

# Reflections on Physical Factors that Influence Participation in Co-design Workshops in Peruvian Low-resource Settings

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**Abstract.** Participatory Design (PD) approaches have been widely applied in different contexts and locations. However, there are still challenges when PD is used in low-resource settings in the Global South. As part of a project aiming to understand complementary feeding practices and promote nutrition of infants and young children under two years, we conducted ten co-design workshops with healthcare professionals (HCPs) and caregivers in two different low-resource settings in Peru. In this paper, we report the physical factors that influenced participation in four out of ten co-design workshops, such as the characteristics of the venue and the design materials we used during the co-design sessions to support a more active participation.

## 1 Introduction

Participatory Design (PD) approaches aim to engage different actors through cooperative, hands-on activities in the design and development of technologies that will impact people's everyday lives (Bødker et al., 2022). PD has been widely applied in different locations and contexts. However, there are still challenges when engaging with different stakeholders in PD activities, especially in low-resource settings in the Global South. Socio-cultural factors can affect stakeholders' engagement (Hussain et al., 2012; Till et al., 2022) as well as there is a need to create suitable design tools and materials to support creativity and enhance community participation in the Global South (Hussain et al., 2012).

Our previous work has identified physical, social and temporal factors that have influenced the engagement of community participants from low-resource settings in co-design workshops (Ortega et al., 2024a). In this paper, we will further describe how physical factors and the created design materials we used during co-design sessions with caregivers and healthcare professionals in future and prototyping workshops have impacted participants' engagement in Peru (Ortega et al., 2024a,b).

## 2 Case study: Exploring How to Support Complementary Feeding Practices in Peru

The World Health Organization (WHO) estimates that 45% of deaths of children under five years are related to nutritional factors (who, 2020). Peru is a country in South America facing a double burden of malnutrition, affecting in particular infants and young children who are experiencing anaemia and/or obesity and overweight, especially the ones living in low-resource settings (Pradeilles et al., 2022).

We started a project aiming to address the double burden of malnutrition among infants and children aged 6-23 months in two different low-resource peri-urban settings in Peru: Manchay in Lima, located in the coastal region, and the city of Huánuco in the Huánuco district, situated in the Andean highlands.

### 2.1 Methods

We conducted ten co-design workshops, including four ideation workshops, two future workshops, two storyboard workshops and two prototyping workshops (Rousham et al., 2023). Here, we report and reflect only on four workshops (two future workshops and two prototyping workshops) out of the ten workshops conducted. We recruited healthcare professionals (HCPs) and caregivers of children under two years in Manchay and Huánuco. For data collection, with informed consent from participants, we recorded the audio of the workshops, in addition to observations, photos and the outcome materials from the workshops. The project received ethical approval from the Nutritional Research Institute in Lima, Peru, as well as from Loughborough University and was confirmed by Cardiff University in the UK. We analyse the data with Affinity Diagram (Harboe and Huang, 2015) and Thematic Analysis (Braun and Clarke, 2021) as reported in Ortega et al. (2024a,b).

## 3 Physical Factors that Influence Participation

Based on the analysis, we identified how physical factors, such as the venue and visual and tangible design materials, played a crucial role in supporting HCPs and caregivers' participation during the co-design workshops.

### 3.1 The Characteristics of the Venue

For the co-design sessions, we needed spaces for the co-design activities to take place (e.g., including tables, chairs, and an area for children). In Huánuco, we conducted the co-design workshops in the auditorium of the healthcare centre as it was accessible for caregivers who attended the medical consultation with their children. Similarly, HCPs could attend easily as it was in the same location. In contrast, in Manchay, we previously identified that the auditorium in the healthcare centre was too small during the ideation workshops, making it difficult and challenging to participate as caregivers had to have their children in their arms, and could not move within the same space. To address these restrictions, we rented a space close to the healthcare centre that was bigger and better illuminated, making it easier for participants to feel comfortable and actively participate in workshops.

Moreover, participants brought their children with them (children younger and older than two years old). Having a bigger space enabled the arrangement of a dedicated area within the same space for children where they could be supervised during the co-design workshops to reduce distractions for caregivers and HCPs. Our data analysis showed that participants focused during the sessions but few still got distracted by children crying or when some caregivers had to breastfeed them.

### 3.2 Design materials used during workshops

We observed how the provided design materials supported participants' engagement by attracting their attention and helping them to build a common understanding of ideas and concepts. These pre-designed materials included sketches of clusters of ideas used in future workshops and low-fidelity tangible materials for prototyping workshops.

#### 3.2.1 Visual design materials

In future workshops, we provided visual clusters of ideas based on the analysis of the ideation workshops that helped facilitating discussion and understanding of the ideas generated by participants. For example, the pre-designed sketches worked as a base for participants' sketches in Huánuco as they enabled HCPs and caregivers to situate themselves in the real spaces (the waiting area) that they would re-design during the workshop. Participants visualised the spatial dimensions of the physical infrastructure (e.g., existing constraints), and facilitated a sense of the current state and supported envisioning of the future state of the waiting area.

During prototyping workshops, participants co-created sketches portraying physical elements augmenting the floor and wall surfaces of the waiting area of the health centre to support play and promote nutrition. These co-created sketches enabled participants to convey their ideas on how to engage children and caregivers while incorporating the food elements to promote healthy eating. Participants illustrated familiar games and elements and even explored the materiality (e.g., cushioned surfaces) in their sketches. In addition, we gave

participants paper templates and printed screenshots of wireframes of a mobile app created in Figma. With these materials, participants co-created paper prototypes facilitating the visualisation, exploration and envisioning of features of the mobile app to support parents in managing children's health and well-being.

### 3.2.2 Tangible materials

Besides similar properties and benefits of visual materials, such as visualising and conveying ideas or solutions, tangible materials enabled participants to explore the different ways of interaction with the prototypes. When participants co-created low-fidelity prototypes with tangible materials (e.g., 3D objects like cubes), it helped them explore, materialise, and manipulate these objects, bringing them closer to the tangible features they wished for their prototypes. In this way, participants used this tangibility to add another layer to refine resulting prototypes and provide design rules or considerations on how their games or toy ideas would be played.

In the four workshops, during the presentations of the outcomes (sketches and low-fidelity prototypes), the visual and tangible materials supported participants to engage with the audience bringing different perspectives and reminding them about particular details discussed previously within their small groups.

### 3.3 Limitations

One of the limitations of this study is that the target population are children under two years. Most of the time, these children depend on their caregivers for care, making it impossible for them to participate directly in the workshops. Thus, we include caregivers and HCPs as proxy co-designers due to their expertise with children under two years old and young children will be involved as users and testers of resulting high-fidelity prototypes in later stages of the process (Druin, 2002). As facilitators and external actors (Mainsah and Morrison, 2014), intentionally or unintentionally, we may have impacted participants' involvement (Dearden and Kleine, 2018), such as asking more questions or helping some participants more than others. However, we reduced our influence by encouraging active participation of HCPs and caregivers throughout the workshops.

The research team acknowledges that our experiences and backgrounds influence the way we see the world and how this may have shaped our work (Motti Ader et al., 2023; Secules et al., 2021). In spite of that, our research team has comprehensive experience conducting research in Latin America and the Global South and has followed the best practices to engage with participants from low-resource settings.

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