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Understanding University Students' Experiences of Engaging with AI and Apps for their Mental Health and Well-being: A Qualitative Study

Julia Groot, Ben Ainsworth, Nathalia Gjersoe, Christopher Clarke, Richard Hamshaw, Mark Brosnan

Submitted to: Journal of Medical Internet Research
on: April 02, 2025

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Julia Groot[1] PhD; Ben Ainsworth[2] PhD; Nathalia Gjersoe[1] PhD; Christopher Clarke[3] PhD; Richard Hamshaw[1] PhD; Mark Brosnan[4] PhD

[1]Department of Psychology University of Bath Bath GB
[2]School of Psychology Faculty of Environmental and Life Sciences University of Southampton Southampton GB
[3]Department of Computer Science University of Bath Bath GB
[4]Centre for Applied Autism Research, Department of Psychology University of Bath Bath GB

Corresponding Author:
Julia Groot PhD
Department of Psychology
University of Bath
Claverton Down
Bath
GB

Preprint
Not Peer-Reviewed
Not Yet Published

Abstract

Background: Fully automated digital technologies, such as AI and apps, provide a particularly promising way to promote and support mental health and well-being in university students due to their accessibility, scalability and cost-effectiveness amongst other factors. Nevertheless, they are currently impeded by suboptimal engagement and high dropout, limiting its effectiveness to promote and support mental health and well-being.

Objective: This study aimed to understand university students' experiences of engaging with AI and apps to promote and support mental health and well-being.

Methods: University students were recruited who did not currently experience a mental health condition to ensure a non-clinical sample. Qualitative semi-structured interviews were adopted and focused on students' experiences of engagement with AI and apps for their mental health and well-being. These interviews were conducted in April and May 2023 and lasted 30:02 minutes on average. Interviews were transcribed verbatim and analysed using a reflexive Thematic Analysis (TA).

Results: A total of 21 interviews were conducted. Four main themes and four subthemes were constructed. The first main theme refers to the 'need' to engage with AI and apps for mental health and well-being. Specifically, this theme describes how non-clinical students would primarily use these technologies as support strategy when their mental health and well-being deteriorates, and their pre-existing mental health and well-being strategies are insufficient. The second theme refers to AI and apps as both a barrier and solution to stigma; while students are less inclined to access mental health apps due to stigma, they also consider apps to be less intrusive compared to other forms of support. The third theme considers a lack of trust in AI and apps. This lack of trust primarily exists due to a scepticism in the capabilities of AI and apps supporting and promoting mental health and well-being, and its (in)ability to safeguard mental health and well-being. The final theme describes how usage is dependent on unique AI and app characteristics. Students may engage more in AI and apps when humanity, warmth and care are considered less crucial, and when a lack of judgement and pressure is considered imperative.

Conclusions: Overall, non-clinical university students were more likely to engage with AI and apps when they experienced a decline in their mental health and well-being. Thus, it could be more beneficial to adopt apps these technologies as support strategy rather than as a promotional strategy in a non-clinical sample. Furthermore, future policy and practice should implement strategies to safeguard mental health and well-being in AI and apps, and provide open and honest communication about capabilities of AI and apps in order to build trust and enhance engagement with digital technologies for mental health support.

(JMIR Preprints 02/04/2025:75381)
DOI: https://doi.org/10.2196/preprints.75381

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Julia Groot[1], PhD; Ben Ainsworth[2], PhD; Nathalia Gjersoe[1], PhD; Christopher Clarke[3], PhD; Richard Hamshaw[1], PhD; Mark Brosnan[4], PhD

[1]Department of Psychology, University of Bath, Bath, United Kingdom

[2]School of Psychology, Faculty of Environmental and Life Sciences, University of Southampton, Southampton, United Kingdom

[3]Department of Computer Science, University of Bath, Bath, United Kingdom

[4]Centre for Applied Autism Research, Department of Psychology, University of Bath, Bath, United Kingdom

Corresponding author: Dr Julia Groot

Email: Jmdg20@bath.ac.uk

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Aim: This study aimed to understand university students' experiences of engaging with AI and apps to promote and support mental health and well-being.

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these technologies as support strategy when their mental health and well-being deteriorates, and their pre-existing mental health and well-being strategies are insufficient. The second theme refers to AI and apps as both a barrier and solution to stigma; while students are less inclined to access mental health apps due to stigma, they also consider apps to be less intrusive compared to other forms of support. The third theme considers a lack of trust in AI and apps. This lack of trust primarily exists due to a scepticism in the capabilities of AI and apps supporting and promoting mental health and well-being, and its (in)ability to safeguard mental health and well-being. The final theme describes how usage is dependent on unique AI and app characteristics. Students may engage more in AI and apps when humanity, warmth and care are considered less crucial, and when a lack of judgement and pressure is considered imperative.

Conclusion: Overall, non-clinical university students were more likely to engage with AI and apps when they experienced a decline in their mental health and well-being. Thus, it could be more beneficial to adopt apps these technologies as support strategy rather than as a promotional strategy in a non-clinical sample. Furthermore, future policy and practice should implement strategies to safeguard mental health and well-being in AI and apps, and provide open and honest communication about capabilities of AI and apps in order to build trust and enhance engagement with digital technologies for mental health support.

Keywords*: AI, apps, MHapps, mental health, well-being, support, promotion, engagement*

1. Introduction

Mental well-being is a complex construct that is commonly defined to include two perspectives: the hedonic and the eudaimonic perspective [1]. The hedonic perspective refers to a subjective experience (often summarised as happiness), which includes satisfaction with life, the presence of a positive mood and the absence of a negative mood [2]. The eudaimonic perspective is defined as a process of self-realisation which contains six dimensions: 1) autonomy, 2) purpose in life, 3) personal growth, 4) positive relations with others, 5) environmental mastery, and 6) self-acceptance [3].

A large proportion of non-clinical university students experience suboptimal levels of mental well-being [4-6]. This is likely due to the significant lifestyle changes university students experience, such as moving away from home, academic and financial pressures, and a loss of social and emotional support networks [7]. Additionally, research has suggested approximately 25% of university students experience depression and anxiety [8], and this prevalence of mental health conditions in university students continues to rise. While many universities identify a duty of care for

students' mental health and well-being, support services at universities are often overstretched [7], thereby limiting students' access to mental health and well-being support. This highlights the importance of accessible care in a non-clinical student population to prevent the onset of mental health conditions and improve their mental well-being.

A particularly promising way to deliver accessible mental health and well-being support to non-clinical university students is through fully automated digital technologies – digital technologies that do not require any form of ongoing human input to be delivered [9]. Automated digital technologies include applications ('apps') which can be accessed through technological devices such as smartphones and tablets [9]. Apps are designed to perform specific tasks, such as the delivery of activities for mental health and well-being. However, it can also include generative Artificial Intelligence (AI) which allows for greater personalisation of content, making it more relevant to the user [10]. The automated delivery through AI and apps allows for mental health and well-being support to be highly scalable and cost-effective; thereby providing an easily accessible way to access support [11]. Unsurprisingly, mental health and well-being apps are becoming increasingly prevalent. The apps market size of 6.25 billion USD in 2023 is expected to continue growing with 15.2% annually, with young adults (including university students) being its primary user [5,12].

A recent systematic review and meta-analysis indicates that automated apps and AI can effectively improve mental well-being in the non-clinical population [13]. Systematic reviews and meta-analyses also indicate that apps can effectively reduce mental health symptoms alongside improving mental well-being [14]. Additionally, AI has been shown to effectively support mental health [15]. Despite this great potential, studies have shown that these technologies suffer from suboptimal levels of engagement and high levels of dropout, thereby not reaching their full potential [16,13]. Therefore, it is crucial to provide an in-depth understanding of user engagement.

Some research has been conducted to understand engagement with specific mental health and well-being apps. Specifically, research investigated student engagement after providing them with access to a mental health app 'Thought Spot' for six months [17]. They found important app-specific determinants of continued engagement, such as detailed and inclusive content enhancing engagement, and technical errors and a lack of integration with other apps reducing engagement. Further research aimed to understand participants' engagement with mood-tracking apps [18]. They found further context-specific determinants of engagement such as enjoying keeping track of trends in their moods through calendars. Although some important findings are provided by previous research regarding engagement with mental health and well-being apps within specific contexts, the general determinants of engagement across mental health and well-being apps remain unclear.

Borghouts et al. [19] conducted a review on barriers to engagement across different mental health and well-being apps, investigating studies from 2010 until 2019. However, this review did not adopt a non-clinical university student sample, which is particularly important since the review found mental health status to be an important determinant of engagement [19]. Furthermore, tremendous digital developments have occurred since then, and the review does not include perspectives regarding engagement with more advanced technologies, such as AI. Melcher et al. [20] further conducted an empirical study to understand engagement across different mental health apps in college students, but did not conduct an in-depth qualitative analysis and may therefore provide less depth towards the contextual understanding of engagement [21]. Hence, there is a need for research into engagement with AI and apps for mental health and well-being in a non-clinical student population, adopting in-depth qualitative analyses.

1.1 Research Aim

Therefore, this study aimed to understand university students' experiences of engaging with AI and apps for their mental health and well-being.

2. Methods

2.1 Study Design

This study adopted semi-structured qualitative interviews.

Ethical approval was obtained from the Social Sciences Research Ethics Committee (formerly known as the Psychology Research Ethics Committee) at the researchers' institution.

2.1.1 Epistemological position

A constructivist epistemological stance was taken in this study. The author (JG) believes truth or meaning is constructed; therefore, this approach was adopted as it identifies that the researcher, interviewing and analysing the data, plays a role in this construction [22]. The approach also identifies that people can construct the truth or meaning differently in similar situations. Therefore, it was considered important to reflect on the author's subjectivity and its impact on the data and findings by adopting a reflexive Thematic Analysis (TA) [23].

2.1.2 Research Team

The current study was undertaken by an interdisciplinary research team. The research team consisted of a PhD student in digital mental health and well-being interventions (JG), an associate professor in digital health and behaviour change (BA), a professor in cognitive developmental psychology and an associate pro-vice-chancellor in student experiences (NG), a lecturer in human-

computer interactions (CC), a senior lecturer in social psychology and qualitative research methods (RH), and a professor in Autism Spectrum Disorder adopting digital technologies (MB).

2.1.3 Reflexivity

Personal Reflexivity. Author JG adopts a position as both an outsider (researcher) and insider (peer/student) in the current study. The remaining research team could be considered outsider researchers. JG being an insider researcher inevitably creates preconceptions regarding students' experiences of engaging with apps for mental health and well-being, shaping the construction of themes in the current study. Specifically, JG identifies the benefits and importance of engaging with AI and apps to promote and prevent mental health and well-being, while recognising the difficulty of continuously engaging with these digital tools.

Interpersonal Reflexivity. The interviewer (JG) could have been perceived by participants as a peer as well as a researcher. Research found that the most important factors for self-disclosure include the recipient being considered trustworthy and confidential – qualities the participants may have more likely instilled in a 'researcher' than a 'peer' [24]. Therefore, it was aimed to instil trust through the study environment (labs at the university), and the interviewer (JG) introducing herself as a researcher and highlighting the data confidentiality at the start of the interview. This could've made it more likely that the students perceived the interviewer as a 'researcher' and enhanced self-disclosure at times. Nevertheless, due to the similar age of the researcher and her status as a 'student', this could have led some students to perceive the interviewer as a peer at times too – reducing potential self-disclosure.

Methodological and Contextual Reflexivity. The research team is based at a university which has impacted the access and recruitment of participants in the current study. Participants were recruited from the Department of Psychology and Computer Science at the researchers' institution due to enhanced access to communication channels within these departments at this institution. Therefore, the research took place in a Western, highly educated context, and is set in a specific subgroup of the student population with specific subject knowledge and, likely, a greater interest in mental health and well-being and AI/apps.

2.2 Participants & Recruitment

Participants were recruited via convenience sampling at the researchers' institution. A study advert (with relevant information regarding the study and a link to sign up) was promoted at sites at the researchers' institution, and via online university channels. University channels used to advertise the study targeted students in the Department of Psychology and Computer Science.

To ensure confidentiality of participants, no demographic information was collected. Particularly, since demographic characteristics (such as age, gender, year of study and department) in combination with qualitative interview data was considered to lead to highly identifiable data. Therefore, general demographics of students in both departments are presented instead, see table 1.

Table 1: Demographic characteristics for the 2022/2023 student cohort in the department of Psychology and Computer Science

		Department of Psychology	**Department of Computer Science**
Gender	**Male**	15.25%	87.43%
	Female	84.75%	21.57%
Age (years)	**18 – 20**	69.33%	37.10%
	21 – 24	17.78%	17.10%
	25+	12.89%	45.80%
Level of study	**Undergraduate**	69.64%	37.39%
	Postgraduate taught	17.86%	57.68%
	Research	12.50%	4.93%
Total number of students		1120	1725

2.2.1 Sample Size

The sample size was considered using the information power principle. This suggests that the more information a sample holds, the smaller the sample is needed [25]. This study adopted a relatively broad study aim and cross-case analysis, but a dense sample specificity, use of an established theory, and strong dialogue. Therefore, the initial aim was to recruit 15-20 participants. Nevertheless, an ongoing analysis was performed to observe whether more information and recruitment of more participants was needed based on ‘code saturation’ [26]. In total, 21 participants took part in the current study.

2.2.2 Eligibility Criteria

A convenience student sample was recruited. Eligible participants for this study were 1) university students, 2) aged 18+. Participants were excluded if they: 1) were receiving treatment or

psychopharmacological drugs for a mental health condition at the time of the study, 2) they scored ≥ 10 on the PHQ-8, and 3) they scored ≥ 8 on the GAD-7. This was to ensure participants' mental health could be considered 'non-clinical', as fully automated digital technologies are considered particularly beneficial as universal interventions targeted at the general non-clinical population [27].

There were no specific inclusion/exclusion criteria regarding students' experiences with mental health and well-being apps. Therefore, some students were currently using or had used several mental health and well-being apps, while other students had never used them before. Furthermore, the apps that students had used included a range of different ones, and the results are therefore not specific to an app. This was to ensure general perspectives and experiences regarding engagement across mental health and well-being apps were considered.

2.3 Procedure

Students expressed their interest in participating in the study by signing up via a Qualtrics link on the study adverts. This Qualtrics link provided participants with the information sheet (Multimedia Appendix 1), after which they were taken to the screening questionnaires (PHQ-8 and GAD-7). After filling out the screening questionnaires, participants who were not eligible were provided with relevant information and resources for their mental health and well-being. Participants who were eligible were contacted by the researcher (JG) via email to schedule a convenient date and time for the interview to take place. The interviews took place in the labs at the researchers' institution between 19th of April and 31st of May 2023. Upon arrival in the lab, participants would once again be provided with an opportunity to read the information sheet. They would then be presented with a consent form (Multimedia Appendix 2) to obtain informed consent. Following this, a brief explanation was provided about the semi-structured interview, and participants had the opportunity to ask questions; after which the semi-structured interview was conducted (Multimedia Appendix 3), lasting 30 minutes on average. After participants had completed the semi-structured interview, they engaged in another interview that was analysed in a separate study. The interviews lasted a maximum of 1 hour in total. Once the interviews finished, participants were provided with a debrief form (Multimedia Appendix 4) and student credits or a gift voucher to thank them for their time.

2.4 Data Analysis

Data was analysed using a reflexive Thematic Analysis (TA) [23]. This was considered the most appropriate method of analysis to identify different themes/patterns of meaning regarding

students' engagement with AI and apps for their mental health and well-being. An inductive approach was adopted to analyse the data. The interviews were audio recorded using an Olympus VN-541 PC high-quality digital voice recorder. The semi-structured interviews lasted 30:02 minutes on average, ranging from 16:20 to 49:37 minutes. The recordings were transcribed using an orthographic (verbatim) transcription method. This method was adopted as it was decided that only information relevant to understanding and conceptualising the meaning would be necessary to answer the research question and would therefore be transcribed. Interview transcripts were fully anonymised, and each participant was assigned a pseudonym.

The six phases of TA proposed by Braun and Clarke were used: 1) familiarisation with the data took place, 2) transcripts were coded, 3) themes were generated, 4) themes were reviewed, 5) final defining and naming of themes, and 6) write-up took place [23]. Specifically, a reflexive journal was kept throughout the analytical process, and continuing discussions took place between author JG and the research team to further conceptualise meaning. The transcripts were coded by author JG using NVivo 14, adopting an inductive interpretive approach which at times was more descriptive in nature. Codes were regularly revisited by JG to conceptualise and construct meaning. Initial themes were constructed by JG, which were further developed and reviewed in discussion with co-authors.

3. Results

3.1 Summary of Themes and Subthemes

Four main themes and four subthemes were constructed by the authors to provide an understanding of students' perspectives and experiences of engagement with AI and apps to promote and support their mental health and well-being, see table 2.

Table 2. Overview of constructed themes and subthemes

Themes	Subthemes	Characteristics
Experiencing a 'need' to engage		This theme refers to the importance of having a mental health and well-being 'need' to engage with AI and apps. This 'need' primarily occurs when pre-existing mental health and well-being strategies are considered insufficient. Therefore, AI-based apps and apps are often not considered as 'promotional tools' but instead as 'support' for mental health and well-being.

A barrier and solution to stigma		This theme identifies stigma as a barrier to engagement with AI and apps for mental health and well-being support, potentially due to these tools primarily being considered as a 'support' rather than a 'promotion' strategy. It further identifies that AI and apps could potentially help reduce this stigma and 'normalise' accessing support through stepped care.
Lack of trust	(In)sufficient capability to support and promote mental health and well-being?	This subtheme refers to the scepticism students hold which works as a barrier towards engagement with AI and apps to promote their mental health and well-being. Specifically, it refers to the scepticism students have about these technologies' current and general ability to promote and support mental health and well-being.
	An (in)ability to safeguard mental health and well-being?	This subtheme refers to students' scepticism towards AI and apps due to the ability to,- and prioritisation of safeguarding of mental health and well-being in AI and apps, thereby reducing their engagement with apps.
Usage dependent on unique AI and app characteristics	No judgement and pressure	This subtheme highlights how the unique AI and app characteristic 'no judgement and pressure' facilitates engagement in certain situations. It identifies how an inability to judge and less perceived pressure in AI and apps provides non-intrusive access to mental health and well-being support.
	A lack of humanity, warmth and care	This subtheme highlights situations in which individuals may be more and less likely to engage with AI and apps depending upon the unique characteristic 'lack of humanity, warmth and care'. It highlights that although humanity, warmth and care are lacking, this could be

		considered a barrier as well as a facilitator to engagement, depending on each specific situation.

3.2 Theme 1: Experiencing a 'Need' to Engage

Most students identified that they did not engage with AI and apps for their mental health and well-being as they did not currently experience a mental health or well-being 'need'. Students mentioned that this lack of 'need' was due to their mental health and well-being being 'good' at that moment.

Jack: 'I don't feel the need to, I guess … Just because I think that, uhm, I do think that I could gain sort of a greater sense of well-being from it, but … I have sort of a general quite high level of well-being. And so although I think that it could promote my well-being further, it's not the most sort of pressing concern for me currently.'

Jack highlights that his mental health and well-being are good, and therefore, he does not engage with apps for his mental health and well-being. Interestingly, this is contradicting theory which considers self-actualisation a 'growth need' – a need that occurs out of a desire to grow rather than a deficiency [28]. However, perhaps students perceive mental health and well-being as a deficiency need instead of a growth need. Deficiency needs motivate people when they are unmet, and once a deficiency need has been satisfied it goes away [29]. Indeed, students identified that they used AI and apps in times of 'need', but discontinued their use once this 'need' was satisfied and went away.

Brenda: 'If I feel like … after the first session or few sessions I feel like I've- already getting better like, like a bit improving, and I'll probably like stop using it for a bit, I guess like oh, maybe I don't need any more because I'm like, become I guess more stable enough (Interviewer: "mm-hmm") to stop using it until I need it next time.'

Brenda identified that once the 'need' to engage disappeared (as her mental health improved), she would discontinue using the intervention. This may suggest students are not motivated to self-actualise through AI and apps and perceive these as relevant tools to satisfy a deficiency need instead.

Nevertheless, it may be consistent with the Technology Acceptance Model (TAM). This model suggests that engagement with AI and apps occurs when this is considered 'useful' [30]. Perhaps engaging when there is no mental health 'need' might be considered less useful.

Instead, most students mentioned that they would rather engage in other activities to promote

their mental well-being and self-actualise.

Elsa: 'If I want to promote my mental well-being, you know, I'll just go for a run after my lecture or something.'

Holly: '[Playing squash] is quite good to like switch off and it's quite a social thing as well. … I'm enjoying it.'

Holly and Elsa identified a preference to engage in other activities for their mental health and well-being. This might be because most students identified that they experience more joy and further benefits such as connectedness and improvements to their physical health when pursuing other activities. This may suggest that automated digital activities do not lead to the same satisfaction of basic psychological needs. According to the Basic Psychological Needs Theory (BPNT) the satisfaction of 1) autonomy (volition and willingness which lead to a sense of authenticity), 2) relatedness (connection, experiencing warmth, bonding and care), and 3) competence (the experience of mastery to use and extend skills and expertise) are essential for optimal mental health and well-being [31]. Hence, perhaps students pursue other well-being activities as they lead to greater satisfaction of basic psychological needs.

Since students had already implemented these other well-being activities in their daily lives, they would also often prefer to stick to these activities instead of implementing a novel app or AI activity in their daily lives. They mentioned that only when these activities did not provide the necessary support or effect for their mental health and well-being, would they consider adopting novel mental well-being strategies delivered through automated digital technologies.

Molly: 'If there is an issue with my friend group, (Interviewer: 'Mm-hmm') and I only share my problem with my friends in a situation like that, the app would be useful where I could share it with someone who is not in that situation.'

Molly highlights that her friend group would be her mental health and well-being support strategy. However, whenever she is unable to access this support strategy, she would consider looking at novel support strategies such as apps and AI.

Although students mention they are interested and open to using automated digital technologies for their mental health and well-being in times of 'need', they also identified that adopting these self-help strategies when in 'need' could be challenging. Primarily, since these interventions require individuals to self-manage their condition, rather than receiving more intensive support and guidance such as through traditional face-to-face support methods. Adopting self-help in times of 'need' could be particularly challenging when experiencing reduced mental capacity.

Henry: 'If … I feel quite stressed, I feel like having to then, perform my [app activity], might

feel unreachable, not realistic?'

Henry identifies that engaging with automated digital technologies to perform a self-guided activity could feel 'unreachable' and 'unrealistic' when in times of 'need'. Similarly, research has found that the majority of students are interested in using an app for their mental health, but that only a small proportion of students (10.7%) have actually engaged with apps during times of need [32]. This might indicate the challenge to engage with automated digital technologies when in times of 'need'.

3.3 Theme 2: A Barrier and Solution to Stigma

Another important factor impacting student engagement is public and self-stigma. While it has been suggested that AI and apps are associated with less stigma compared to traditional (non-digital) mental health support services [11], it is important to recognise that stigma still plays an important role, thereby reducing engagement. Several students identified that accessing any psychological intervention – including ones delivered digitally – is stigmatised. Perhaps this is unsurprising as stigma is considered a prominent barrier to help-seeking generally [33].

Interviewer: 'Is there anything that stops you, uhm, at the moment from using a mental well-being promotion app?'

Jack: 'Probably the stigma of using it. Uhm, as I go back to, it doesn't seem normalized, I don't know anyone who uses it.'

Jack highlights that stigma, and mental health and well-being apps and AI not being normalised, are important reasons for him not to engage. This is in line with research, which has found that self-stigma (someone's internalised attitudes) [34] has been linked to reduced help-seeking behaviours [35,36]. Jack shows self-stigma by mentioning that he personally does not think it is normalised, as he does not see anyone using it. Nevertheless, this contradicts recent findings that mental health and well-being apps are downloaded over a million times monthly [37].

However, stigma is considered more prominent when apps have been developed for specific mental health purposes (such as an AI-based therapist) as opposed to low-key well-being activities (such as journaling and mindfulness meditation). It is also considered a more prominent barrier when digital technologies are developed by recognised mental health organisations (such as universities, government, and mental health charities) compared to the private sector.

Elsa: 'Uhm, there might be a s-s-stigma? Like using the university one [university mental health app]? Opposed to like using … like headspace, and stuff like that.'

Jack: 'Depends a little bit as well on what exactly it is that you're doing in that app. (in

overlap) If it's- if it's for example, something like journaling, and there might be less stigma to than more of an AI focused kind of therapist.'

This likely arises from the perception that accessing more intensive psychological support – such as AI and apps developed by recognised mental health organisations - is associated with weakness. Yap et al. [38] refer to this specific kind of stigma as 'weak-not-sick beliefs', which is further associated with lower intentions to seek support. Indeed, several students mentioned that admitting to a decline in their mental health and well-being to an extent where they 'need' additional support is stigmatised. Therefore, students adopt other strategies before admitting to this 'need' for support and accessing AI and apps.

Harry: 'I'll like do an exercise or something like, uhm, like try to like calm down before I use any of these apps, because I feel like they're still a bit of … a bit of a pressure for me to use these apps. … I feel like I try to stay away from like, a professional kind of help, like, I'm quite an independent person.'

Harry mentions he would try another activity first, as he tries to stay away from 'professional help'. Harry mentions that he is an 'independent person', which indicates that he perceives individuals who access support to not be independent and could relate to the 'weak-not-sick belief'. This again highlights the stigma associated with accessing mental health support generally, and therefore, apps for mental health and well-being support too. Nevertheless, mental well-being promotion might also suffer from this barrier, as promotion and support were often considered interchangeably by students.

Additionally, stigma was further shown in students hiding that they were accessing support. Students identified that it is easier to hide that you are accessing support when accessing AI and apps, but even then did they express concerns that someone else could find out.

Ralph: 'So if, for example, someone has your phone and sees that, 'oh, that person has a mental health app'. That could potentially make someone less likely to download that app because they will think 'oh, what if people think that there's something wrong with me?'

Ralph mentions that someone finding a mental health and well-being app on their phone could be considered a barrier to engagement. This highlights the perceived public stigma associated with accessing any psychological intervention/support, and therefore, not wanting others to be aware of accessing this support. However, this could increase engagement relative to traditional face-to-face support methods, as it is easier to hide that you are accessing support when accessing AI and apps.

Although students highlighted stigma would prevent them from engaging with apps and AI

generally, students also identified that they could potentially provide a solution to public and self-stigma.

Anne: 'I think sometimes, with things that, with things like this that have a stigma. I think it takes people doing the small things first, to realise: 'you know what? This isn't so bad'.'

Barbara: 'I think taking that first step of trying something self-guided, might make people more willing to then contact them, use the messaging and contact someone in-, with the app.'

Anne and Barbara highlight the importance of engaging in something low-key for mental health and well-being first to improve engagement with more intensive mental health and well-being support. Indeed, Ho et al. [39] suggest that a stepped-care model could reduce stigma and improve access to those in 'need'. They suggest a stepped-care model in which different levels of care are provided; from less intensive care (such as self-guided interventions) to more intensive care (such as specialist treatment). Research further identifies several approaches that can effectively reduce (self)stigma by adopting apps. For example, education-based approaches are one of the most commonly used approaches to combat stigma [40]; furthermore, mental well-being activities (such as the positive psychology activity 'expressive writing') have been found to reduce self-stigma [41]. Both of these activities could be delivered through digital technologies and thereby help reduce stigma. Thus, AI and apps could potentially provide a crucial way of reducing stigma to alter public and self-stigma and enhance engagement with mental health and well-being support accordingly.

3.4 Theme 3: Lack of Trust

Many students recognised a great potential for apps to promote and support their mental health and well-being. However, they currently do not engage with AI and apps due to a lack of trust. Trust is defined by Mayer et al. [42] as: 'a willingness of a party to be vulnerable to the action of another party based on the expectation that the party will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party' (p.712). Indeed, relevant theory suggests that trust is an important factor determining engagement with digital technologies (Technology Acceptance Model) [30,43]. Two subthemes have been constructed identifying prominent reasons students currently lack trust which prevents them from engaging with AI and apps.

3.4.1 (In)sufficient Capability to Support and Promote Mental Health and Well-Being?

Students are aware of technologies (particularly AI) developing at an exponential rate, and expressed concerns about whether these rapidly developing technological tools are sufficiently

capable to provide support for their mental health and well-being. They identified that, at times, AI can make errors and is unable to tailor to an individual's needs.

Harry: 'I seem to get really frustrated (chuckles) when it's like a robot or like erm an AI on the other side because … there are certain things that they don't really understand.'

Harry mentions that he gets very frustrated with AI when it does not understand him. Chhabra et al. [44] indeed identified that a lack of semantic understanding (an inability to understand the queries), personalisation when responding to the query, and competency (inability to provide a fitting solution) are some of the most common limitations in AI's capabilities that can lead to frustration in individuals. Similarly, Molly mentions she is sceptical of apps' abilities to support individuals' needs.

Molly: 'I would say in-person, in-person would more likely to be more focused on what the person needs because they're probably trained (interviewer: "mm-hmm") so they know what to do exactly and in what conditions, which the app might not be able to do that.'

Nevertheless, Harry and Molly's sceptical views on AI and apps may be justified. Recent research by De Freitas et al. [45] indeed suggests that AI returns messages to mental health queries that are considered unhelpful in as many as 24.5% of cases, and messages are even considered to be risky in 38.1% of cases. Furthermore, they found that in high-risk situations such as suicide and self-harm, AI returned unhelpful and risky messages such as by suggesting talking to people with the same interests [45]. Its capability was found to depend on the clarity of communication by the user. For example, clear explicit queries for support were more accurately supported compared to vague support queries [45].

While this refers to the limited capabilities when communicating verbally, it does not take into account non-verbal communication. Students identified the importance of non-verbal expressions in mental health and well-being support - information that AI and apps are currently unable to access – and how this might limit the capability to support mental health and well-being. Non-verbal expressions could include facial expressions, eye contact, body movement, and affect [46]. These non-verbal cues may at times more accurately represent true emotional states than verbal cues [47]. Furthermore, Burgoon et al. [48] show that approximately 60-65% of interpersonal communication is displayed non-verbally. Thus, students are sceptical about AI and apps' ability to support mental health and well-being when they do not have access to any non-verbal expressions currently.

Henry: 'You might not have that same level of personal care? That you get from talking to a person? You know, they can sort of see how you're like, reacting to questions in a physical way?

Like, I don't know, sometimes you might be talking and you sort of make a face when you're thinking about something, and that might sort of indicate to a GP or a mental healthcare practitioner that, maybe you're not getting to the bottom of what- how you're actually feeling. Whereas if you're sort of messaging on an app, you might not, it might not pick up on those like nuances that an in-person appointment might sort of access.'

Meghan: 'I don't think an app is good enough for a crisis … it's not directly seeing the person. I think that's what app can't mimic, it can't see the person, and directly see what that person, how they're feeling (Interviewer: "mm"). And I think, if the person's in crisis, I just don't think the app would b-, I don't think it would be good enough?'

As Henry and Meghan mentioned, AI and apps do not directly 'see' a person's non-verbal response and how they are feeling, therefore missing important information. While this could be considered a general limitation regarding the capability of AI and apps to provide accurate and effective care, this limited capability might be particularly important in high-risk situations, such as during a crisis. Research suggests that due to limited verbal communication in a crisis, non-verbal communication may be of particular importance [49]. Thus, while students expressed general concerns about the capability of AI and apps to provide mental health and well-being support, these concerns might be particularly present for crisis situations.

Thus, students were sceptical about whether mental health and well-being can ever be fully comprehended, supported and promoted by automated digital technologies. Therefore, leading to a lack of trust which currently prevents them from engaging with AI and apps to support and promote their mental health and well-being.

3.4.2 An (In)ability to Safeguard Mental Health and Well-Being?

Another significant concern students expressed, is whether AI and apps can safeguard people's mental health and well-being. Safeguarding mental health and well-being includes protecting mental health and well-being, and preventing harm [50]. AI and apps' limited capability, and the potential harm that could occur (especially when being used in high-risk situations) raised concerns about the morality and ethicality of using AI for mental health and well-being support. Students would engage with AI and apps for their mental health and well-being more if they were aware of safeguarding systems that are in place and know that they can trust the apps' intention and ability to safeguard.

Students identified the importance of mental health and well-being being protected and safeguarded and that this should always be a priority. They mentioned that this should be at the forefront for them to trust AI and apps, and to engage with them for their mental health and well-

being. Students identified that AI and apps should only be used for mental health and well-being purposes that are safe and have been proven effective. Furthermore, whenever mental health deteriorates, students identified it is important for AI and apps to recognise this, so the individual can be signposted to healthcare professionals instead.

Carry: 'I think that maybe, it should sort of identify a point where, 'right this person needs to then be in contact with a person rather than just the app'. … I think knowing the point where you then put them in contact with the person, would be really important.'

Carry's quote identifies that professional support delivered by a person is perceived as superior to AI and apps – which is a view commonly shared among students. She therefore identified that when mental health deteriorates, safeguarding should be in place by signposting an individual from the AI or app to a mental healthcare professional. Many students identified that this was the moral and ethical obligation developers have when creating automated digital technologies for mental health and well-being.

Colin: 'If you were realising that someone was really struggling and then you didn't offer them [professional support], like in an ethical, moral standpoint, that wouldn't be very uhm righteous I think, to be almost like 'You should stay here and we can solve everything you have.'

Leo et al. [51] similarly found that when mental health symptom severity increased, a preference was displayed for human support compared to digital support – potentially due to individuals' enhanced trust in the capability and effectiveness of treatment provided by healthcare professionals.

Nevertheless, students also identified that safeguarding and signposting might be difficult due to the scalability of AI and apps. The great scalability means that many users from different cultures and backgrounds could access the app. This poses risks to safeguarding mental health, as cultural background is an important factor in the aetiology of mental health conditions as well as the expression and diagnosis associated with mental health symptoms [52].

Harry: 'I think problems could be maybe harder to monitor, because … if so many people are using this app around the world at any moment at any time, it would be very hard to have people … monitoring, uhm, whether there are these sort of safe practises ongoing.'

Harry identifies that it could be challenging to safeguard mental health when many people are using AI and apps worldwide. Safeguarding by ensuring relevant and tailored support is provided to effectively support individuals and prevent harm across different cultural backgrounds is important. Furthermore, as the expression and diagnosis differ across cultural backgrounds, it is important to consider what signposting could be in place to further safeguard mental health and well-being.

3.5 Theme 4: Usage Dependent on Unique AI and App Characteristics

Students identified that AI and apps contain unique characteristics. These unique characteristics impact the situations in which students would engage with them. This is again consistent with the widely used Technology Acceptance Model, which suggests that technological characteristics are important in determining engagement [30,53]. Although students primarily referred to AI when discussing specific technological characteristics, they may apply to general apps too.

3.5.1 No Judgement or Pressure

AI and apps contain unique characteristics that students found made it a favourable option for promotion and support of mental health and well-being in certain situations. Many students identified a concern about accessing professional support as this takes up the time of healthcare workers. Furthermore, students are aware that mental healthcare services are overwhelmed and that waiting lists are long, thereby feeling guilty about taking up healthcare workers' time. In addition, they considered that taking up another person's time adds a certain 'pressure'. Similarly, students felt social support also has a 'pressure' associated with it, while automated digital technologies do not contain this 'pressure'.

Robert: 'You don't feel like you're sort of wasting a GP's time.'

Sally: '… the pressure's off ... I feel like [face to face] is more intimidating actually, like talking to someone in person, like expressing your feelings.'

These quotes by Sally and Robert identify the pressure and burden they perceive when accessing professional and social support, taking up another person's time. Sally identified she feels more comfortable talking to an AI as there is less 'pressure'. Indeed, this was a view reflected by several students.

Another characteristic that students perceive positively is the perceived inability to judge. This was a reason for many students to engage with AI and apps for their mental health and well-being. Many students described being worried or anxious about judgement from others when seeking social support (e.g., friends and family) as well as professional support. Talking to an AI or app that is unable to judge them, therefore provides a non-intrusive way to access support.

Hayley: 'When I first started therapy, I was not as comfortable expressing <u>everything</u> to my therapist, because at the end of the day, it is a human. You're always kind of thinking that "oh, what if they judge me though?" (Interviewer: "mm") "What if they think certain things about me" (Interviewer: "mm"). Therefore applying all that to an app … you can be as blunt and honest as you

want (Interviewer: "mm-hmm").'

Nathalie: 'I think it sort of frees you to be quite open about things. Whereas, you know, in front of someone, you might feel that sort of … judgement of maybe like what you're saying.'

Hayley and Nathalie mention that when using an app, they feel less judged and therefore more comfortable expressing themselves, indicating they feel less disrupted expressing themselves to automated digital technologies compared to people. It has long been established that anxiety and fear of judgement are important factors in determining someone's willingness to seek help [54] as well as someone's willingness to be open and discuss certain topics in therapy [55]. Overall, the AI and app characteristic lacking the ability to judge enhances students' engagement for mental health and well-being purposes.

3.5.2 Lack of Humanity, Warmth & Care

Students further identified that a unique characteristic that is lacking in AI and apps is warmth and humanity, which refers to the kindness and compassion that people have for one another. This kindness and compassion are uniquely shared amongst humans. Similarly, humans can 'care' for one another, which is feeling or showing concern for or kindness to others. According to Watson [56] humans who care are 'present, open to compassion, loving, merciful, gentle, loving and kind. While AI can convincingly imitate some human feelings and expressions - such as kindness or care - through speech, the motivation for these expressions do not stem from innate and underlying feelings of warmth, kindness, and care. Therefore, humanity and warmth are important determinants for the situations in which students may engage in these digital technologies.

Ellie: '*… sometimes you just sort of need a person? … I know there's a lot that AI and, sort of, apps can do. But I think that, there's a lot to be said for being able to speak to a person. I think it gives you more of that sort of human element. There's more humanity in it.*'

Ellie mentions in this quote that AI can 'do a lot'. Which refers to AI being very capable in creating effective responses. For example, research has found that when individuals are unaware of whether a message is created by AI or a human, AI can at times better detect people's emotions and show empathy than humans can [57]. Nevertheless, Yin et al. [57] also found that when individuals are aware that a response has been generated by AI instead of a human, individuals feel more 'heard' by a human despite this response reflecting their emotions less accurately and being less empathetic. People adopting AI in the real world are aware they are talking to AI chatbots, and this could lead them to feel less heard. However, this lack of humanity seems imperative only when an individual needs humanity (e.g., when they want someone to care for them, or they want to feel understood).

Sarah: 'It depends on the circumstance and also, uhm, the reason why you decide to go to

the app in the first place.'

Sarah identifies that not every goal or purpose might require humanity. This is in line with recent research findings that AI can effectively deliver a range of different strategies that promote and support mental health and well-being that do not require humanity, such as psychoeducation, treatment adherence, and positive psychology techniques [58]. Thus, humanity, warmth, and care can function as a barrier to engagement in certain situations. However, most individuals identified a range of situations in which AI and apps could be beneficial despite the lack of humanity, warmth, and care.

Overall, AI and apps contain unique characteristics that impact the way and situations in which individuals would engage with them for their mental health and well-being. Specifically, it might provide a non-intrusive way to access mental health support due to the lack of pressure. Furthermore, individuals might be more likely to engage in situations in which a lack of judgement may be more imperative, or when they are in need of support that does not require humanity, warmth, and care.

4. Discussion

4.1 Summary of the Findings

This study aimed to understand students' experiences of engaging with AI and apps to promote and support their mental health and well-being. A reflexive thematic analysis of 21 interviews led to the construction of four main themes by the research team. These themes identified how 1) experiencing a 'need' to engage, 2) stigma as a barrier and solution, 3) a lack of trust, and 4) usage dependent on unique AI and app characteristics, can impact students' engagement with apps for their mental health and well-being.

4.2 Strengths & Limitations

A particular strength of the current qualitative study contained great information power as data saturation was achieved. The study aimed to continue recruitment until no new codes emerged. After 21 semi-structured interviews, the researcher no longer identified any further novel codes. Thus, continued recruitment was considered to lead to similar results, and the researchers believed to have captured the diversity, depth, and nuances of the phenomenon studied - demonstrating content validity [59].

Adopting an inductive thematic approach was another strength of the current study as it has the possibility to generate unanticipated insights, and insights with actionable outcomes that could

shape policy development [23]. Hence, several implications for policy and actionable outcomes for AI and app developers have been identified (see 'implications for future policy and practice').

However, a study limitation may be that students used the terms mental well-being promotion and mental health support interchangeably. Initially, the interview was focused on mental well-being promotion entirely, and therefore, a definition of mental well-being promotion was provided at the start of the interview (see Multimedia Appendix 1). Despite this, participants frequently drifted from the definition to discuss the relevance of apps for mental health support instead. Consequently, the research question was refined to include mental health support. Although refining the research question is considered good practice when adopting a reflexive qualitative approach, future research could adopt a more interactive process that involves stakeholders (such as students) in the development of the research question to ensure the primary aim is more fully realised through relevant interview questions focused on mental health support [60].

Another limitation is that complexities and contradictions may have been lost as the dataset was analysed cross-cases. This is a particular issue in larger samples [23]. When focusing on patterns, the commonalities in the dataset are identified. Nevertheless, it is important to recognise that individual differences exist. For example, the TAM identifies the importance of demographic and personality characteristics impacting engagement with digital technologies [53]. Similarly, we found that while most students would only use AI and apps for mental health and well-being when in 'need', some students would continually engage to promote their mental well-being. This loss of data is called the 'fragmentation of accounts' [61], and while this means there is a loss of contradiction within the dataset, the study's aim was to provide a general overview of the commonly experienced factors to engage with AI and apps for their mental health and well-being. Nevertheless, it is important to consider that differences in perceptions and engagement exist across individual differences, which should be further investigated in future research.

4.3 Comparison with Prior Work

The findings in the current study regarding factors determining engagement in AI and apps are consistent with factors identified in the widely used and updated version of the Technology Acceptance Model (TAM) [53]. The updated version of the TAM identifies that usefulness (which could refer to experiencing a mental health 'need'), trust, and app-characteristics are factors that can determine engagement with digital technology. Hence, the current study findings contribute to the literature by identifying factors determining engagement with AI and apps for mental health promotion and support in non-clinical university students specifically.

However, the first constructed theme, that a 'need' is required for non-clinical students to

engage, directly contradicts the idea of universal interventions for mental health and well-being promotion as suggested by the World Health Organisation [27]. Universal interventions are aimed at general (non-clinical) population groups who are not specifically 'at-risk' due to lower levels of mental health and well-being. Additionally, it contradicts the existing theory regarding self-actualisation being perceived as a growth rather than a deficiency need [28]. Students did identify an interest to engage in self-actualisation through other activities (such as sports, social activities, hobbies, etc.) as opposed to automated digital technologies. Perhaps other activities fulfil basic psychological needs better, leading to greater motivation to engage – in line with the BPNT [31].

Perhaps this could explain the large numbers of dropout and suboptimal engagement found in previous meta-analyses for mental health and well-being promotion in a non-clinical population [13]. These suboptimal levels of engagement could be explained by the current study identifying a deficiency need rather than a growth need that may be experienced to engage with apps [28]. Thus, perhaps individuals drop out and disengage once their levels of mental health and well-being are sufficient. Also, as students often described their experience with other interventions as more enjoyable, it could be that other activities may fulfil their basic psychological needs better and therefore, individuals may drop out of digital interventions and engage in other activities instead [31]. Nevertheless, research has found that non-clinical students do engage with mental health and well-being apps in the real-world [62]. Hence, future research should be conducted to understand whom engage with apps for mental health and well-being promotion in non-clinical university students.

Consistent with much research on help-seeking for mental health and well-being [35,36,38], it was found that stigma was an important factor impacting engagement. It is important to consider that these findings are positioned in a specific setting (Bath, United Kingdom) as this setting likely influences what was found. For example, Weiss et al. [63] found that different factors and indicators relate to stigma across different cultures and countries. Furthermore, research has found that stigma is more prominent in Eastern compared to Western cultures [64]. Therefore, it is important to consider that the impact of stigma may have in other cultural contexts differs (e.g., cultures with increased stigma may be more likely to engage in apps compared to in-person support as they are even more likely to hide accessing support) [64]. Thus, current study findings are positioned in university students in the UK and do not necessarily apply to different settings.

Furthermore, our findings are largely in line with research on AI for mental health and well-being support. Li et al. [15] conducted a narrative analysis in their systematic review of AI for mental health support and found that the most common negative experience with AI was an inability

for AI to fully understand individuals – consistent with our findings regarding a 'limited capability in AI-based apps'. Li et al. [15] also found that some common negative factors regarding AI included it being impersonal or individuals preferring human interaction. This again aligns with the final theme in the current study on the 'humanity, warmth, and care' lacking in AI and apps. Nevertheless, individuals who engaged with AI in Li et al. [15] considered the most positive experience with AI to be its empathetic communication, and a less commonly mentioned positive experience was AI's non-judgmental characteristic. This partially supports our findings, as we did not find an empathetic response to be an important factor when engaging with AI. Perhaps this difference could be explained as students who participated in the current study had different experiences with AI and apps - from no experience to continued usage with AI, apps, or both - compared to participants in Li et al. [15]. Nevertheless, future research could further investigate perceptions across students with different experiences with AI and apps to provide a more detailed understanding of factors that impact engagement in each scenario.

4.4 Future Directions

The themes constructed in this inductive reflexive thematic analysis have identified many different areas for future research into AI and apps to promote and support mental health and well-being in students. First, since students primarily identified interest in engaging in times of 'need', future research could focus on engagement and the effectiveness of adopting these unguided self-help interventions during times of 'need'. Indeed, a recent systematic review aimed to understand engagement with unguided self-help apps in clinical populations' but found insufficient evidence [65]. Thus, it remains unclear how effective these interventions are when in 'need'.

Second, while stigma has been identified as a barrier to engagement, it has also been proposed that AI and apps could help reduce public and self-stigma. Either through a stepped-care model [39], or through effective activities combatting stigma being incorporated into apps [40]. Nevertheless, future research is needed to investigate whether a stepped-care model that incorporates apps and engagement with activities within apps that reduce stigma could ease the public and self-stigma in a UK university setting.

Third, while this study presents common perceptions and experiences regarding engagement – such as most students primarily being interested in engaging for mental health support - it is important to consider that individual differences exist. Indeed, Borghout et al. [19] found that individual differences impacted engagement with digital technologies. However, it remains unclear which individual differences impact upon engagement with and effectiveness of digital mental well-being promotion [13]. Thus, future research should investigate the impact of individual differences in

engagement with AI and apps for mental health and well-being promotion.

4.5 Implications for Future Policy & Practice

The current study has several implications for future policy and practice. First, it was found that stigma was perceived as a common barrier to engagement in a UK setting. Therefore, policy and practice should consider ways to reduce the stigma associated with AI and apps for mental health and well-being purposes. Ho et al. [39] suggest that less intensive support may be considered less stigmatising. Hence, it may be important for digital mental well-being promotion to be advertised as distinct from more intensive digital mental health support to reduce stigma. Furthermore, other methods could be adopted to reduce public and self-stigma, including adopting education-based programmes [66].

Furthermore, developers should consider whether developing AI and apps for the purpose of mental well-being promotion is most beneficial to students. Particularly, since many students mentioned they prefer other activities for their mental well-being promotion and are more likely to use AI and apps for mental health support. Thus, students' research priorities and needs regarding AI and apps for mental health and well-being should be further understood, and perhaps future AI and app development should primarily focus on supporting mental health conditions instead of promoting mental well-being.

Finally, policy and practice should incorporate ways to safeguard mental health when making AI and apps publicly available. Mental health conditions may present and can be identified differently across cultures [52], making it more challenging to safeguard mental health when these automated digital technologies are publicly available worldwide. This may be particularly challenging as identifying high-risk individuals may have consequences for data protection and security [67]. Nevertheless, to build trust and enhance engagement with AI and apps, further strategies should be adopted by developers to safeguard mental health and well-being.

5. Conclusion

In conclusion, the current study aimed to understand university students' experiences and perspectives of engaging with AI and apps to promote and support their mental health and well-being. Several themes were constructed by the research team, identifying that: 1) most students have to experience a 'need' to engage; 2) engagement may be impeded by stigma in university students in the UK, although AI and apps might also provide a promising solution to stigma through a stepped-care model and educational activities; 3) a lack of trust in the capability of AI and apps for mental

health and well-being and its ability to safeguard are currently perceived as barriers to engagement, and policy and practice should consider ways to build trust to enhance engagement; 4) unique AI and app characteristics may determine in what situations individuals may engage. Future research should investigate for whom these digital technologies may be engaging in non-clinical populations. Finally, future policy and practice should adopt strategies to reduce public and self-stigma and build trust by incorporating safeguarding strategies for mental health and well-being, particularly when scaling these automated digital technologies worldwide. Nevertheless, these accessible and cost-effective interventions provide a promising method to support mental health and well-being in university students.

5.1 Acknowledgements

The authors are grateful for the participants for taking part in this study. This work was supported by the Economic and Social Research Council (grant 2572559) and Cyberlimbic Systems Ltd.

5.2 Data Availability Statement

In line with open research practices and data sharing policies by the Economic and Social Research Council (ESRC; part-funder of this research project), interview transcripts from this study will be made available where possible upon publication or within 12 months of completion of this PhD thesis on the University of Bath Research Data Archive.

5.3 Conflicts of Interest

The authors declare no conflict of interest regarding this manuscript.

5.4 Contributions

Design of study: JG, BA, CC, MB
Data collection: JG
Data analysis: JG, BA, NG, CC, RH, MB
Write-up: JG, BA, NG, CC, RH, MB

Preprint JMIR Publications

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