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COVID Contact Tracing App: User Perspectives and Experience Research

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1 Introduction

1.1 Purpose

As part of the national response to Covid-19 in Ireland, work is underway to develop a new mobile COVID-19 application (app) for real-time symptom tracking and digital contact tracing. The aim of the app is to enable the health services to map and predict the spread of COVID-19 in support of the overall goal to flatten the curve and slow and prevent the spread of COVID-19 to others in our community. As well as being of benefit in the immediate fight against Covid-19, the app will have particular benefits in helping people return to normal life as the emergency measures currently in place can be lifted.

Optimising user experience is a key part of developing a successful app and can be leveraged to improve adoption and usage over time. Therefore, the purpose of this study was to investigate the usability of the COVID Tracker app amongst the general public and to identify any potential issues, areas for improvement and further design considerations. In Ireland, 42.1% of the adult population have low ICT skills (1) and 40.2% have either problematic or inadequate levels of health literacy, with difficulty accessing understanding and acting on health information (2). Difficulty with these skills has implications for using mHealth, such as mobile apps and portals and, as such, the development of mHealth will ideally consider health literacy in the design and development approach. Therefore, this study also considered the health literacy of participants to identify any differences in user experience by degree of health literacy.

1.2 Report overview

This report presents a summary of the approach and results from a mixed-methods user experiences research study, undertaken at an early stage of the app development, with a baseline version of the app. The results have informed the design and development, and further research to support the development of the App. The next section (Section 2) provides an overview of the methodology. The results of the study are presented in Section 3 and Section 4 concludes the report.

2 Methodology

2.1 Overview

Qualitative research is invaluable in the process of technology development and testing, allowing a range of potential users to raise issues or concerns that developers and researchers may not have considered. Qualitative user feedback has been shown to improve the acceptability and feasibility of health interventions, allowing developers to modify interventions to make them more relevant, persuasive, accessible and engaging for users (3). In developing an app aimed at all members of society and given the societal benefits of high usage levels of the app in question, it is vital that the app is tested among prospective users of varying age groups and backgrounds to ensure it is accessible for all.

Two separate qualitative research protocols were used to produce data about the functionality of the COVID Tracker app as part of a 'mixed-methods approach'. The mixed-methods protocol has been used by Yardley et al. (4) in the development of a web-based intervention to reduce transmission of colds and flu. In the study of Yardley et al., a mixed-methods approach enabled the researchers to 'identify important…beliefs and factors that should be addressed by interventions aiming to reduce infection transmission' (p.18-19). The success of Yardley et al. in gathering data on an eHealth app with a function broadly similar to that of the COVID Tracker app informed our decision to use a mixed-methods approach.

Focus groups were used to gather user perspectives on the concept of the app as well as wireframes of how it would look and function. A focus group is a qualitative research technique that brings a group of people together to discuss their perceptions, opinions, beliefs and attitudes towards a product, service, or concept. **Cognitive interviews**, using the **'think aloud' technique** were also conducted. In these interviews, the participant was asked to navigate the app on their phone, verbalising and sharing their thoughts about and impressions of the app as they explored its various functions.

Both methods, focus-group testing and 'think aloud' interviews, have been identified as important components of a 'person-based' approach to designing and implementing health interventions. Yardley et al. note that '(t)he aim of a person-based approach is to ground the development of behaviour change interventions in a sensitive awareness of the perspective and lives of the people who will use them' (3, p.1). Elsewhere, Yardley et al. argue that 'there is widespread consensus in the eHealth research community that eliciting and addressing the needs and perspective of the intended intervention user is a vital part of good intervention development' (5, p.2). Importantly, the

data yielded by a person-centred approach can refine the intervention in question. Yardley defends the person-centred approach on the grounds that

> *(it) yields vital insights into how different people in different situations perceive and execute the behavioural elements of the intervention, why some elements may be particularly necessary or salient to them – or alternatively may be aversive or problematic – and thus how the intervention can be made more attractive, persuasive and feasible to implement. (p.2)*

Thus, data gathered from these qualitative methods can be incorporated throughout the iterative design process. The principles of person-centred design are also consistent with the process of 'user experience' (UX) design. Indeed, UX design might be understood as the codification of practical actions to implement person-centred design. In this approach, the entire range of an individual's experiences and responses to the app inform the development of the final product. The UX designer explorers the motivation of users who engage with a service or product. User responses to the functionality and features of the product are recorded and incorporated into development, as well as the user's sense of the aesthetic balance of the product. In the terms of the UX design process, this pattern can be reduced to the questions, 'why' (what motivates a user?), 'what' (how does the user engage with the functions?) and 'how' (does the user find the product aesthetically pleasing and accessible?).

While the focus-group protocol is familiar to most, the reader might be less conversant with the 'think aloud' interview. As such, a brief description of the method is warranted here. In a think-aloud interview, participants are asked to 'verbalise their thoughts, impressions and feelings whilst engaging with an app' and 'the role of the researcher in a think aloud study is to retreat to the background and only prompt participants when necessary' (6, p.3).

The method is theoretically robust insofar as it recognises that other qualitative research instruments, such as questionnaires, rely on the recall ability of participants in recording their insights. By contrast, the think-aloud interview generates observations and data 'in real time' (6). Arguably, the think-aloud research protocol results in participants volunteering insights that are more spontaneous. Focus-groups and questionnaires frame and constrain the possible reactions of participants to the intervention by posing questions, to which participants respond. The spontaneous verbalisation of the user's experience in the 'think-aloud' interview generates data which can be considered a more organic or unmediated representation of the actual process of interacting with an intervention.

Recent research has used the technique to examine attitudes towards public health apps. Perski et al. deploy the think-aloud protocol in evaluating the effectiveness of apps designed to reduce

smoking and problem drinking (6). Similarly, Crane et al. use think-aloud interviews to gauge the functionality of an app designed to reduce alcohol consumption (7), Roswell et al. rely on the method to evaluate the functionality of an app intended to promote physical activity for people with diabetes (8) and Minen et al. use think-aloud interviews in evaluating an app designed to enable the management of migraine (9).

Given the aforementioned statistics on low ICT skills and low levels of health literacy in Ireland, participants in the study were chosen to ensure a mix of ages and IT skill levels were represented. All participants in both the focus groups and the interviews were asked a question to gauge their health literacy level to ensure a mix of health literacy levels were also represented.

2.2 Focus groups

Focus groups were conducted as a first step in the user research in order to provide early insights and feedback to the development and communications teams involved in the app. Focus groups were facilitated by a market research company, with researchers from the Department of Health providing key questions to guide the focus group discussion. This list of questions is included in the document as Appendix 1. The focus groups were observed by researchers from the Department of Health.

The key objectives of the focus groups were to understand perceptions and feelings in relation to current app usage and sharing personal data, to explore understanding of key language used in COVID-19 communication, to gauge reaction to the symptom tracing app technology, to explore reaction to the app name, design, and look and feel, including tone of the language used and to explore initial reactions to the content and flow of the app.

Due to the current restrictions on movement in Ireland in response to the COVID-19 pandemic, the two focus groups took place online, using Zoom video calling software. The share screen function was used in order to show participants prototypes and wireframes of the app. At the beginning of each group, participants were asked a question related to health literacy; *'How confident are you filling out medical forms by yourself? Are you extremely confident, quite a bit, somewhat confident, a little bit or not at all confident?'* This question has been previously validated for detecting inadequate health literacy (10).

Participants

Two focus groups were conducted with 4 participants in each group (n=8). The groups were split by age group, with one group aged in their 20s and 30s and the other group aged 60+. In the group aged 60 and over, all participants said they were extremely confident filling out medical forms. In the group aged in their 20s and 30s, there was more of a mix in terms of health literacy, with

participants saying they were ‘confident’, ‘pretty confident’, ‘quite a bit’ and one saying they would ring someone for help when completing a medical form.

2.3 Cognitive interviews

As a second step in the user research, ‘think aloud’ interviews were conducted in order to test the usability of the app and to gain insight on user experience for all age groups. User interviews were conducted by researchers from the Department of Health. These interviews took place at a later stage in app development, when the app was fully functioning on smartphones. Eight individuals were provided with a version of the app for testing on their smartphone. Again, the interviews took place online using Zoom video calling software. Using the share screen function, participants were asked to make their way through the registration process for the app, as well as doing a ‘COVID check in’ or symptom check, and browsing the other information and updates on the app, while also ‘thinking aloud’ about what they were seeing, doing and thinking about on the app. In this way, the researchers could see how participants were behaving on the app, as well as hearing their impressions and thoughts throughout. At the beginning of each interview, participants were asked the above health literacy question to gauge their health literacy level.

Participants

Eight user interviews were conducted with 8 participants, 4 males and 4 females, of varying ages and varying levels of experience with technology. Participants used a mix of iOS and Android operating systems. In terms of health literacy, three participants reported being ‘extremely confident’ filling out medical forms on their own, two participants said they were ‘very confident’, one was ‘quite a bit’, one was ‘somewhat confident’ and one was ‘moderately confident and would ask for help in filling out medical form’.

2.4 Analysis

Often in this type of user research, qualitative sessions will be recorded, transcribed verbatim and analysed using inductive thematic analysis, where data is coded and organised into themes. In this way, feedback is structured under thematic areas that emerge in the data (6 - 9). Given the fast-paced nature of the project, and the need for direct feedback on specific processes and functions of the app, an expedited version of this type of data analysis was used in this case. Extensive notes were taken in each session of both the focus groups and interviews and these formed the basis of the data analysis. Analytic processes included note taking of each session, summarisation of participants’ views, identification of particular issues, as well as identification of common issues across participants and within subgroups of participants (e.g. younger and older participants).

Recordings of the sessions were also taken but were referred to only if needed for clarification of notes.

For the focus groups, notes were made by three researchers from the Department of Health as well as by the market research company facilitating the groups. Notes from the researchers were collated and summarised, data was grouped under the key research questions in the discussion guide or under new questions that emerged in the discussion. Similarities and differences were identified across participants and common opinions were noted. Commonalities occurring in particular groups of participants, e.g. younger versus older participants were also noted.

For the user interviews, participants' experience using each page of the app were summarised. Any issues participants had with the content and/or functionality on each page were identified and noted. Feedback on each page was then grouped under particular app processes e.g. 'Registering as a user', or particular app functions e.g. 'COVID Check-in'. Feedback that occurred on multiple pages were grouped under 'Overall' comments. Data was collated across participants, similarities and differences were identified, recurring opinions or issues were noted and commonalities occurring in groups of participants were also noted.

3 Findings

3.1 Focus Groups

The market research company who facilitated the focus groups produced a presentation summarising their findings. This presentation is included in this document as Appendix 2. Three Department of Health officials observed the focus group discussions. Salient observations of the market research company and the Department of Health Officials are summarised below.

3.1.1 Digital and eHealth literacy

Both focus groups were asked questions framed to capture information about the participants' digital literacy. Participants were asked about their use of apps which monitored lifestyle, activity levels and other indices of health. The older cohort reported lower levels of engagement with apps such as Strava™ or Nike+™. The market research company describes this cohort as 'capable but not confident' in its interaction with apps. By contrast and, as expected, the younger group reported greater use of fitness tracking and other health apps. However, both groups expressed sincere and grave reservations about the ability of fitness and health apps to record personal information and health or medical data points. Participants were concerned with the use and sharing of their data by multinational companies and governments. These fears were particularly pronounced among the younger cohort which took steps to actively disable location monitoring functions of certain apps.

3.1.2 Gauging reactions to concept and functionality of COVID-19 app

These privacy concerns notwithstanding, participants were enthusiastic about the concept of an app designed to facilitate contact tracing. Participants expressed confidence in the HSE and the government and indicated that they would be willing to share their data without hesitation. Moreover, participants suggested that the app would benefit from and foster solidarity among the public in the national 'fight' against the novel coronavirus. As one participant put it, 'they (the HSE) can have anything they need from me at the moment'. Indeed, they welcomed the fact that an authoritative source of information might soon be available in the form of an app.

3.1.3 Reactions to the app user interface

Participants were shown screenshots of the app and their views on each screen were solicited. The summary provided by the market research company captures in detail the participants' responses to each screen. A 'spontaneous positive response' to the graphical user interface was observed in both groups. In particular, the yellow colour scheme is easily recognisable as part of the government's COVID-19 communication strategy. However, a number of participants observed that the HSE and

Government of Ireland logos were quite small. Given the importance of these institutions in guaranteeing the authority of the app and its trustworthiness, they suggested that these logos should be enlarged. Indeed, the response to the opening screen of the app was met with ambivalence. A number of participants noted that the purpose and function of the app was not immediately apparent. Further, the ambiguity was compounded by the fact that the logo was not distinctive and could easily be confused with that of Focus Ireland.

3.1.4 Registration process

Participants voiced no major concerns at the process of text message verification. Indeed, a number of participants observed that the practice has become standard across a range of apps offered by different service providers. Moreover, the text verification process instilled confidence in the app.

The group was asked to reflect on a screen which required the user to agree to the privacy policy of the app. A number of participants noted that they would agree to the privacy policy without reading it closely.

The participants noted that they would have no objection, in principle, to enabling the various tracking functions of the app. However, they suggested that what they were agreeing to and enabling should be made more explicit at an earlier stage in a user's engagement with the app.

3.1.5 Using the app

Although no participant voiced any real objection to using the app, a number of participants, particularly in the younger cohort, suggested that they would need to be reminded to use the 'symptom check-in' function of the app. They suggested that the app might be amended to include a reminder function.

There was an ambivalent response to the section of the app which advised the user on what actions they should take if they were experiencing symptoms consistent with the novel coronavirus. The fact that the app simply provided a link to the HSE website was identified as a weakness. One participant observed that, if he were experiencing symptoms, he would consult the HSE website instead of the app.

3.1.6 Communications strategy

Participants were asked what would encourage them to download and use the app on a regular basis. Participants stressed the importance of a comprehensive public relations campaign. This campaign, they suggested, should clearly explain the purpose of the app and the rationale for the collection of user data. The younger cohort suggested that national celebrities could be asked to endorse and promote the app.

3.2 User Interviews

Findings are presented from the user interviews below under headings related to a particular process or function of the app, followed by overall comments.

3.2.1 Downloading the app

Participants were given instructions on how to download the app to their device for conducting the user interviews. Although the process for downloading the app for testing was more complicated than will be the case when the app is released, it should be noted that some participants struggled with this process. A step by step guide on how to download the app may be needed for some users, particularly those in older age groups.

3.2.2 Registration process

3.2.2.1 Get started

In the 'Get Started' section, some participants missed that there were three pages of information to be viewed here and had to be prompted to view further pages. This was the case for both young and older aged participants. An arrow signalling the ability to swipe across could be helpful to highlight to users that there is more information available if needed. One participant suggested that making the progress dots on the bottom of the page more prominent could help to draw attention to the other pages before clicking the 'Get Started' button.

In terms of the information itself, some participants, particularly those of an older age group, felt the font size could be bigger and the text more spaced out. The use of bullet points was suggested here to make the information more accessible. There was positive feedback, however, that the information provided was clear on what the app was about and what the HSE requires from the user.

3.2.2.2 Your data

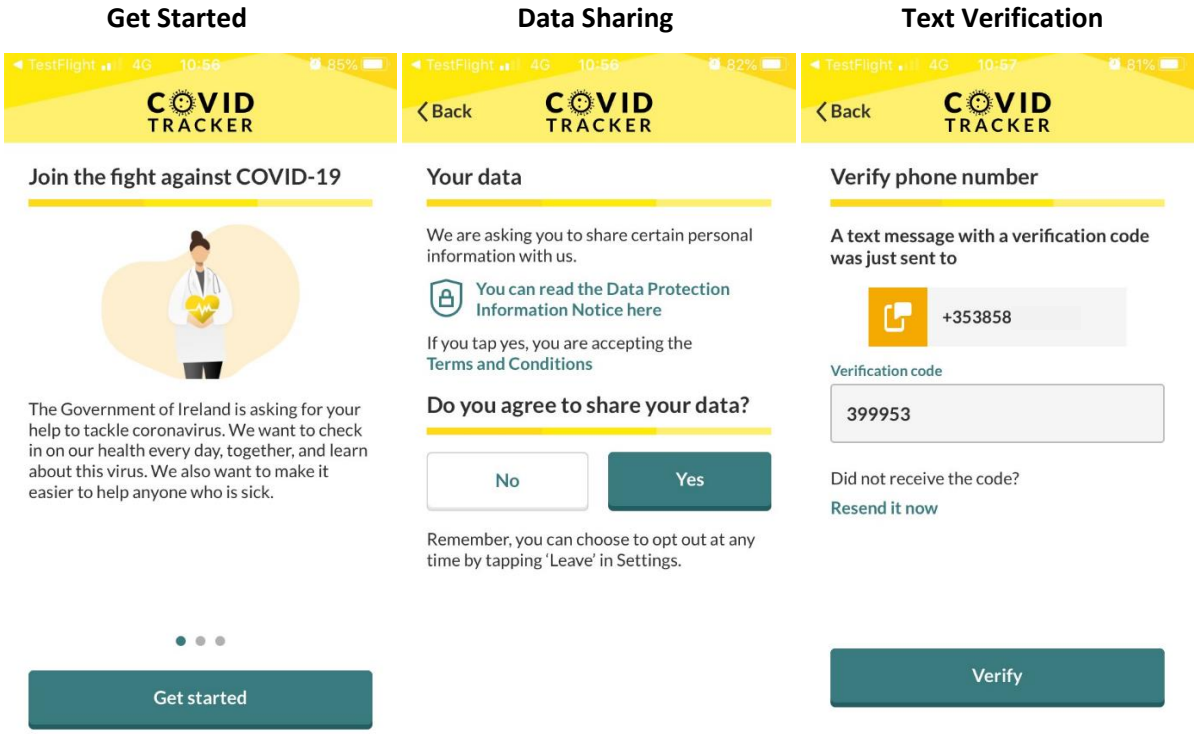
One participant asked immediately what the GDPR implications of the app are. The participant had read media reports about the development. Data privacy was 'a massive concern'. He asked, 'What am I sharing? What are people sharing their data for?' The participant noted that the app asked, 'Do you agree to share your data?' He was unsure at this point what he was agreeing to; 'I want to know how the Bluetooth system works before agreeing to this'. Most participants, however, were happy to share their data, didn't attempt to read the data protection notice, and progressed quickly to the next page.

3.2.2.3 *Text verification*

There were some minor issues with the text verification process, particularly among older users. One user noted that when the number was received by her phone, it was quite hard to find. It was not obvious that she had received the code or that she might need to check her 'Messages' application. Overall, however, users found this process clear and straightforward. One participant mentioned that the gap between the field where you enter your number and the buttons on the bottom of the page to progress was a little too big and she didn't immediately see that pressing the button was necessary to continue. She suggested moving the 'Verify' button up higher on the screen.

3.2.2.4 *Permissions*

As in the 'Get Started' section, in the 'Permissions' section some participants did not see that there were multiple pages to be viewed by swiping across. The font size could also be bigger here and the information more spaced out. One participant expressed confidence in the app and was happy to give permission for data sharing and location tracking. She agreed to share her data 'without reservation'. Overall, the app looks trustworthy. One participant highlighted that the app does not ask for any information which would raise a red flag, such as a PPS number, though some concern was raised about the use of Bluetooth.



3.2.3 COVID Check-in

When arriving to the Updates tab, the majority of participants was initially drawn to 'Today's Fight' and the information below, rather than the 'COVID Check-in'. Participants suggested that, this being the main function of the app, it should be more prominent onscreen and should be where you are drawn to first. This could perhaps be in a different colour or made larger or more obvious in some way. One participant noted that it might be difficult to motivate users to continue to do this every day if they are feeling well. He believed advertising would be key to keeping up momentum on this. Another participant suggested a daily reminder for this purpose.

The information provided on the first page of the 'COVID Check-in' was again quite small for some users and not spaced out enough. One user noted that this screen contained half a blank page. Spacing the text out more and making it larger would be beneficial for elderly users. However, the position of the 'Yes' button here was mentioned as being clearer than the position on the bottom of the page in other sections. One participant mentioned that not having to input a name or address was reassuring from a privacy point of view. Another participant mentioned that there was some repetition of the information here and on the following page where users enter their gender and year of birth.

Entering symptom information was clear and straightforward for all users. Links to more information on the HSE website were valued by the participants. One participant felt that the font size and spacing on the HSE website was more appropriate than on the app. Another participant highlighted the relaxed, conversational language used in this section which she felt would re-assure people who were not very competent with technology. She welcomed the fact that the app presents HSE guidelines in 'black and white'. She felt that any advice received through the app would be clear and reputable. The sentence referring to symptoms being a match for COVID-19 could be bolder or made more obvious to users, this being very important information.

3.2.4 Updates and information

The information presented in this section was clear to all users and presented well, even for those that would not consider themselves 'very tech savvy'. The font size was a bit small for one user on the 'How COVID-19 is spreading' graph, for example, the 'community transmission' text. On the national breakdown page, one participant suggested having a breakdown by province as well as by county and mentioned that percentages should be displayed with one decimal point.

3.2.5 Contact tracing

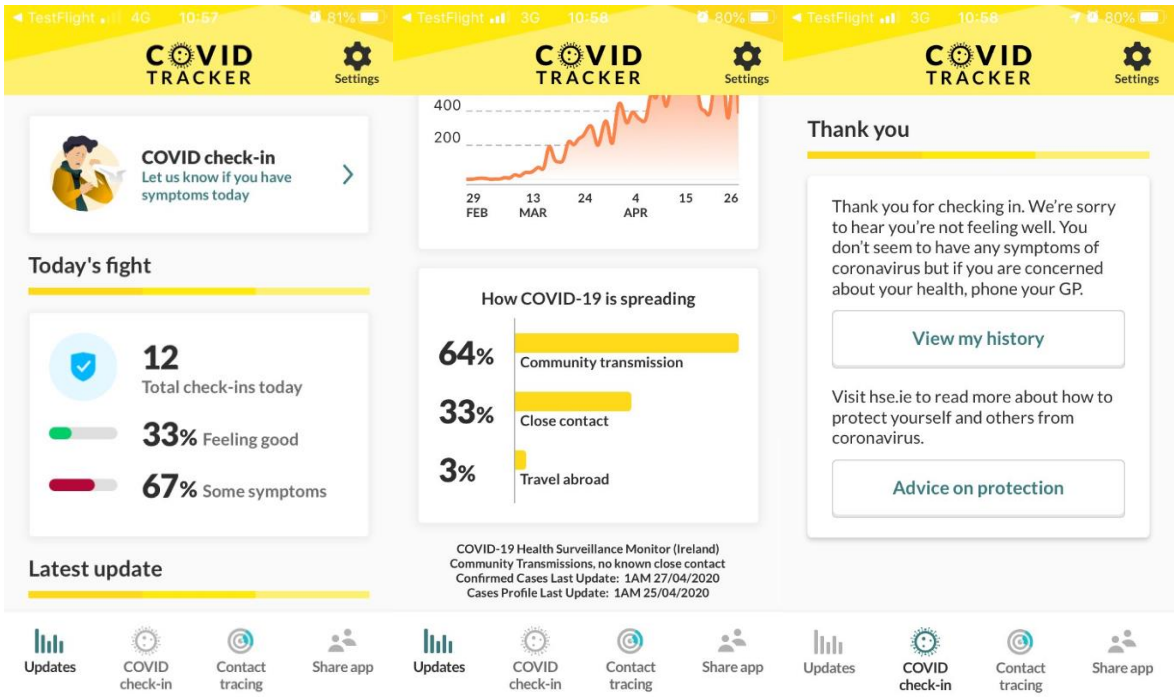
In terms of the contact tracing tab it was felt that a bit more information on how this would work and the rationale for asking users to do this was needed. It was suggested that including the average

number of people infected by one confirmed case could be displayed here, as well as reference to reducing this number. One user assumed this was tracking location history rather than the contacts the phone had made via Bluetooth. Some users, however, liked the amount of information provided and thought it was not overbearing. They felt that the app provided a good call to action and could be key to getting people back to work. The option to 'share' the app was straightforward for users and didn't bring up any particular issues.

3.2.6 Settings

Users found it reassuring to be able to delete their data on the Debug Trace page, and that they could choose whether to share it with the HSE. The option to leave the app at any time was also liked by participants. One participant who tried this at the end of the interview was pleasantly surprised that you didn't have to 'jump through hoops' to leave the app. It was noted by one participant that there should be a similar option to change their permission settings (turn on/off) on the Permission page, as an older user for example might not know how to do this in phone settings. Another participant also assumed that you could do this. A female participant mentioned that it could be useful to include symptom history in the Your Information page in Settings.

COVID Check-in **Updates** **Links to HSE**



3.2.7 Overall look and feel

Overall there were positive reactions to the look and feel of the app. The colour scheme is instantly recognisable. One participant felt that it was clearly linked to the government's existing publicity

material about COVID-19. The look and layout of the app is modern, 'up to date' and 'feels professional'.

Several users, however felt the text was too small throughout the app. One participant suggested the information should be displayed in bullet points rather than in paragraph style. She felt people would be more likely to read information presented in bullet points. Another participant noted that many of the screens include a lot of blank space which could facilitate a larger font.

3.2.8 Overall usability

Overall the app is well designed and has a simple, user-friendly interface with relevant information. It was described as 'accessible and straightforward'. One participant felt that she could 'fly through the app in 3 minutes'. She felt this is important as people are so busy. A few users mentioned that you could check in with the app while eating your breakfast or on your morning commute. One participant noted that the app does not require undue concentration and she contrasted this with the intimidating forms received as part of the census. Her elderly parents could and would use it. The same participant mentioned that the app gave her a sense of performing a public service. 'I'm doing my duty by logging on'. The word 'tracker' suggests you're doing your bit.

Some users highlighted that there could be pushback on a government app that collects location data, or uses Bluetooth, though most were not personally concerned about sharing this data in the circumstances. One participant felt that there should be a clear summary of what you're signing up to. He felt that you should, at the least, be required to scroll through the data protection policy before you can proceed through the app. He felt that, as it stands, the design of the app encourages you to click through the screens without considering the data sharing policy in depth.

Some users experienced navigation issues and had to be prompted to move on from certain pages. Some participants did not recognise the navigation bar at the bottom of the screen would bring them to other parts of the app, they were looking for a 'back' or 'next' button. Highlighting the navigation bar and what it does would be beneficial, particularly for older users. It may help to make it clearer that the page the user is on is highlighted or selected, and thus drawing attention to the other options that can be selected.

In terms of additional information to include, there was a suggestion to provide a link to the Covid-19 payment application, and another to include a FAQ page on COVID-19 along with more links to up to date HSE information. For example, 'If I have already had COVID-19, can I get it again?'.

3.3 Summary of design considerations

This section presents a summary of design considerations resulting from the user research from an app development perspective.

3.3.1 Navigation

It is not clear to users that there are multiple screens to view on both the 'Get Started' and 'Permissions' sections. This needs to be made more obvious with the inclusion of an arrow or some indication to swipe across.

Some users are not recognising the bar at the bottom of the screen is a navigation bar that can bring them to different sections of the app. It may help to make it more obvious that one page is selected over another. At the moment it appears slightly bolder, but could this be enhanced?

The space between the end of text and the button to continue is not consistent. It sometimes appears immediately below the text and sometimes appears at the bottom of the screen. Could all buttons appear a small distance below the end of text?

3.3.2 COVID Check-in

Upon arriving to the first page after registration, users are immediately drawn to 'Today's Fight' and the information below rather than to the 'COVID Check-in'. Being the main function of the app, could the COVID Check-in box be made more prominent to ensure users are drawn here first?

An option to set up a daily check-in reminder would help users to remember to do this every day.

The sentence referring to symptoms being a match for COVID-19 could be bolder or made more obvious to users, this being very important information.

3.3.3 Information

More information in relation to how the contact tracing works, both during the registration process and on the contact tracing tab, was mentioned by users to ensure buy-in from all.

3.3.4 Look and feel

The text is small throughout the app and in some areas, there is plenty of blank space to facilitate a larger font size and more spacing. This would be beneficial particularly for older users.

4 Conclusions

Both qualitative methods, the focus groups and think aloud interviews, offered insights into how users in Ireland would react to and use the COVID Tracker app, insights that would not have been gleaned from standard quality assurance processes in app development. Given the national importance of uptake and regular use of the app, insights such as these will be vital to developing an acceptable and easy to use app. However, limitations of the study should also be mentioned here. The small sample size used will naturally limit the generalisability of the findings to all potential users of the app. The fact that the interviews took place online may have also biased the sample towards with greater ICT literacy. The necessity to conduct the research online created some friction. In particular, using the screen share function proved difficult during some interviews, causing lag on the audio and other issues. Finally, the research design provided a single snapshot of user perspectives and experience only, i.e. we did not track participants' use of the app over time.

Notwithstanding the theoretical sophistication and increased popularity of think-aloud interviews in digital health interventions, the limitations of the research exercise should be noted. Perski et al. reflect that 'further research is required to assess whether the inclusion of features judged by participants to be important for engagement…is in fact accompanied by higher levels of engagement' (6, p.11). Moreover, 'it has been argued that the use of think-aloud methodology to elicit data might be…problematic as it is cognitively demanding to complete…assigned tasks whilst verbalising…thoughts'. These limitations should be borne in mind when considering whether to implement changes suggested by the think-aloud interviews. Further, this research is not intended to be nationally representative. With 8 participants taking part in the focus groups and 8 taking part in the think aloud interviews (n=16), it is important to critically engage with results and feedback and consider these results presented in this paper so far and in the remainder of this section, in conjunction with other sources of data and evidence.

4.1.1 App concept and data sharing

Participants are in general open to the concept of a contact tracing app. Most participants expressed confidence in the HSE and indicated that they would be willing to share their data without hesitation for this purpose, assuming data would be used for this purpose only. Using the app would help them to feel like they were 'doing their bit'. Some concerns were raised over the Bluetooth tracing function. It was felt that more information should be provided upfront on how contact tracing would work and what data exactly they are agreeing to share by using the app.

4.1.2 App Interface

The app interface was perceived positively overall. The colour scheme is instantly recognisable as part of the government's COVID-19 communication strategy and the app has a professional look and feel. One comment was made about the similarity between the look of the app and the logo of Focus Ireland in the focus group, but no issues were raised in this regard in the user interviews. The simple, conversational language used in the app was liked by participants, with no intimidating or unnecessary jargon. Some users struggled with the small font size throughout the app, particularly given the large amount of blank space on some pages.

4.1.3 Registration

The registration process was relatively straightforward, especially for those who are used to downloading and using apps regularly. Some minor issues emerged with the text verification process, which may benefit from more detailed instructions for older users and those not as tech savvy. Other reactions on the registration process related to the need for more detailed information in terms of data sharing and how data would be used.

4.1.4 Main functions

Of the main functions of the app, the COVID Check in, the provision of information and updates and the contact tracing function, the most confusion surrounded the contact tracing function. It was not clear to participants how this worked and what was required of them. Participants felt the other functions were straightforward, though some felt a reminder for the daily symptom check in would help with engagement, and that the COVID Check in could be more prominent on the opening page.

4.1.5 App usability

Overall app usability was good. The main issues emerging from the user interviews were around the clarity of navigation features. A number of participants did not recognise when further pages could be viewed by swiping, and some did not recognise the bottom display bar as a navigation bar to take them to other pages. Both of these features could be more obvious to users with arrows or symbols.

4.1.6 Public engagement

Participants stressed the importance of a comprehensive public engagement campaign to support app users. The campaign should clearly explain the purpose of the app and the rationale for the collection of user data to ensure there would be 'buy in'. The younger cohort suggested that national celebrities could be asked to endorse and promote the app, alongside our political and medical leaders, e.g. The Chief Medical Officer, Minister for Health, and the Taoiseach.

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6 Appendix: Focus Group Discussion Guide

Health literacy skills screening question: Before we begin, I have one question to ask you about health information.

''How confident are you filling out medical forms by yourself?''

Are you: extremely, quite a bit, somewhat, a little bit, or not at all confident?

Opening: Many countries across the world have started using mobile Apps to help the national effort to fight covid-19. Citizens can share information about how they feel and receive information from official sources about staying safe and well.

If Ireland was to do this, it would be helpful to know what you think and how this might fit into your daily life.

1. **Gauging current use and preferences (*skip if answer to first question is no*)**

For interviewer: you could allow people to look at their phones for this

- Do you currently use any Health Apps or activity tracking devices e.g. Fitbit, Apple Watch, Strava etc? How often?
- Do you share your location on any Apps (health or other), platforms, devices (explore don't know)?
- Are you connected with friends, family, or other users on any App (health or other)? How much does this matter?
- If you have stopped using an Apps (health or other), what was the reason?

2. **Gauging perceptions of key functions and purpose**

- What do you understand by the term 'symptom tracking'?
- What does the term 'data sharing' mean to you?
    - What concerns you and what reassures you?
- How would you feel if you could see the number of covid-19 **cases** in your county?
    - In the area that you live, e.g. your town, village or within 2 kms of where you live?
- How would you feel if you could see the number of reported covid-19 **symptoms** in your county?
    - In the area that you live, e.g. your town, village or within 2 kms of where you live?
- How would you feel if you could see the number of people who have **recovered** from covid-19 in your county?
    - In the area that you live, e.g. your town, village or within 2 kms of where you live?

3. **Gauging impact of information about staying safe and healthy, and covid-19 discourse**

- What comes to mind when you hear the terms:
    - self-isolating?
    - Social-distancing?
    - Physical distancing?
    - Do you prefer one over another?

- Can you tell me about any public information about covid-19 that has reassured you lately?
- Who or where did that information come from? E.g. website, public figure? A local figure e.g. GP?

4. Gauging reaction to the App name and appearance

Here is an example of an App for Ireland **show relevant wireframes for each of the following questions**

- First reactions
    - Tell me what you like and dislike about the look of the App?
- What are your views on the name **Fight Together**?
    - What about the name **Prevent Together** compared with Fight Together?

5. Functionality

- Direct participants to look at the registration screens
- Note for MCCP: gauge a sense of how willing people would be to allow the requested permissions for an app like this.
    - Views on entering personal details
    - Reaction to permissions pages

- Direct participants to look at check-in screens
    - Check-in for the first time: what do you like or dislike about this?
    - Check in day 2: what do you like or dislike about this?
    - What do you think about the names "Covid Check", "Symptom Check" "Check-in" - which do you prefer and why?
    - Information on the check-in screen: what do you like/dislike about the information presented on this screen?

- Direct participants to look at the symptom reporting screens
    - what do you like/dislike about this process?

6. Wrapping up

- How trustworthy do you think this App is as source of information?
- Finally, overall, how important do you think this App is to the overall efforts of the HSE in fighting covid-19?

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