

Co-Designing Human-Centred AI Technologies for Health and Wellbeing: Approaches, Challenges, and Opportunities

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The use of Artificial Intelligence (AI) is becoming ubiquitous in technologies for health and wellbeing. However, many of these AI-based interventions often overlook the critical role of patients, healthcare professionals, and other key stakeholders and do not involve them early and inclusively enough in the design process. Thus, we propose to organise a full day hybrid workshop to discuss the challenges and opportunities to use co-design approaches as a critical methodology to meaningfully involve different key stakeholders from the very beginning of the design process taking a multidisciplinary and democratic approach to human-centred AI design. We will invite a multidisciplinary group of participants from academia and industry, as well as practitioners who will discuss their experiences, barriers, and facilitators for using co-design for designing culturally appropriate AI-based technology in diverse healthcare and wellbeing contexts.

co-design, artificial intelligence, AI, health, healthcare, wellbeing, human-centred AI

1. BACKGROUND AND MOTIVATION

The integration of Artificial Intelligence (AI) in the design of healthcare technology has increased in the last few years (Andersen et al. 2021; Rajpurkar et al. 2022; Knoche et al. 2023). AI has the potential to make healthcare more accurate and efficient, especially in clinical practices (Zajac et al. 2023) such as disease prediction and diagnosis (Khalifa et al. 2024). For instance, AI algorithms have been able to detect pathologies more accurately in medical

images (Rajpurkar et al. 2022), predict major depressive disorders (Schnyer et al. 2017), support the detection of diabetic retinopathy (Gulshan et al. 2016; Beede et al. 2020) and cancer (Lehman et al. 2019), and the construction of data-driven clinical pathways (Bettencourt-Silva et al. 2015). It could also help patients more directly by enabling them to get insights that support their quality of life (Shaheen 2021) and promote mental health via, for example, the use of chatbots or generative AI that provides advice and support (Dritse et al. 2024).

Yet, the development of AI algorithms in digital health interventions is mainly done by developers, professionals and practitioners who tend not to have direct contact with key stakeholders such as patients, caregivers, and healthcare professionals (Zytka et al. 2022; Till et al. 2023; Cajamarca et al. 2023). As a result, lay end-users and stakeholders who are impacted by this type of technology are excluded, even though they should have a say on how these technologies ought to be designed, especially in relation to ethical concerns such as data privacy and accountability. Indeed, research has shown that AI can negatively impact users when their perspectives, values, and needs are not considered at the time of developing technology that may affect them (Choi et al. 2023). For instance, biases could be propagated based on the data selected to train such AI algorithms (Wang et al. 2019). There are ethical concerns regarding the use of large amounts of sensitive personal data to train AI models (Reddy et al. 2020), as well as with the accountability for who is responsible for what AI algorithms do (Morley et al. 2020). Without careful consideration of end-user perspectives, AI-based systems may do more harm than good, especially when deployed without contextually appropriate, personalised support—as seen in applications like mental health (Dritse et al. 2024). As AI becomes increasingly prevalent and influential in daily life, it is critical that end-users and other stakeholders who are most impacted by these technologies participate proactively in shaping how they are built, starting from the earliest stages and continuing throughout the entire design process, to design culturally appropriate AI-based health technologies (Sultana et al. 2025). This entails going away from a technology-centred approach and instead taking on a human-centred approach, which is gaining increased attention in HCI at the moment (Andersen et al. 2023; Capel et al. 2023).

Co-design has been a key methodology for designing with and for vulnerable populations (Maestre et al. 2024; Harrington et al. 2019) and building more contextually situated technologies (Till et al. 2025). For example, Maestre et al. (2023) co-designed technologies that would not further stigmatise people living with chronic illness when trying to access social support, while Stawarz et al. (2023) co-designed decision-making system for people with Type 1 diabetes. Co-design has the potential to address several barriers in the design of AI-based systems, including how to involve and engage with end-users and key stakeholders in a meaningful way to foreground their needs and help design and shape the design of health technologies with positive impact for them. These in turn could help establish guidelines, regulations and policy that

could inform a more ethical design process for AI-based technology (Fijoo et al. 2020).

Given the benefits of bringing together multidisciplinary stakeholders when developing personal health technologies, especially involving AI (Ayobi et al. 2021), we propose to organise a workshop that will synergise cross-disciplinary learning from researchers, academics, practitioners, and students to discuss the challenges and opportunities for applying co-design approaches to design human-centred AI-based technology in a more ethical and inclusive way in health and wellbeing contexts.

2. AIMS AND OBJECTIVES

The main aim of the workshop will be to present and discuss participants' experiences and challenges using co-design methodologies to design, develop, or evaluate AI-based technology in healthcare as well as more broadly in health and wellbeing contexts. Potential workshop participants will be asked to submit a 2-page position paper where they would summarise their experiences in a case study format (i.e., introduction, methodology, key findings and discussion) where that would describe what was done, for what purpose, discussing key insights, lessons learned, and any future plans. We envision this workshop being a space to share and discuss challenges, lessons learned, and best practices regarding the use of co-design in designing, developing, and deploying a more human-centred AI tech for health and wellbeing.

3. WORKSHOP OVERVIEW

We propose to organise and conduct a full-day workshop. All workshop activities will be completed synchronously with participants joining in person and online via Zoom. Participants in both modalities will have opportunities to interact and exchange with one another throughout the workshop. Online participants will be projected using a projector located in the workshop room, and via a laptop in each discussion group. We will strive to strike a good balance of turn-taking and contributions from those participating in person and online.

3.1. Description of Activities

As described in Table 1, the first (morning) part of the workshop will consist of introductions (A1) and presentations of each participant's case study (A2). In the second part, participants will complete a series of activities encouraging discussion of key and common opportunities and challenges. In the second part, after the lunch break, participants will be divided into different groups to further discuss

Duration	Activity
30 mins.	A1: Welcome and introductions.
1 hour	A2: Presentation of case studies (part 1).
30 mins.	Coffee break.
1 hour	A2: Presentation of case studies (part 2).
1 hour 30 mins.	Lunch.
2 hours	A3: Group sessions: discussion around key topics.
30 mins.	Coffee break.
1 hour	A4: Final insights and next steps.

Table 1: Workshop Schedule

their co-design approaches, challenges and opportunities (A3). Each group, which will be moderated by two workshop organisers, will be asked to consider one or two of the following key topics in their discussions: data safety, confidentiality and privacy, accountability, cultural sensitivity, democratic participation, as well as key ethical issues, unintended consequences, and broader impacts. At the end of the sessions, each group will share key discussion points and next steps (A4).

For activities A1 and A2, in-person participants will use a workshop organiser's laptop to present their position paper in order to assure that those attending online can clearly see and hear the speaker. We plan on having an even number of participants joining in person and online so we can form groups in each attendance modality for A3. For the discussion of key insights from each group and next steps (A4), online participants would be projected on a big screen and workshop moderators would enable cross-participation between online and in-person participants, assuring that all attendants participate actively. To support these interactions, we will also use a virtual whiteboard such as Miro to capture, manage, and organise visually participants insights, thoughts and ideas during activities A3 and A4.

3.2. Materials

We will need to be provided with a projector and wireless Internet connectivity. The workshop co-organisers and online participants will use their own computers or laptops to present and participate.

3.3. Workshop Outcomes and Next Steps

The main outcome of the workshop will be a collection of case studies including the challenges and

opportunities discussed in the group discussions, showing different co-design approaches to build a AI-based tech for health and wellbeing. This will help us summarise the cross-disciplinary learnings, key insights, and recommendations, for using co-design methodologies to build human-centred AI tech, especially for researchers and designers that do not know how and where to start. All position papers (i.e., case studies) will be published on the workshop website unless the authors would prefer not to make them available. We plan to discuss how to write and publish key insights from the workshop activities, participants' experiences, challenges, best practices, recommendations, and lessons learned during the workshop. Such publications could involve an article for a magazine like ACM Interactions, or as part of a special issue in a journal. We also plan to work on a book where all the case studies presented and discussed during the workshop would be showcased. Workshop co-organisers and participants who agree to have their case study portrayed in the book would be invited to be co-authors. The book will mainly highlight the different approaches and health contexts to use co-design methodologies for the design, development, and implementation of human-centred AI tech for health and wellbeing.

3.4. Accessibility Considerations

On the submission form, we will include questions asking for any accessibility requirements that the participants may have. We will do our best to address such requests to ensure an equitable participation. We will also enable hybrid participation during the workshop, to encourage participation regardless of the participants' geographic location. We will also use captions for online participants. We will ask accepted position papers to add accessibility checks on their PDFs prior to uploading them to the workshop website.

4. ORGANISERS IN ALPHABETICAL ORDER

Amid Ayobi is a Lecturer in Digital Health at University College London. His work includes multidisciplinary projects that support self-tracking, understanding the mental health needs of people from ethnic minority backgrounds, and developing machine learning models with clinicians, patients, and data scientists.

Christina Chung is an Assistant Professor at the University of California, Santa Cruz. Her research incorporates empirical and theory-informed approaches to design personal informatics technology in social and community contexts.

Deysi Ortega is a PhD student at Cardiff University with experience in co-design methods. Her research

focuses on designing materials and socio-technical health interventions for and with low-resource communities.

Francisco Nunes is a Senior Researcher at Fraunhofer Portugal AICOS working in the Human-Centred Design team. His research involves user research, design, and evaluation of mobile and AI-based self-care technologies. He often draws on ethnographic fieldwork and co-design methods to understand technology use contexts, and reflect on potential technology-enabled futures.

Ji Youn Shin is an Assistant Professor at the University of Minnesota. Her research focuses on designing technologies for collaborative healthcare, such as patient-provider communication, family-centered care, and community-based approaches.

Juan Fernando Maestre is a Lecturer in the Department of Computer Science at Swansea University. His research applies novel participatory design methods to conduct research both in person and remotely with vulnerable and stigmatised populations.

Katarzyna Stawarz is a Senior Lecturer at Cardiff University with expertise in designing and evaluating Digital Health technologies. Her current project focuses on co-designing a set of interactive devices to support physical activity at home.

Nervo Verdezoto is a Senior Lecturer at Cardiff University with expertise in human-centred participatory design of socio-technical systems in healthcare. His work investigates healthcare infrastructures, and co-design of culturally appropriate health technologies in the Global South, with focus on maternal and child health, pregnancy complications, and reproductive wellbeing.

Tariq Osman Andersen is an Associate Professor at the Department of Computer Science, University of Copenhagen. He brings experience in co-designing and prototyping a patient- and clinician-facing prediction platform for remote pacemaker monitoring, AI-based support for radiologists in the Global North and South, and interactive/collaborative LLM-based reporting in dermatology.

5. CALL FOR PARTICIPATION

Organisers will disseminate the call for participation via their networks using email, social media, and word of mouth directing those interested to the workshop website. The website will contain detailed information regarding the workshop (i.e., goals, activities, organisers, etc.), as well as submission instructions. We will invite people from industry

and academia including researchers, students, and designers. People interested in participating in the workshop will be required to fill in and submit a short application online form via the workshop website, with a summary of the position paper, mode of participation (in person or online), health context of their case study, expectations from the workshop, and any accessibility requests. Potential participants will be able to upload their position paper via the submission online form. Position papers will need to be written in a case study format highlighting challenges and lessons learned around their experiences in using co-design approaches to design and/or build AI-based technology. We envision around 10 to 15 participants attending the workshop with a varied selection of co-design methodologies and experiences in different health and wellbeing contexts.

5.1. Call for Participation Text - Conference Website

Have you used co-design methodologies to design or build technology that uses artificial intelligence (AI) in the context of health or wellbeing? If so, please consider participating in our workshop where you will be able to share your experiences, challenges, and lessons learned. We are inviting people from academia and industry to submit a 2-page position paper which would summarise their experience in a case study format describing what was done, for what purpose and in which health and/or wellbeing context. The position paper should also include a discussion of key insights, challenges, lessons learned and any future plans. This will be a hybrid workshop so you could participate in person or online. Accepted position papers will be published on the workshop website if authorised by the authors. We plan on writing an article (and invite interested workshop participants to be co-authors) summarising and discussing key insights from the discussion of experiences, challenges, and lessons learned during the workshop. We also plan to work on a book which would showcase the diverse case studies and discussions from the workshops. At least one of the authors of the accepted position paper should register and attend the workshop either in person or online. For more information about the workshop, position papers, and how to participate, please visit the workshop website (<https://sites.google.com/view/bcs-hci-2025-workshop/home>).

6. ACKNOWLEDGEMENTS

Francisco Nunes was supported by Fundação para a Ciência e Tecnologia (FCT-Portugal), through national funds, under the grant UIDB/04923.

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