that you have with one person in half a day, rather than a week, for example. Yeah. And especially for urgent stuff, I think, especially like, I don't know, if you work in a more interactive, collaborative, like field, but it's really important that you, you have the information that you need, and sometimes you don't have all the information you need to like, proceed to the next step. So I guess that's important. Yeah.

Interviewer

Yeah and when you said that technology provides a lot of solutions for problems, do you think that's for all kinds of areas, also for health?

P9

I think for health, technology can be more of a solution is a problem. So there's, like so many examples of how technology has helped healthcare move forward. And the first, and the most simple example is just the access of one doctor to all of your records and it's able to see your past medical history in one go, rather than having to speak to previous doctors or doctors, you know, being old and dying, and then having a new doctor and so on. And, so I feel like yeah, technology has helped healthcare. And that's, that was just a simple example. Even in healthcare research, we use technology. And that's how we develop interventions and so on.

Interviewer

So, have you ever tried to talk to a computer before?

P9

Yes.

Interviewer

In what context?

P9

It was, I don't remember what the chatbot was called. But I was very, very young and it was just for fun. Like, we would talk to a chatbot, and it became like a viral thing when we found out about it. And we were, we were really young, and it was just more of a fun thing to do. I've never used it in like a professional setting. Oh, well, actually. I guess no, no, those aren't chatbots. Okay.

Interviewer

What about like more recently? Have you tried to use it, I don't know, a lot of companies that have chatbots online or stuff like that, or even Alexa or Siri?

P9

Yeah. Um, are there, for example, when you go online on a website, and they have like a little chat box, there, is that a chatbot that is speaking to you or?

Interviewer

It depends, sometimes, it often nowadays is a chatbot, so it's automated.

Yeah

But sometimes you would get connected with some people.

P9

Yeah, I think in most cases, I've always been connected to actual individuals sorting out my issues. So I haven't there's no example

of me using a chatbot before, like, in the more recent times,

Interviewer

How do you feel about talking to a computer? The idea about it?

P9

I think it's, I'm still on a grey area with that. But I think it's very obvious that you're speaking to a chatbot. And I think that might be because it's what you like, you know, that you're speaking to a chatbot and it is not person and so on. I feel like, potentially, if you carried on speaking, and you got a bit more deeper, it would, there would be a limit, or block when you have a chatbot, then in comparison to if you had a person that you were speaking to. Or just the development of like, the conversation, I think would be more limited, if you're speaking to a chatbot, then if you're speaking with a person

Interviewer

Um okay, do you have anything else to add?

P9

Nope.

Interviewer

Okay, so, in your opinion, what kind of personality should chatbot have?

P9

The I would chat with? Maybe a chatbot with a sense of humour, that would be funny. And open, more cultured, I guess has a little bit of information on like, different cultures, or at least should know what you're talking about if you mentioned something more culturally relevant. Yeah. Free of like, bias, I guess is also important. So objective. Yeah.

Interviewer

Let's say this chatbot was specifically for therapy, would it still have the same personality, as you just mentioned, like with humor, open for cultures, free of bias. Would you add more or would it be a bit different.

P9

I think for therapy situations, maybe less humour. And although I guess that would be different from person to person, I would still go by the rest. What would I add anything else? Maybe a bit more empathetic or sympathetic. Yeah.

Interviewer

Yeah. So acting towards the mood you are in?

P9

Yes. Yeah.

Interviewer

Anything else?

P9

Nope.

Interviewer

Okay, great. That was the first part. I'd like you to try out the chatbot now.

Interviewer

So as we're building a chatbot, specifically for stroke patients, we would like to know, how would you get information about strokes? Would you go to your GP or other stroke survivors, carers, clinicians? Or would you just look online?

P10

Go to my GP? I suppose yeah after the emergency room. Yeah.

Interviewer

What about if you didn't have a stroke, but just in general want information about strokes? Maybe a family member had that?

P10

Online, I think.

Interviewer

How would you get in touch with people who could help you? So let's say you want to go in person? Would you phone them, send them an email, letter or always in person?

P10

It would be between phone and email. Depends on whether their website seems like it's run by tech savvy people or people who would rather have a phone call

Interviewer

Would that be the same if you, let's say, either you had a stroke or brain injury, or you just wanted more information about it? Would that be the same thing?

P10

Yeah, if I'd had a stroke, then phone call would definitely be my preference.

Interviewer

So our chatbot is specifically also targeting anxiety. And I would like to know if you ever felt anxiety?

P10

I've had a few panic attacks. Yeah.

Interviewer

Do you have any strategies for managing your anxiety?

P10

I've tried to institute better sleeping schedules and regular exercise. And I've been to a counsellor before. So I've used therapy. I do a little more reluctantly, but I have a personal journal that I write in. So yeah, that's probably the extent of it

Interviewer

Have you ever tried relaxation exercises?

P10

Yeah, I meditate for spiritual reasons. So that's in there already.

Interviewer

And do you ever, maybe not in the situation, but afterwards, try to analyse what the reason was for the anxiety, and then try to maybe change your thinking styles or stuff like that?

P10

So my anxiety is, the few times I've had panic attacks, it's secondary to my depression. So I suffer from major depressive disorder. So I think I actually get caught in those thoughts, just like anxiety tends to do. And I don't think I've ever successfully analysed my own thoughts about it. Although, conversations with my therapist when I was seeing a therapist back home, certainly helped.

Interviewer

Okay thank you.

P10

Ofcourse.

Interviewer

Okay, so you mentioned that you have a smartphone. When did you get your smartphone and what make and model is it?

P10

So this one is an iPhone 7 and I got it in March of 2018.

Interviewer

Is there anything specifically that you like or dislike about it?

P10

So I also have an iPad and a Mac. So it's just..

Interviewer

Or maybe before, when did you get you iPad?

P10

it's a iPad 3, is that the newest one? Yeah, the latest iPad Air. And my MacBook I've had for eight years. So the MacBook before I ever had an iPhone.

Interviewer

Okay, so you were saying what you specifically like about those?

P10

Yeah, so I like the user interface with Mac. I like having, because my dad's a programmer, and I have a little bit of an interest in web design. I like the fact that I have access to the Terminal directly unlike on Windows. And I like the apps that are available in the Mac ecosystem

Interviewer

Is there anything you dislike about it?

P10

Because it's so proprietary once you get

Interviewer

What does proprietary mean?

P10

So Apple owns everything.

Interviewer

Ah okay, yes.

P10

And and they're not interoperable technologies. Once you get stuck with the Mac here, you're there for life for or you have to rebuild your entire digital ecosystem.

Interviewer

Is there anything about the functionality or anything else you don't like?

P10

Not really, I would say

Interviewer

You are quite happy with the iPad, iPhone and Mac?

P10

Yeah. Precisely.

Interviewer

Okay, cool. Do you have any favourite apps?

P10

Yeah, so I have 'Things' which is a like a to do, manager, task manager app. I have a app on my phone called 'NextDraft'? No, no 'Drafts'. Sorry, is what it's called. And it lets me make notes. And I can kind of send them off to email or use them in other applications very easily. So the text is easy to manipulate. 'CameraPlus' on my phone again. It allows me to kind of control the functions of the camera more precisely. And on my desktop, I have a feed reader, RSS feed reader called 'Reader'. And I have Scrivener for writing. Scrivener. It's like an alternative to using Word when you're working on long word processing

Interviewer

Oh interesting!

P10

It was specifically developed with creative writing in mind.

Interviewer

Do you ever use any health related apps?

P10

I used to use a sleep tracker for a while. Haven't done that in sometime. And I had a Fitbit, but I passed it on to my sister.

Interviewer

What about like, because you said you do meditating. Do you maybe ever use a mindfulness or meditation app? Or exercise tracker?

P10

Oh yes, so I do have Strava and I have Nike Plus running to track my runs.

Interviewer

Have you ever used Apple Health?

P10

I have not.

Interviewer

Why?

P10

In general, I just delete the apps that come with the phone.

Interviewer

Okay. And the apps that you mentioned, are they the same on your iPad? Or do you have different apps that are your favourites on your iPad?

P10

On the iPad, I have GoodNotes, which allows me to take notes with my Apple Pencil, which is a very nice thing. 'Liquid text', which allows me to import PDFs and documents and manipulate them again with my pencil to take notes. Yeah, and then Scrivener I also use on my iPad.

Interviewer

But you don't use any health related apps on your iPad?

P10

No

Interviewer

What's the main purpose, you kind of already like said it a little, but what is the main purpose of your computer?

P10

Yeah, from my computer, it's there. Specifically, the iPad doesn't have any access to the terminal. So any development, web development stuff that I want to do is on the computer. And for right now, the Adobe Creative Suite isn't really available on the iPad. So whenever I want to use Photoshop, or anything else, so heavy, heavy duty

applications.

Interviewer

Wait, you already said that. You used your MacBook for 8 years, right?

P10

That's right.

Interviewer

How long have you in general used computers?

P10

So 18 years I would say.

Interviewer

Have you always used Mac?

P10

No, my dad's a absolute Mac hater. Yeah, yeah, Windows. So my first Windows version was 95.

Interviewer

So why did you like Mac so much? I guess for web development?

P10

Yeah, I mean, that's kind of what got me into it. I listened to some podcasts from people. And obviously, you pick it up from the community.

Interviewer

Do you ever visit any health related websites on your computer? Maybe NHS or?

P10

Yes, sometimes? Yeah. I'm trying to think. Yeah, usually when it's trying to get exact definitions or symptoms for diseases, I'll go to something like the NHS for their official information.

Interviewer

When you feel ill, do you normally google it first? Or do you mostly always first go to the doctor?

P10

No I would go to the doctor. Yeah.

Interviewer

What about websites about getting meditation, mindfulness, food intake?

P10

food intake, certainly. Because I've had acid reflux.

Interviewer

What is that?

P10

It's basically your sphincter at the top of your stomach doesn't tighten anymore. So when you eat sometimes as it's digesting and the stomach churning, the acid comes back up into your throat.

Interviewer

Oh, okay, that's bad

P10

And to control that you need to like, control your diet.

Interviewer

Okay, okay, so you can control it as long as you keep your diet? That's good.

P10

Yeah, sometimes when it gets really bad, there's medication. But yeah, in general diet is the main thing. And losing weight as well. Yeah, so I've certainly consulted

Interviewer

So you say consultant? So you maybe use the web to try to get more information about the topic?

P10

Exactly. Yeah. I mean, I have doctors in my family. And, yeah, I mean, I trust doctors. So I would, I would rather have an informed opinion. I take that information and try to talk to the doctor.

Interviewer

Okay. So when was the last time you felt that technology was helpful?

P10

in health or just in general?

Interviewer

in general.

P10

Useful.. You know, I certainly use it all the time. Yeah, I suppose technology's been really useful. Pretty much every day that I've been here to keep in touch with my family back home. So that's a big one. That would have been pretty hard to think of 10 years ago. Yeah. Other than that, I mostly browse the web, and do word processing. So it's not like technologies done very much for me lately.

Interviewer

What about then specifically for health? Did you find it very helpful to have the technology?

P10

Sometimes, yes, sometimes no. So this is why, you know, when you asked the question about whether technologies going to solve all problems. Having access to the informations is important, of course, but one of the things I've talked to my doctor relatives, is the fact that having that information without the context of medical training, can just scare you. It can make you a bit, act a bit like a hypochondriac. And I think that's also dangerous. So I think there, there does need to be better ways of presenting the information than WebMD or health-line or whatever.

Interviewer

I guess forums can also be quite scary?

P10

Oh, God. Yes. That's the worst.

Interviewer

Did you have anything else in mind when you said neither agree nor disagree at that question?

P10

Sure, I mean, this is something a bit more political, but it's to do with the latest elections. And kind of, I've always been wary of making accounts on the internet, having my information out there to be used. So I'm very concerned about data protection, which I don't think people take seriously enough, especially when you look at the way it's reported. Except for when there's really staunch, you know, privacy reporting. Usually people think it's already lost, like, we can't do anything about it. And I think there's a burden to have our laws catch up to our technology in that way. So that's what else I meant. Whether it's computers, which is the current technology, we're kind of going through or previous ones, I think humans generally tend to create technology faster than they can morally understand its implications. And, so, I would also indicate advocate for slowing ourselves down as a race, when we adopt new technology.

Interviewer

Has there ever been a situation where technology made you feel less stressed or less anxious?

P10

Sure, particularly when I have depressive moods, I often listen to music. Funnily enough, it's all sad music, but it still calms me down. And helps me out. I mean, one of the things about mental health especially, is that it's isolating. So when you read or listen to music, or something, where you feel like the lyrics of the song, understand you, that's very helpful for getting out of the trap of thinking. You're the only person who ever felt this bad.

Interviewer

So you also said, because you just mentioned feeling more isolated, that you, like, on the one hand, it helps you when you hear the music, but you also said in the questions that you both disagree and

agree that technology can make you feel more isolated. What did you think about when you answered that?

P10

Sure. So I come from, I'm a first generation immigrant in America, I moved to America when I was four years old. And I still am very much in touch with my family in India, we used to visit all the time when I was a kid, less so now, but I'm through technology still in touch with them. So from that perspective, because I have an international family or WhatsApp groups, or Facebook Messenger groups, all those things keep us in touch. But at the same time, I've noticed that especially comparing how America is versus India socially, I've kind of seen how technology can erode a lot of the traditional support structures in society by isolating us. So people. To me, it seems that once we kind of get, one example, is that I feel like very few people would be comfortable just picking up and calling a friend nowadays. You would text to see if they're free and that's so alien to me. Because when I go to India, for instance, although that's also changing now. As they get more technologically savvy, but in India, you walk up to a relative's house without having told them that you're dropping by like that's some of the social support you get out of it. And I think some of that, as a society progresses with technology, and kind of adopts Western liberal values gets lost because the family is less important than the individual, as you kind of progress with liberty. So I think it's very easy to become dependent on technology as your mediator to your interaction with the world. So that's how I think it can be isolating.

Interviewer

It's funny you say that with calling. Some of my friends get so confused when I phone instead of texting. Well, yeah, it's quite funny because I used to almost only phone, but then I kept my German SIM card so here it's quite expensive. So now I've started texting more, but like now and then I still phone and they get confused.

P10

Okay. Yes.

Interviewer

Um, when was the last time you felt frustrated?

P10

Frustrated with technology. Again as I said, in general, my uses of the computer these days are so simple that this technology does it pretty well. But in general, I would have to say maybe going back to the presidential election in the US and the whole public proliferation of fake news through social media, like, yeah.

Interviewer

What about if something doesn't work with your phone or your computer, internet problems or so. Does that frustrate you or not that much?

P10

I mean, it is, it certainly bothers me, but it's not that bad. I'll just do something that doesn't involve a computer.

Interviewer

Okay. Yeah that's nice. Has there ever been a situation where technology made you feel more stressed or anxious?

P10

Sure. I mean, it's one of the reasons I don't seek out news on the internet. Because, you know, this is another thing that the way that the internet has changed journalism, even the most, like, conservative, not politically, but like old organisations in the journalism world, have changed the way they report so that stories are not objective anymore, right. The reporter clearly is telling you what they think about the issue. And because of that, there's nowhere where you can go for just the facts kind of reporting. So you have to seek out so many different sources and kind of decide for yourself, like the burden of deciding what the news actually is, is on the consumer. So that stresses me out.

Interviewer

Yeah, I try to like read news from different countries. And it's very funny how you can see the same topic sometimes get represented very differently.

P10

Yeah.

Interviewer

I still like reading news, but it is hard to know. Like, some of it is very biased.

P10

yeah, it is. Yeah, so I'm pretty ill informed in general nowadays, but I listened to news podcasts. That kind of covers some of it.

Interviewer

Are there any other situations that make you feel stressed or anxious with technology. Maybe too many messages?

P10

Yeah, so yeah, definitely. So I said that the WhatsApp groups helped me out. But in keeping in touch with my family, but I mute them all. Yeah, so that I can just check them when I want. I wish there was a way to specifically control group message notifications, so that they wouldn't show up in the app badge outside, not like, turn off the apps notifications altogether, but just for group messages. Because they get, you get 120 messages a day, or whatever. So.

Interviewer

I try to avoid group-chats

P10

I've also tried that.

Interviewer

But you cannot always avoid it.

P10

You cannot always do, yeah. Exactly. For sure. So and I've certainly found myself now. It's something I'm trying to combat, but it's almost an impulse to every five seconds, pull up my phone, check the time even, I mean, it's become a physical reflex, I'll just hit the time, and then I'll put it back in my pocket, even though I have nothing to do. So that's not directly the technology cousin means it it's me thinking about how much control the whole thing has over me.

Interviewer

Yeah. I guess that's also why you said, agree, that you're a bit addicted to the technology?

P10

Yeah. Yeah.

Interviewer

How would you in general feel about talking to a computer? With either text or writing, but with a computer?

P10

Sure. okay, I mean, if it's not just help circumstances. Yeah, I think chatbots are quite cool. I like the idea of developing technology were computers can kind of talk to us. I read a lot of scifi. So it's a fun little fantasy.

Interviewer

So you would do it?

P10

Yeah, definitely. In fact, one of my goals with getting comfortable with the terminal is to programme my terminal, so it speaks to me in natural language. So not that it speaks to me, it's very simple. But I would change all the prompts. So that there, it's almost as if the computers conversing with me.

Interviewer

That's cool. Yeah. Have you ever spoken to a computer before?

P10

I have not

Interviewer

Not even Siri or Alexa?

P10

Oh, yes, I guess I have used Siri. And I'm not entirely sure how to recognise whether customer service things are using chatbots or not. So probably I have, yeah.

Interviewer

Do you find it hard to recognise?

P10

Yeah, sometimes, yeah. Because in general, customer service representatives don't really engage you, specifically in chat. They don't engage you in a way that's particularly human. So I don't think it's that hard for the chatbot to copy that.

Um, one more time back to how you feel about talking to a chatbot. How would you feel about talking to a therapeutical chatbot?

Interviewer

I think it'd be really interesting experience. Because I, you know, I've used therapy for my own with humans. And I can certainly see that there is disadvantages of that, I don't seek therapy anymore. Even though I certainly still deal with the issues. So it would be interesting to me to see how a chatbot would be a different experience. Because the thing that was most useful to me about my therapist, when I was going to my therapist was having a conversation with someone who had no investment in my life as a person who acted in it, but was just there to hear it and ensure that I could frame it in a way that would be useful for me to deal with those issues. And I think that's something a chatbot might be able to do even better. Because when a human beings asking you those questions, I mean, obviously, the warmth of interacting with a human being is important when you're talking about trauma of any type. But sometimes, it can seem threatening to have another human being asked you, because there's a question of whether they understand you're thinking about those things. Whereas a chatbot. At least as I can see, now, I wouldn't be worried about whether the chatbot understood me or not. I would almost see the knowledge is coming out of some abstract data pool. There wouldn't be personality to it.

So now were you said there wouldn't be a personality to it. So in your opinion, what kind of personality would a chatbot, that you would like to chat with have? It could also really not imitating a human but.

P10

Sure. Yeah. I think, so the interesting thing is even though I wanted to, its advantage to me is that I know it's not a person, I would want the chatbot to imitate a human being in a speech patterns. And let's see, I think the most important thing would be for the chatbot to be able to understand the tension points and the interaction and be able to collect information out of me. Because I know that as a person who's depressed, I'm not that forthcoming with information that would be useful for people to help me out. And I think one of the better uses of chatbot might be to do something like that. A little humour wouldn't hurt

Interviewer

So it should also show a bit of empathy?

P10  
Yeah

Interviewer  
Anything else?

P10  
No, I mean, it's a little it's a small detail, but I think the chatbot should have a human sounding name.

Interviewer  
Okay, thank you. I would now like you to try out the prototype chatbot.

## D.8 Think-Aloud Transcripts

I like that it instantly says it's not here to replace face-to-face treatments but to offer complimentary exercises. This would be one of the things that I worry most about.

Hi, Yvonne. Nice to meet you. That's funny.

I choose, "Hi, Yvonne."

So it's nice that it's personal. I will just write my name.

Lovely to see you. Let's start with the first task. I would like you to record your anxious feelings and break each anxious moment into situations, feelings, thoughts, and actions.

Why. Yeah, that's interesting. I've never seen a conversation where I could instantly choose the answers like here. This makes it easier than just writing.

Let's continue.

So now I just talk to the chatbot. Like to a person, right?

Okay. So now I have to think, what was a situation?

Okay, what does she answer? How did that make you feel?

Yeah. So I select an option. Sad, upset, annoyed. Anxious. Yeah. I mean, or maybe even more worried, worried and anxious. Oh Yeah. That's interesting. I thought I was anxious. But in fact, I was more worried if I have the options here, I can more clearly divide between different feelings, which might be useful for Cognitive Behavioural Therapy, but I'm not an expert. Worried. I click on worried and see. It's very understandable that this makes worried. What did you do to reduce your anxiety? (your actions)

Well, what did I do? Well, I tried to think positive and track myself.

Okay, I'm curious what the answer will be. How did you feel after your actions? Please select an option again. After my actions, okay. Select the option.

Yes. Well, I think that it's nice that the conversation is fluent and doesn't take too long. It really feels like a conversation right now. I just wanted to add that.

How did you feel after your actions, please select an option again. I felt relieved, upset, annoyed, tired.. Okay, I felt none of these feelings nervous. Scared, okay. I felt okay.

Hmm. Well, it's nice to hear that okay is a good feeling. However, I'm not sure if okay, it is a good feeling for everyone. Maybe some people read okay or take okay, from the boxes and might still think, okay, that's not necessarily a good feeling. Just not that bad

anymore. But maybe the chatbot is someone, or if it could have a personality, as you said before, it will be a positive personality, which is what I enjoy. I like that it says "okay, it's a good feeling". Thinking positive is very nice.

I don't want to record another moment.

Unknown Speaker  
Watching Video.

Okay. Yeah, I have another question. What if I want to quit for now and come back another time? Is there an option? Just like, can I say something like see you another time? Or? How can I come back to..

Ah okay. Yeah, but now it seems like I should do all the task at once. That might be a little much. I wouldn't like that. I would like to, exactly be able to decide myself when to continue and it feels as though it's not a person. Right? It still feels strange, just not to answer anymore. Because whenever I do something, there is always a reply from the chatbot. Right. So I feel strange when just leaving without saying something like bye and the chatbot says bye. I don't know if that's necessary. Okay, let's continue.

But what if I did task one and two yesterday, and today, I want to continue with task three? Can the chatbot start from another time?

What is thinking style is closest to yours? I tend to think something awful or disastrous will happen. I tend to make negative predictions about the future. I tend to be higher myself planning I, so I tend to think people are seeing me negatively. None of these represent my thinking style. So these are quite negative thinking styles.

Yeah, I see that. That's nice that it doesn't suggest too many positive styles. And when you see yourself on the negative side, and you realise, oh, that's even worse for myself. I'm so negative. Just seeing negative options and choosing one from negative options. It seems like it's not too bad. Because it seems like a reasonable thinking style. So if I see it now, I don't feel too bad when I choose "I tend to make negative predictions about the future". "A lot of people are feeling this way about the future. But I promise that the future will not only be negative". Well, that's a positive chatbot I like her or him. Oh, was it her? Right? Yes. I like her.

Yeah. But I think it's; I don't know if it's good that the chatbot has a human name because it would be strange if there were, for example, a picture of Yvonne, but it could also be useful, I don't know. Just something I wanted to mention. Whether a human name is a good thing or not, I don't know something to think about.

Great, in this task, I want to start changing your anxious thoughts. Before I start asking you more questions that will challenge your anxious thoughts, I want you to watch videos three-five and six that I made for you. You can access the videos by clicking on this link,

let me know when you're done with the videos.

So that will take quite a while. Yeah, either way, I think three videos and then continue with the chatbot is a really strong break. How long does the video take, like five minutes? 15 minutes maybe, yeah, that's okay. I was just thinking maybe there could be something like the videos are all the same for every participant, right?

Maybe in the future, you could have different videos depending on what thinking style people are choosing, but just an idea. Well, then, I hope you find it helpful.

Have you done everything... I can type in all the numbers that apply to you. 1,2,3, and 4.

Is worrying about or avoiding your anxious situation... Oh, this is something I don't know. I choose no.

So here's a different thing now. So I can type in the numbers that apply to me. Yeah, I think it's nice that it's not always the same like ticking boxes. However, it's a very different chatting situation then chatting with a human, this would be I think never happened when chatting with a human, but it's nice to have a little different exercise all the time or different kind of conversation. The mix is nice.

Now the chatbot becomes a little more serious. Now there is a question of how I would speak to a close friend if he were in my situation; this is a nice question. So now I imagined being a stroke patient, right?

Yeah, there was a lot of questions one after each other, and it's nice that the chatbot was also mentioning this, I thought this was a little much. It's nice that it feels like it was made from humans who are empathetic.

Task 4. (Watching video).

Have you watched it? Yes.

Oh, that was fast. I don't like it when the answers come so fast before I can even read the text, but this was the first time it happened.

What would happen if I choose "Give me more information"? Do I see another video, or do I?

Okay. It's nice that the website is so close to the chatbot. In the future, the chatbot is built into the website right?

And then you can access the website. That's nice, it feels a bit more like a chatbot because if you're just on the website and using it already, it's a very different experience when you have it on an

application that is just for chatting and not also where you can switch tabs or so a little different. I like that.

"Which feared situation did you choose to confront?" Okay. That's a tough question. For myself, when speaking out loud can public. This is something that I cannot really do because I'm not used to it, and I would like to confront myself. "Did you managed to stay until your anxiety level reach zero". So it asked me whether I already tried to.

Okay, yes, I stayed in a situation.

What is the most feared situation that you wish to confront? This is about the future. Okay. Playing music in public. Scary situation..

I was just thinking maybe this chatbot could have emojis or gifts or something like this some time or little pictures, instead of only text, but well, this is what I would like maybe the chatbot could adapt to this after a time or not do it anytime. It's just an idea.

Yes. Eight hours of relaxing? Sit back, lie down. Sounds of nature. Is this really an eight-hour video someone supposed to watch?

No only five minutes.

I have to say that's confusing if the title says eight hours.

But if it's five minutes, well, after clicking on it, I will find out. It still could be useful to rename the video on YouTube if you are the owner.

Yeah, I think so far the chatbot is very responsive. I like that.

Okay. Yeah, that was very nice. I have to say that I enjoyed talking to a chatbot.

Interviewer

Did you enjoy doing the exercises with the chatbot?

P1

Yeah, it was fun.

Interviewer

How would you characterise the chatbot?

P1

Well, as I said before, I would say that at first it was neutral then I found it positive and funny and afterward when I was confronted with many questions one after another and also go into the situation do it do it, it was very straight like a like a fitness coach or a private coach, someone very strict, but after he was funny in the first place, it was more acceptable for me, then if it was straight and strict from the first moment, so general a positive person that would like you to to reach your limits. This is

how I would characterise it or her.

Interviewer

Thank you very much.

P2

Seems friendly, all the exclamation marks.

Continue.

It looks similar to the Woebot one, like friendly wise.

I'm putting my name in.

A situation where I felt anxious. I'm just going to put something generally since I haven't had a stroke

Saying what I do to reduce my anxiety.

How I felt after my actions to reduce the anxiety.

I'm on the second task.

My thinking style is.. Um.

The chatbot seems to be reassuring quite often. That is nice.

I think I'm on the next task.

It's asking everything I do to reduce my risk of another stroke. I don't think any of these apply to me, but I can still put the ones that are relevant, I suppose.

Can you give me more information about confronting my fear?

Feared situation I chose to confront. I'll just choose a random one.

The most feared situation that I wish to confront? I'm not sure. I think It misunderstood when I said I'm not sure.

Showing me a meditation thing, I think.

Telling me about scheduling an enjoyable activity every day.

Motivated me to talk about an enjoyable activity. That's nice.

Interviewer

What was your experience using this chatbot?

P2

It seems quite similar to the robot one, it's nice. I think it's nice when it like embeds the thing into the chat. I think I like that the robot includes little pictures and things. That was cute. But I think this seems quite thorough. And then you can get more information if you wanted it, but then if you didn't want it, you could kind of skip it quite easily. That was good. I sometimes think, If there's an app or something and you can't skip certain things I probably more likely to drop it, to stop using it. So if there's like a way to skip certain things, if you already know it,

that's quite good. And I also like you can make the chat longer if you want to or you can make it shorter if you want to. So I think that's similar to what I said before.

Interviewer

Did you have any difficulties when using it?

P2

Maybe only because I haven't had a stroke, but other than that it was quite clear and straightforward.

Interviewer

And did, well, I guess you said you enjoyed using. Would you have enjoyed more than doing the exercise on paper or something like that?

P2

Yeah, I think so. It's more interactive. As a computer, it feels like, since the chatbot format with the little bubbles coming up its kind of like messaging a friend or something. So yeah and they have those therapy things online. So it kind of feels like that a little bit. But yeah, I haven't used it that much, but I imagine it to be something like that.

Interviewer

Thank you.

P3

Okay, so let's continue.

Great, I'm looking forward to working with you. Yeah, very nice.

Hi Yvonne, Nice to meet you. Yes. That sounds appropriate. Nice to meet you too. How do you prefer me to call you I prefer first names or nicknames.

My name is P3.

Lovely to meet you, P3. Let's start with the first task. I would like to record your anxious feelings and break each anxious moment into situations, feelings, thoughts and actions. Is my respond to ask why?

Okay, so I'm just sending why.

Understanding what's going through your mind when you are anxious will help you take appropriate action in an anxious moment.

But I'm not anxious.

I have to feel a moment of anxiety. Okay.

Let's continue.

Okay, so I'm thinking about the moment of anxiety. Okay. Can you describe a situation where you felt anxious?

Yes, I think the last one.. May I ask you, Kim, about getting any information? Okay. So, yeah. This is maybe a minor. It's not really anxious, but sometimes doing difficult anaesthesia, for example, with very small children, this is not that I'm really anxious, but of course, okay, what might happen? Is this okay, to choose this one?

How did that make you feel? Please select one of the options. Okay. Which kind of selection? Sad, tired, angry..

None of them are fitting really?

Okay, okay. anxious. worried or maybe worried. Yeah.

Yeah. So depressed nervous, none of these, I think worried.

It's very understood that this makes you worried. What did you do to reduce your anxiety? Good. teamwork and communication. Being prepared for unexpected events. Having a good colleague as a back up.

How did you feel after you action? Please select an option again.

Yeah, relieved. Thank you for sharing this with me. Okay. If you want, you can record as many anxious moments as you wish. Do you want to record another anxious moment? Yeah. No, that's fine. Good.

In the second task, I would like you to identify your thinking style. Okay.

(Watching videos)

Okay, I'm done. Okay, this is a lot. Where does it start? Okay, I tend to think something awful will happen. I tend to make negative prediction about the future. Attempt to think people are seeing me negatively.

Um, I don't think the awful will happen, but some of my experience, I know what can happen. And so it's very unlikely. Saying none of these represent my thinking. Can you write your thing saying your own words? Okay. From my experience, I know what might happen, what can happen during work... Okay.

It's good that you elaborate on your thinking style. Let's continue with the third task, okay. But I wrote something without getting any response on that.

Okay, so these are some questions you ask. Yes, quite okay. So yes, I heard it.

Um, have I done everything I can to reduce my risk. So you want me to put the numbers down? So it's two, three.

Does worrying about or avoiding you anxious situation really change the possibility of having another stroke? No of course not. What am I losing out on because of my fears? Depends how much fear, but if it is very strong fear, my independence, my work, okay, so with you really you can't cope anymore because of your fears, then your work, two might be as well. My friends social life. So if I get social phobia, it might. So, five, yeah, and this is part of my quality of life, so in principal all of it.

Do I want to carry on worrying like this? No.

Do I want to return to my usual activity, accepting that there's always a smaller part of having one. Yes. What would you say to your closest family member or friend if he was in your situation? More or less the same.

Well, that was a lot of questions straight after each other. Well done on completing this task. You're halfway through your treatment. I hope you enjoy the treatment. Let's continue with task four. Okay, so there are six tasks. Okay.

In task four I want to teach you how to confront your feared situations in small steps. This time I want you to watch video

number seven. Click here. (Watching video). Have you watched it. Yes.

Um ok. There are a couple of things that I want you to remember when you confront your feared Situation. Don't escape, stay put, distract your mind by counting backwards from 50... Yeah, that's what I'm doing when I'm flying... Do you want to continue with the task? Or do you want more information? I want to continue. That was enough information.

Which situation did you choose to confront? Okay.

Did you manage to stay until the onset level reached zero? Yes. It's very hard to get out of the plain.

Which situation do you wish to confront?

I can imagine that. This is a scary situation for you. You are doing really well. Okay, yes.

I have two more tasks for you. Task five. You might have moments where you find yourself restless, nervous or irritable. Taking five minutes each day to learn to stay calm and relax can really make a difference. I have made a relaxation video for you. But I can also recommend meditating. You can try the next time. Are you ready? Yes.

Let me know when you have watch the video. Yes, done. Actually I do sometimes autogenes training. In the final task, I want you to sketch an enjoyable activity at least once a day... Sure. Tell me in your own words, which enjoyable activity you have scheduled to do regularly. Going for run.

Thank you for sharing this to help your management side in long term I want you to watch we did number nine. Yes, done. It's was really lovely to talk to you, P3. I hope you enjoyed this treatment. Enjoy the rest of your day.

Interviewer

Thank you very much. How would you characterise your experience?

P3

The videos were quite interesting and entertaining. Yeah. So and if I feel relief, and I feel it helps me, of course then it's entertaining.

Interviewer

Okay, thank you.

P4

Oh, this is the name of the doctor.

Okay. So should I, if I write a sentence would it still read it like, "you can call me". Yeah

It's quite fast the respond.

Record my anxious feelings and break each anxious moments into situations. Ah Okay.

All of a sudden like three new boxes are created. Oh is this just like one page? Not a video? Ah okay.

How did it make you feel? Can upset be like being upset to myself? Yeah.

This is cute: "I'm sorry, that it made you feel upset".

Oh, you do have a lot of different options. Okay, that's a good thing. Sometimes it's kinda like so many new windows new bubbles appear like all at the same time. It goes like, uh, where was I.

Unknown Speaker  
Watching Video

P4

This is assuming that the person is already going through anxiety? Yes.. No, well, I think I can kind of coordinate myself too like the mindset.

So once you answer from one of those, you cannot go back, right?

Sometimes I think there's a possibility that people will be unsure. So they go for one, but maybe not. And then yeah, I don't know, for people who are so indecisive like me.

Unknown Speaker  
Watching video.

P4

So basically you get advice with the same videos for different thinking styles.

Interviewer

So thank you for going through it. Did you enjoy using the chatbot?

P4

Yeah, I mean, it's a lot more interactive than I imagined. Yeah. So it's good. And when the chatbot gave options, there were plenty of options that could feel like at least one of them. And yeah, I just found it quite helpful.

Interviewer

How would you characterise your experience with it?

P4

Characterise? To be honest, from time to time, when the chatbot asked me for, how do you feel as I typed something in, and then it just carried on to the next task, so it just gives a very automatic kind of shallow level of, oh, yeah, that's a great one. Let's move on to the next one. So in those situations, I felt like, oh that's it. If I was really going through a bit depressed or anxious mind mood it could be a bit like, this is after all a chatbot. But then when the task goes on and you actually get advices from the videos and thinking exercises, it actually gets into your mindset. I would say it's slightly one-sided, but a very helpful friend.

Interviewer

Yeah. So did you find anything difficult with it?

P4

No, not really.

Interviewer

Would you feel you need assistance to go through it the first time?

P4

I don't think so. I think it's quite explicitly explained in every step.

Interviewer

So it's quite straightforward.

P4

Yeah and then when it didn't get what I typed in, it didn't understand it, it actually gave the instruction to put task two, to go back to what I just wanted to do. So, it kind of gives a good level of advice by itself already I think.

Interviewer

Okay, thank you.

P5

Okay, so it's typing.

Great. I'm looking forward working with you.

When I ask a question, please enter your response. Okay?

Hi, Yvonne. Wouldn't say "Nice to meet you", because I don't meet you.

How can I call you? I prefer first names or nicknames? Just my name, please. That's weird. Sorry.

Let me start with the first task. Okay, cool. Record your anxious feelings and break each anxious moment into situations, feelings, thoughts and actions.

Okay, is that just how you've been feeling? Now it's just typing. Is it weird that it's typing, even though there's not a person typing in it, there's like the three dots. I feel that's very specific to a human person. Right? That's crazy. I never thought about that.

What was going through your mind when an anxious... So to understand better what I want you to do, click here. Okay. I'm gonna click here. I want to make sure I'm doing right.

Okay, okay. Continue.

A situation where I felt anxious... I responded, when I have to talk to people I don't know. How does that make you feel? Please select one of the options. Tired, angry, anxious, worried... Nervous, I think.

It's kind of weird when it's like a chat, using an exclamation mark for things. I can imagine that a situation made me feel nervous! Because when you're talking to a person, it might sound more empathetic. Or I guess this is meant to sound encouraging, but it sounds like, I can imagine this weird bot being "hey, everything's great". I'm like "no, it's not, I'm nervous". Okay, tell me what you did to reduce your anxiety (your actions). I stopped thinking about it and just did it or I ran away, what I do with all my problems.

I'm relieved, upset. I would probably choose relieved. Maybe like a feeling of dread. Thank you for sharing this with me. If you want you can record as many actions as you wish.

In the second task, I would like to identify your thinking style. Okay.

I'll read through the options... Probably I tend to think people are seeing me negatively.

I don't like that, It's just "Don't worry, we will work through this". You don't know me. What are you talking about we're gonna

work through this. Do you have more to add about your thinking style.

In this task, I want you to start challenging your anxious thoughts.

Okay. Done with those videos.

I want to show you one more thing. These reminders.. Yeah.

Ok, I will type in all of them. 1,2,3,4.

Is worrying about or avoiding your anxious situation really change the possibility to have a stroke? I guess not. That's not really up to my brain. Losing my independence, my work, my friend, social life, my hobby, my family relations, quality of life. Quality of life, thats pretty specific.

Do I want to carry on feeling like this, what would happen if I said yes, like, I'm going to say no.

But I was wondering, I feel like these questions are there to remind that they're not meant to be replied "no" to, right? It's just like someone reminding you. Trying to rationalise.

Do I want to return to my usual activities, accepting there is always a small possibility of stroke happening. Yes, sure. Yeah.

What would you say to your family or close friends in such a situation. That I love them. Because that's literally all I can do. Hopefully.

Wow, that was a lot of questions straight after each other well done on completing this task. I don't know if I love that. It reminds me of, someone that I used to work with. I was like, wow, that was really, maybe I'm being too negative on this. I was, ooh, that was hard. Are you okay? I'm like, yeah, I'm fine, Robot. You don't know how I'm feeling.

Yeah, maybe the exclamation marks aren't, maybe they would be helpful for somebody else. You're halfway your treatment. That's good to know. I hope you are enjoying this treatment. Let's continue to task four.

I have watched the video. There are a couple of things I won't you to remember. Wow that's a lot of messages at once. I wonder, it might be easier if each of these numbers were set in a separate message, because a long text, a medium, just like oh my god it's a lot to read through. At least in message form. If it was a page maybe not so much.

Which feared situation did you choose to confront? What do you mean?

Oh, um, yeah, I guess, applying for a job. No a job interview. A phone job interview. Scary.

Did you manage to stay until your anxiety level reached zero? Ah, yes.

What is the most feared situation that you wish to confront?

Um, I guess having a stroke. Yeah.

That's a scary situation for you. Yeah, that sounds scary, having a stroke. You are doing really, really well. I have two more tasks for you.

You might have moments where you find yourself... I made a relaxation video for you. But I can also recommend meditating. And try that next time. Yes, I'm ready. I hope you are enjoying this.

I feel like that "I hope you're enjoying this" could come across weird if you don't have the right context behind it or a face. You know? Because sometimes it's just, I hope you're going to, like, you better be enjoying this. Scary.

Sit back, relax, and enjoy the slideshow. Relaxing images. Okay. I'm done.

Schedule an enjoyable activity at least once a day.. Yes, I'm ready. Are you ready? Going for a long, relaxing walk. Watching a TV show if it's raining and I can't walk.

Bye Yvonne. Bye bye. Okay. I'm done.

Interviewer

Thank you. I have three more questions. How did you find talking with this chatbot?

P5

I don't know, it was interesting. Because in my mind I'm thinking, on one hand, I didn't like when it said stuff like, "that sounds hard", or "I hope you're enjoying this" because it just sounds kind of generic, you know. And I think part of it sounds, because, I mean, since I'm a RA, we have training on how to talk to people when they have issues and you are supposed to adopt those kinds of empathy and things like that and that sometimes sound a bit fake. I had to go to an upper RA once with a problem and she was like that, and I could tell that she was using those techniques on me and I was like, oh, this isn't, you know, now I feel like not special, you know, paying attention.

Interviewer

Maybe it's even more fake when it comes from a chatbot?

P5

I think so. But then on the other side, I was thinking, well, what would the alternative be? That is just, well, maybe if there was, I don't know, you have a name. Maybe if there was a picture of a

person next to the little icon there. So you felt like you're talking to a person that could be better, but then, I don't really want to feel like I'm talking to a person, someone who remember that this isn't really a real person. But at the same time, if you'd know it's a real person, why would you bother to talk to this thing that you know, doesn't understand you anyway. So it's kind of weird. It's one or the other? I guess, I would prefer to talk to a real person. But if I had to do that, I would probably prefer it to be more life like, even though I really hate life like things. Yeah, it's complicated.

Interviewer

Do you find anything difficult or hard to understand?

P5

Um, I think when there was like that long message of like, here's some things you can do and I think there was like a few messages one after the other, it kind of made the chatbot go down immediately. So I had to kind of scroll up and read the first. I guess, it took me a minute to sort of understand what's going on.

Interviewer

Did you find it fun or engaging to do these exercise if you had to do them? Would you prefer to do them on a chatbot, webpage or rather by paper?

P5

Probable in a chatbot I think. Rather than paper, because It feels like you have a more immediate answer, then filling something out.

Interviewer

Okay, thank you.

P6

The first thing I think when reading the first two messages is that, that's pretty much exactly what I would want to see because It's not like, buddy buddy. It's not informal. It's formal but friendly. Which is what I would want to see. Okay.

Hi Yvonne, nice to meet you. Right?

First task.

Record your anxious feelings and understand what's going through your mind will help you take appropriate actions.

What was a situation where you felt anxious?

I was travelling by train and couldn't find my ticket.

How did that make you feel?

upset.

What do you do to reduce your anxiety? Haha

I've been through this kind of situation so many times. What did I do? panicked.

Particular spoke to a member of staff. Didn't help. Maybe it helps record another anxious moment. If you want you can record as many anxious moments as you wish. Do you want to record another anxious moment?

Second task allow you to identify your thinking style. Random. I can't really say that can I. But my thinking style is random. I leap from one thing to another all the time.

P6

Ah there is a button first

All very negative options. Well, I suppose it's anxiety, is it.

Oh there are videos.

Okay, I click on the link for the reminders. Wow.

Okay and back.

Does worrying about or avoiding your anxious situation really change the possibility of having another stroke?

Yes.

What would you say to your closest family member?

Right continue with task four

Alright, what's the most feared situation that you wish to confront?

Okay, go large. Being alone.

Moments you find yourself restless, nervous. All the time.

I'm finding that some of the messages come up too fast. And I've not finished reading one before it disappears off the top.

P6

Although it has just persuaded me to do a bit more painting.

Interviewer

So for the last few questions: First of all, thank you for taking your time to go through the chatbot. How would you characterise the experience with writing and type into this chatbot?

P6

Like sitting with the doctor and laying out the facts.

Interviewer

Okay. Yeah. Did you find it fun or engaging to do these exercises?

P6

Um, I wouldn't say fun. But not stressful. I'm not sure. I mean, when you're talking about your health when you're in a bad place. I'm not sure what you would call fun.

Interviewer

Yeah, that's true. But do you think you would enjoy it more doing it through this chatbot than doing it on paper? For example?

P6

Yes, yeah. Yeah. Yeah. Because you get the links to other things and you can have other resources coming in. It feels very much like something that would be added on to other things and you could revisit as a sort of, a kind of sort of daily in house support. So you're getting all your medical treatments. And but those that's right there on your computer, and you could go back to it 3,4,5 times a day and just go through it again and again. That's what it feels like.

Interviewer

And did you find anything very difficult when you used the chatbot?

P6

Only coming up with examples because I'm not actually in that situation.

And the only thing would be that the messages maybe came too fast.

Yeah, some of the messages are long enough that they fill the window, you're not finished reading one, when the next one comes up,

and it's gone. You can read it.

Interviewer

Okay, thank you!

P7

So I think it's weird that she has a name. But I'm actually thinking, this is good because it gets more access to information. I don't like that, she says, I'm happy that you were talking with me because she's a robot, I think I would have preferred "Thank you for taking the time to talk to me". And together we can do the treatment. I'm not here to replace face-to-face treatments, I think that's really good. And I want to offer you complimentary exercises. Let's continue.

I actually like that there's a little button that goes across because it makes me think that it's thinking even though it's not. Great, I am looking forward to working with you. Um are you though, you are a computer. When I asked you a question, please always enter your response or select one of the options.

Hi, Yvonne.

I don't like that, because she's a computer. So I think something like "I'm ready to get started". I personally would have preferred. A bit more of a bland, non-human response. Nice to meet you. We're not meeting, it's a robot. "How can I call you?" What would you like me to call you might be good. Rather than how can I call you. I prefer first names or nickname, really you're a robot, you don't prefer anything.

So what would you like me to call you? Lovely to meet you,

Let's start with a first task. I would like you to record your anxious feelings and break each anxious moment into situations, feelings, thoughts and actions. Gosh, that sounds like a lot of work. Because emotions are very complex, so I don't know, that sounds like a lot of things to type.

I'm feeling anxious.

Can you help me out? I didn't understand you.

Can you try rephrasing?

So I just hit why. So is that an option?

So what if I chose not that option. I chose just to respond like that. And she doesn't understand. So can you try rephrasing.

What was a situation where you felt anxious, P7?

I don't want to type it in. What was a situation where you're feeling anxious? Gosh, that was like, it could be anything really. Reading.

I'm trying to imagine what it would be like having a stroke.

And a thing that would make me feel anxious. How did that make you

feel? Please choose one of the options. That doesn't feel like a good response. Annoyed, angry. I would have liked to see frustrated, I think having a stroke and being limited in your physical interactions would make you feel so frustrated. Which would be annoyed. But really, it's frustration. That's what I'm looking for.

Feeling anxious can be an annoying feeling. But it's also an important feeling. Recognising your feelings the first step towards overcoming situation. That feels very condescending to just take the word that I put in and then come back to me saying, annoying is..

What did you do to reduce your anxiety? Stop reading?

How did you feel after your actions, please select an option again.

So after I stopped reading, I still felt annoyed. I'm sorry that you made me feel annoyed. Once again, a bit condescending.

If you want. It's really hard for me to think about a robot doing human empathy. I think that there's a way that you can get a robot to do empathy, but I don't know if this is it. If you want you can record as many anxious moments as you wish, do you want to record another. No.

In the second task I'd like you to identify your thinking style.  
Hehe

Okay. None of these represent my thinking style. But actually, what if it's more than one? You don't have that option in there? You don't have to blame yourself. We will work through this.

Do you want to add more to your thinking style?

Yes, then you're just gonna say, I'm sorry that you blame yourself. And type in what you want to add about your thinking style.

It's good you elaborated on your thinking style. Let's continue with task three. Great in this task, I want you to start challenging your own anxious thoughts.

I don't know if you know much about therapy. But my line of therapy that I teach is the exact opposite of CBT. So my philosophy sits in psychodynamic. So rather than let's challenge your thoughts, this is how you think better. I'm like, why? What does it mean? Let's unpick it. So I'm naturally not going to sit with CBT. But I see the benefit in it.

I want you to watch videos three, five and six that I made for you. That also feels like a lot of work to give me three videos to watch before we move on.

Exclamation mark. Um I want to show you one more thing. Reminders.  
Oh that's good. I like that. It's a helpful task.

Have I done everything I can to reduce the risk of having another stroke. I take my stroke tablets, regular exercise, trying to eat healthy. I like that she's offering me like a tick box to make sure that I'm doing everything that I can. Type in all the numbers that apply to you.

So I'm going to just put two, just to mess with her.

Now she's asking me some questions.

Is worrying about it or avoiding it really change the possibility of having another stroke. Yes I know that's not the right answer, but I'm going to answer it anyway. What am I losing out on because of my fear my independence my work? Actually I like that she's unpicking fear.

What would I say to my closest family members? I like that aspect of it too.

That was a lot of questions straight after each other well done of completing this task. That's a little bit condescending as well. You're halfway through your treatment. I hope you enjoyed the treatment. Let's continue with task four.

Have you watched it? Yes.

There are a couple things I want you to remember when you confront your feared situation.

Uh it went too fast there. I couldn't see what was on there.

I want to continue.

Actually, I like that bit. I like to kind of breaking down a feared situation so that people can see where they're coming from. Which feared situation did you choose to confront in the past?

Did you manage to stay until you your anxiety level was a recognised zero. No. What is the most feared situation that you wish to confront?

I can imagine this is scary situation for you. You're doing really well. Excellent. I have two more tasks for you. For some reason, I didn't feel that was as condescending respond, I don't know why.

It went to fast there. I didn't get a chance to read that.

I push yes. I hope you are enjoying this. Done.

I wonder if you should have an option for relaxation videos, I think that people, especially in crisis or anxious anxiety, if you give

them a level of control, that it feels like they have some more control with their anxiety as well. And they more likely engage.

Are you ready? Yes.

Enjoyable activity you have scheduled to do regularly. Gardening, which is obviously a lie if you're looking at my garden

Really lovely talking to you, P7, I hope you enjoyed this treatment, enjoy the rest of your day. Bye Yvonne.

Interviewer

Can you tell me how you experienced talking with this chatbot?

P7

I think I feel naturally resistant to it. But actually, there was probably some helpful suggestions. I think I took some issue with just a little bit of the language. But that's just a small thing. Yeah, I don't really know, I don't know whether my personal style would have preferred a website layout, that I could choose different things. Whereas I realised with a chatbot, it's just a one on one interaction. So you might not necessarily have a choice of things. Um I think I want it to be obvious that it's a chatbot. And I think that Yvonne is trying to come across as a human. So I don't know, I'm sure that there's data somewhere about empathy levels with chatbots, and where the level is if people can go the other way and feel quite strongly against them. If you're trying to come across as not a chatbot, does that make sense? Yeah. Okay.

Interviewer

Did you find anything quite difficult?

P7

I have, I've tested positive for a slower processing reading time. So I found that some of the things we've done before I had a chance to read them. I liked the aesthetics of it and I like the picture of the videos before you click on them. Because they make me want to looking at a stream. I was like, oh, that looks, I can see how that would be beneficial. You did have some choices in there. But I almost sort of like choices within the choices. So for example, and maybe it would have if I clicked on it properly. So for example, the exercises, I would have liked to have some exercise choices in the exercises, that probably would have made me feel a bit more engaged.

Interviewer

And did you you find it more fun or engaging to use this compared to do like exercises by hand or on a normal computer website?

P7

I think that there's something really lovely about it actually, there's something really nice about having that interactive element, I think you're more likely to get responses than just go on the site and look up some exercises. I like the idea if it would be a bit of a reminder. So almost like this chatbot is keeping a, holding you in

mind, as we would call it in psychodynamic theory and saying, oh you know, you haven't really done this today? Can I log them for you? So almost like a friend who's keeping an eye on you and making sure that you're adhering to your regiment. Let me see. And then that way, I think you're more likely to engage. I'm finding myself wondering if you've got any behavioural scientist working with you, just because the format of it looks very good. And you can always see where the sentiment of the stroke exercises are coming in. But to me there was a little bit of just the way it's planned out in human behaviour and how to get people to respond was not quite as smooth as the other parts of it.

Interviewer

Okay, thank you.

P8

That's good. Like the first bit. Because that's just the kind of more mandatory thing which anyone would say.

I find it interesting how it's then "Hi Yvonne, Nice to meet you" rather than like, it's like a dichotomous question rather than like or then you talk.

There's the question.

It's very quick at responding. That's good, I guess.

I think I see why they have the button. Because then you get more information. And if you don't you're not like very convinced, like you not keen to talk about it. You get the chance to. Yeah.

There's the "How did that make you feel?" There's sad, upset.. It's quite nice, you have like an option, but at the same time, when you have the option to choose from, you don't get to say what you want to say. So personally it doesn't give the best understanding of me as a person. I guess it's easier for the chatbot. Because then when you say, oh, you're relieved, then they have like this thing to say. So it helps with accuracy, I guess.

They kind of do it in very CBT way, because I know, like even therapists they kind of repeat as more like active listening.

If I want to choose two options, say there's only select an option, but if I'm angry and sad, I do you think, they can have like a more variety.

Maybe like, because I clicked on like a second episode of like an anxious episode. And the kind of worded the same I think. Personally, I think that can come up as a bit tidies. Yeah.

Oh, you can watch the video.

It's quite a good representation in terms of what is your thinking style, closest about the same time, If there's an option to be an open question. It could also be helpful.

They kind of, maybe I'm just a really like, pessimistic person. But the whole, "I promise you that the future will not only be negative". They can't read guarantee that.

It's very helpful in terms of if someone doesn't want to have a conversation with the GP about stroke. Because earlier today me and my friend was out actually having a conversation where she's very frustrated about situations, but she doesn't want to go to GP she doesn't know what to do. So I see why, the closest thing to having maybe privacy and confidentiality is to have a chatbot. So I see how when it comes to your health related things, because with her it's a health related thing, it's just she can't find anyone to talk to because she finds it super embarrassing to go to GP whatsoever,

which knows that they're not gonna judge. So having this information here would be useful.

(Watching Video)

Okay, I'm just gonna go back to the link let me know when you're done with the video there we go.

I was just looking at the reminder and I kind of see why when it comes to light therapy because they're just gonna say the same thing. For some reason I say therapy they have a system so this is just more like it's put on a paper or on the screen and it kind of like takes time to read and understand and digest it. So that's helpful as well.

They asked me open ended question. They're just kind of leading you on to the questions which is what therapy is doing. Which can be super annoying at times, because you kind of know, what they say.

If I want to say 1,2,6. can I say 126? Or does it have to be one comma two comma three comma I wonder. Oh it worked. That's quite nice.

Oh, I'm halfway through

(Watching video)

This is just me being very annoying. I would quite like it, you know black and they're all they have that one way were you can press bottom and kind of bring you own to a next level. I don't know why but I feel like this could always have that effect on it. Yeah, that would be quite interesting. Yeah, because I think in terms of the video, it's quite general. It maybe the person want to invest a bit more in it, well, then they just kind of have a general frame the whole thing. So, If you can choose a situation where you can kind of carry on with the video in like that sense. So rather than watching the whole video it's more like an interactive video fast. I think I've seen it before while I was doing my training, where they say choose two situations, choose two scenarios, which one. So when what happened when I confront the fear, if you can choose an option and they lead you into.

Okay, I was just thinking, because I put the "what is the most feared situation that you wish to confront". And I was gonna like gone because I didn't my head there was not one most feared and it really depends on a lot of factors. So then I put there's not one most fear situation. Because that was in my head and then I got the response "I can imagine that scary situation for you. You're doing really well", which I kind of see why it then comes into this, which is quite clever, but then I would like a bit more.

Oh, it's a meditation video. Right? Relaxation. Yeah, yeah, relaxation.

Trying out the video.

I'm trying to consolidate myself.

I know it's a lot of reading questions and sometimes they want to know, what's the overcome, what's the strategy? So it's having more options, responses for relaxation. Or not having 20 minutes chatting before having the relaxation. That could also be helpful to some people.

That's very nice. (Referring to the relaxation video)

(Watching Video)

I feel like some people may jump into just a video. Maybe. Just because. I do believe in psychotherapy in a lot of ways. I'm not an anxious position to say, if I get very anxious, and I talked to a chatbot would it calm down? But if I really want solution straightaway, I don't know how much patience I will have with the chatbot before going on to this video when I see all the video options. I'm not sure if I could manage my anxiety independently, and that's what I want.

It's really an interesting video.

I do at the beginning. I was like, Oh, this woman is talking so slowly, but at the same time now when a person is very anxious, having breaking it down into bits and making them very slow. I don't know whether she did this. She has a very flat emotion for a reason. At the beginning, I was like, I would wish if she smiling a bit, but I don't want to be like, really judgement. Like, maybe having a very not emotional, like a very flat emotion kind of helps in a situation when person is anxious. I don't actually know. I do think, when it comes to even video, if you see a very bubbly person, if you see a bubbly person, when you're very anxious, doesn't help. Having a very flat kind of where everything is very plain helps. I do think like in lot of times, I would like to be in an anxious situation where I'm so frustrated. I'm so jittery, then I do this.

Bye.

Interviewer

I would like to know, how did you experience talking to this chatbot?

P8

It was helpful. If I don't want to talk to a person, because sometimes it gets quite overwhelming in a lot of situations, but I would appreciate it if there were more options and responses. I mean, obviously, when it comes to like a kind of more in other health related thing, maybe I do want to talk to a person, but at the same time I know when it comes to some really like, you just don't want to talk to anyone. That's more private and then that's when you can like, kind of give your opinions and be as transparent.

But how much can they respond to the way you want to. I know it's working. I know, there's still a long way to. I'm not asking for perfect AI. I do wonder if AI can respond to human. No, no. I can't see it in the next 50 years. I'm sure it will reach that point. I don't know about the emotion part. I don't know. But anyway.

Interviewer

Did you have any difficulties using it?

P8

No, it's quite straightforward. Yeah.

Interviewer

And did you enjoy chatting that way? I mean, It's limited, how much you enjoy doing therapy, but the way it was structured was it enjoyable to use it that way?

P8

The function was good. Yeah. It kind of leads from one question to another. So it kind of works in how human mindset goes.

Interviewer

Do you think it would be more fun or engaging to use that as compared to like, do it by hand or on a website?

P8

Yeah. Yeah. Because that's more interactive. So you don't click buttons, and then you get it submitted.

P9

Okay, so I'll just click this button, I guess.

Just waiting.

Quite enthusiastic. I guess that they ask about my name.

A lot of exclamation marks.

Only one response given. There is a link, which is quite cool. But also can be a bit annoying for some people.

Describing a situation, I felt anxious.

Quite unsure how much detail I should go into.

Selection of options, which is also quite good, but should also have like a textbooks section so you can add in your own part. Or the option to click more than one, because I felt more than one of those.

This is quite nice. Great example. (To the response)

It's good that the chatbot is kind of leading the conversation almost, again, would have been nice for more than one option.

The use of going through a tough time. I think a lot of people hear that. And it's trained for people to have to use that term often. But I think, yeah, it's quite annoying, because, you know, people were trained to do that.

I think the options are good, actually. Because people would find this hard to write.

Yeah, options to click more than one would be great.

This option is good. Asking to add more information.

I'm quite unsure whether I should use like, long sentences or if I should keep it brief, like bullet point vibes. I think if you do bullet point vibe it's less of a conversation with a person and more of a chatbot conversation. I would have liked to see how the thinking style is linked to the third part, maybe I'll get to that.

I should watch these videos, I think

The first three are quite nice. (task 3). The second box is also quite interesting, especially for someone who has a stroke, I guess. Third box, I'm frightened of losing control in public.

It's a lot of information in one page the reminders. (Website tasktreatment)

So this question is very specific to stroke patients. This is a good

question, does worrying about or avoiding really change the possibility of having another stroke? It puts things into perspective. That's really nice. This question, do I want to carry on worrying like this? If I was super anxious right now, I would find that a very annoying question. Obviously. Yes, obviously, don't want to return to usual activities accepting there is always a small possibility of a stroke happening.

What would you say to your closest family member or friend if he or she was in your situation? That's a very good question. This one's good. I think this is one of the most important questions that would help target someone who's anxious. Puts things into perspective. It's good that they acknowledge or Yvonne acknowledge that there was a lot of questions.

Halfway through. Let's continue. Okay.

These lists are good (Task 4). Don't escape, stay put.

Well, what does this question mean? Complete deadlines. I mean, I couldn't avoid that.

There are some situations I guess where you have to be and you have to do it. But it still causes your anxiety. But if you could do to avoid it, but you know, you can't, so. I guess this is more different for people with stroke. This chatbot would be really cool. If there was more freedom to like, lead it, because it's a very leading. It leads the session very well, which is good for people who are guess aren't very responsible. Maybe a patient would just kind of want to talk rather than do a hierarchical structured lesson, for example.

That's good meditation and like the relaxation video, just examples would be quite nice. Examples of how you could have relaxation, meditation, the kind of music that you would use, or the types of meditation that you do. So the fact that everyone has made a relaxation video is quite nice, because some people don't know where to start. So that's good.

The final parts a bit more positive. So schedule an enjoyable activity. That's quite nice.

Bye.

Interviewer

How would you characterise the experience of using this chatbot?

P9

I think the chatbot was pretty cool in that it was a leading session as and Yvonne led the session a lot. It wasn't, it didn't feel like you're speaking to a person though. Because, or like whatever you could tell that if I had said something else, I would have got the same response, but that's just something to do with the task, I guess. But it was very clear that it was chatbot. And it was like a

lot of messages from Yvonne. Yeah.

Interviewer

Was there anything you found really difficult?

P9

No.

Interviewer

Okay, so it was more or less straightforward.

P9

Yeah. Yeah.

Interviewer

Would you say you enjoyed doing the tasks like that? Or would you prefer to do it on paper or on a internet programme or website?

P9

I guess I was just watching videos and stuff. So I guess this, this isn't that big of a problem, but maybe having the videos like in the chat, alternatively yet, like a website, where you have a chatbot on the side. So it's all just kind of nice and neat and packaged. That would have been a bit better than having to like link yourself to a different webpage.

Interviewer

Anything else you want to add about the chatbot?

P9

No, I think this chatbot is is good, because it's very CBT base. Let's say it becomes an app or something, maybe adding a part where the patients can have freedom to talk a bit more and discuss the situation and have like more empathetic responses. That might be what someone needs in the moment and then they can actually go on and do a lesson per se or do a task.

P10

So do I just start with the chatbot?

It's interesting to see that it's a bit like a messaging app.

Yeah, it's fascinating that there's, like, click on multiple choice options here, I think that's interesting way to interact with the chatbot, I would have only thought of typing responses back.

So it was really interesting, up until this point, where it was kind of, you know, introducing itself that felt very human and personable. But after getting my first name, it's prompt was to immediately "let's start with the first task". And I think there's a there's a bit of an empathy gap there.

I think perhaps, even though it's a chatbot, or maybe especially because it's a chatbot, but I'm not a doctor, and I can't ask it questions, the activity should have a bit more context. The person should be informed why the chat bot or the doctor thinks that would be helpful. Me, of course, I just clicked why that's doing that. Maybe if it was up before that,

Very helpful that there's a link to examples, because I always want examples of what someone wants from me when I do these kinds of things.

This doesn't have anything to do with chatbot or anything, but the kind of graphical interfaces that medical websites often have I think are poorly design. And they often give off the impression that it's cheaply done. And I think that's, that would be a problem, especially when you already have the gap of trying to convince someone to interact with a chatbot. There's another kind of trust flag that comes up when the graphics look like the banner ads on a website that you did. Anyway.

It's interesting to me that, you know, after asking how I felt, no, sorry, it asked me what situation was where I felt anxious. It then asked me how I felt it provides me with a drop down list of options. And I understand how that's helpful to doctors to kind of have a small array of words, so that they can consistently deal with certain things. But as I was saying, I have a doctor, cousin, and uncle and I was just talking to him about this, the other week were leading patients into language, about their symptoms, can cause a doctor to kind of miss diagnose something, because they're, they're prompting the patient who may or may not have, we may or may not be able to articulate the experience into words that the doctor knows are related to certain illnesses as as indicators of certain illnesses. But the patient doesn't know that. So think there's, that's something that could be improved and now these options really expresses what I was feeling at that moment anyways.

So the chatbot response to that was to say, you know, I'm sorry that this made you feel upset. And I wouldn't fault the chatbot. Because I don't think my friends would sound any better in text. But I think

this is one of the limitations of a text chat. Especially is, you know, what are you supposed to say to someone who says they're, they were upset by something? It's harder to make it come off genuine and to convey your empathy through just text, I think body language and all that it's really important.

I did not do much just wrote out the panic attack.

So again, there's a, there's a drop down menu. And similarly, oh there is an option "none of these". I didn't see it before.

There we go at the bottom, none of these represent my thinking style.

It's interesting to see the chatbot language in these options. Some of it seems to give away the non-humans of the chatbot. For instance, there's a verb tense that's wrong here. That I'm supposed suppose could be. Because the chatbot might have been programmed by someone who isn't first language English, but that feels like something that would be caught by someone who isn't who's a native speaker of English. And I think they could be expressed more as storeys. I think the even though the chatbot isn't going to know, necessarily the exact situation the persons in or even be able to tailor a specific storey to the person, representing each of these states as a kind of storey about how a person might feel in that situation, or might be thinking would be more personal. I think.

That's pretty funny. Yeah, again, I'm not sure how a human being would respond any more usefully in this sense, but it's, it's pretty funny to read the sentence, "you don't have to blame yourself". I'm not sure when that's ever helped anyone who's, who's blaming themselves.

Chatbots got some reminders for me to read. This is a little better designed than the other graphic, I think. Yeah, and especially now that we're in the age of computing, I think it's really helpful. People might be more able to understand this kind of algorithmic process that the doctors and and this guide are asking you to go through whenever you have anxious thoughts. I think checklists are good. I have read the reminders.

It's asking whether worrying about or avoiding the possibility of having a stroke really changethe probability of that happening. And I think that a person could take this in many ways, because we just went through a series of questions about ways to deal with anxious thoughts, and, you know, checklists about things your doctor might have told you to do in order to reduce your risk. And you could construe that as being worried about having a future stroke, and doing something about it. And those things, obviously do change your chance of having a stroke. But I don't think that's what the chat was asking. And so I'm gonna say no.

Yeah. Again, just going to keep saying this, I guess as we go as we go through but the chatbot doesn't seem to have an easy way of segue

into new topics, or new ideas that it's introducing into the conversation. So it all feels a bit blunt. Which isn't to say that it's questions aren't astute, obviously, medically there. Do I want to carry on like this? That's a bit of an insensitive question. But interesting. So again, it's asking a question about that could be construed in many ways, or may have a complicated answer that doesn't have a yes or no. But it's asking me to answer with yes or no. A person with a stroke may not be able to return to their usual activities. So one that can be insensitive, I suppose it might bring up their trauma again, but I mean, it has other than being insensitive there's a question of ability that's not being addressed by this question.

What would you say to your closest family member or friend? That's maybe the best interaction I've had with the chatbot. I think it's asked the question that we expect a therapist to ask. And I think it's a good question that requires an answer.

Interesting, I assume that question was a prompt for something that a doctor might see later. Because after I entered my text, the chapter kind of moved on without really acknowledging it at all. So I assume it's just for the chatbot, to capture that text.

It's interesting to see images and kind of information graphics thrown in here. Kind of the latency, as the chatbot brings that up. That sets off the interaction from the human interaction. Because even though I can do it, I still don't often seek out outside information, and put it into my conversations with friends, I might send a link after our conversation, for my friend to check out. But I don't bring in outside resources into a conversation often. So I wonder if there's a way for the chatbot to frame it as if it was its own knowledge and not refer to data.

The chatbot just asked a question that uses a number of skill. And this is kind of like the biggest the pain scale when you go into an emergency room, and they try to ask you to put a number to it. But I feel like that's really difficult, especially with something like anxiety, where it may not be bothering you in that moment. But you're, you're aware that that anxiety will occur the future. And so there's certainly some discomfort related to that. So I don't think that anyone even though I answered yes, I don't think anyone could truthfully answer that their anxiety level reached zero.

Yeah, again. chatbot just kind of moved on. So again, I just assume it's text capture and not something I'd want to put up with as a person that's just experienced a stroke.

Yeah, it's interesting. Also, I guess, as the interaction goes on, it feels more and more like a scripted interaction, which obviously it is, and even an interaction with the doctor to an extent as a scripted and interaction. But you feel less with the human being, I think, that's helpful.

It links to one of these relaxation videos on YouTube, one of those

eight hour loops. And that's, at least to me, it's funny. It's not something that I would I would go to, to actually help me.

Interviewer

How would you characterise your experience with this chatbot?

P10-2

I'm not entirely put off by it. But I think if I were somebody who was suffering from something that the chatbot was actually trying to treat, I would have very little patience with it. Specifically, because of those certain points in the conversation, where it seemed to ignore what I was saying and move on to its next step. That's not something I would expect a human being to do. If they did, I would probably just walk out of the room.

Interviewer

Did you have any difficulties with it?

P10-2

No, I think it was pretty straightforward.

Interviewer

Would you enjoy it more to do these exercises on paper? Or on a website? Or is it more fun to do it through a chatbot?

P10-2

I think there's some magic to doing it through chatbot. I think it feels like you're sending a message off into the ether. And a response is coming back to you from some magic box. So that's cool.

## D.9 Interview Codebook

Name	Description	References
Chatbot	This node is specifically concerned about the attitude towards chatbots and suggestions from people for the technologies	86
Pattern of Experience	Describes participants experience with chatting to chatbots.	44
Personalities	This includes comments about what personalities a chatbot should have.	42
Health	Health describes participants experience of stroke and anxiety, how they would inform themselves about strokes, and what strategies they have against anxiety.	139
Anxiety and Strategies	Describes participants experience with anxiety and what strategies participants use.	94
CBT	Comments about CBT related strategies	27
Relaxation	Comment about relaxations methods.	55
Stroke	Describes participants knowledge and experience with strokes and where they would seek help.	45
Perceived Risks	Perceived risks and frustration refer to the users' subjective judgment of risks and frustration involved in using the technology.	84
Addiction and Distraction	Comments related to feeling addicted or distracted by their technological devices.	50
Privacy	Includes expressed privacy concerns by the participants.	18
Software and Internet Problems	Codes related to being frustrated by software or internet problems.	16
Perceived Usefulness and Ease of Use	This theme describes participants subjective positive aspects of technology.	118
Functionality	Includes aspects of the quality and purpose of using the devices.	40
Information and Education	Involves codes related to information gained through technology and educating themselves via technology.	48
Recognizing Opportunities	Includes participants recognized opportunities through technology.	30
Usage and Experience	This theme describes the different technologies and knowledge in terms of years of usage and subjectively evaluated experience.	130
Knowledge	Information about how knowledgeable participants are with technology	25
Technologies	Describes codes about what technologies participants use.	105

Figure D 1: Summary of the interview codebook merged into the main themes.

## D.10 Qualitative Content Analysis

Participant Experience											
Barriers	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	No.
Feedback and Wording	✓		✓	✓	✓				✓	✓	6
Overload of Information	✓	✓	✓		✓					✓	5
Speed of Messages	✓			✓	✓	✓	✓				5
Suggestions	✓		✓	✓	✓		✓			✓	5
Facilitators											
Ease of Use	✓	✓	✓	✓		✓		✓	✓		8
Design of Flow	✓					✓	✓		✓	✓	5
Chatbot Personality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
Fun and Engaging	✓	✓	✓	✓	✓		✓	✓	✓	✓	9

Table D.1: Summary of participants experience of using the chatbot