International Journal of Design for Social Change, Sustainable Innovation and Entrepreneurship

discern

https://www.designforsocialchange.org/journal/index.php/DISCERN-J

ISSN 2184-6995

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Mirian Calvo, Leon Cruickshank, Madeleine Sclater

Published online: November 2022

To cite this article:
Calvo, M., Cruickshank, L., & Sclater, M. (2022). Exploring mutual learning in co-design. Discern: International Journal of Design for Social Change, Sustainable Innovation and Entrepreneurship, 3(2), 79-96.

Exploring mutual learning in co-design

Mirian Calvo[a], Leon Cruickshank[b], Madeleine Sclater[c]

[a]ImaginationLancaster, Lancaster University, Lancaster, England, UK. m.calvo@lancaster.ac.uk
[b]ImaginationLancaster, Lancaster University, Lancaster, England, UK. l.cruickshank@lancaster.ac.uk
[c]The Glasgow School of Art, Glasgow, Scotland, UK. m.sclater@gsa.ac.uk

Abstract

An emerging body of literature identifies a connection between mutual learning and co-design, yet it does not specify the nature of this connection or its implications for the practice of co-design. In this paper, we explore the theoretical and practical implications of mutual learning in co-design. We present three case studies with rural communities in the Highlands and Islands of Scotland (UK). Using participatory action research, we undertook a series of co-design projects with each case forming an action research cycle. Through these, we build cycles of insights concerning mutual learning and how this can contribute to practical co-design outcomes for participants. We also present insights that increase the duration and amount of mutual learning in co-design projects.

Keywords: Co-design, Participatory design, Mutual learning, Community engagement, Design research, Social design

Introduction

Many co-designers and researchers have experienced the magic of a project that just 'flies', seemingly with little effort, and the inverse where things seem always to be 'stuck'. In this paper, we explore how mutual learning between the participants in co-design processes may influence the success of projects and call for more co-design research focusing on this area. While the labels of co-design and participatory design (PD) are "often tangled" (Mattelmäki & Visser, 2011, p. 1) and used interchangeably to name collaborative design approaches (Fuad-Luke, 2009), co-design is also described as a contemporary progression of PD (Meroni et al., 2018; Selloni, 2017). Initially, co-design was described as the collective creativity happening over the entire design process (Sanders & Stappers, 2008), depicted as workshops (Binder, 2010) or events where people explore issues together in creative and open-ending ways (Brandt & Eriksen, 2010). Rizzo (2010) refers to co-design as an umbrella of creative methods, techniques and practices whose aim is to inspire and enhance the divergency of the design process.

In the context of social design, where design is driven by social demands (Manzini & Meroni, 2014), design goals and objectives are established with community members in their environments (Mattelmäki & Visser, 2011) and within a broad social agenda (Markussen, 2013). In a review of the social design agenda (which is the theoretical context of this study), co-design and its methods have been divided into four orientations (Mattelmäki & Visser, 2011). The first orientation emphasises people's expertise and involvement, while the second one focuses on people's contributions unfolded with tools developed by designers. A third orientation concentrates on the twin roles of designers as simultaneously facilitators and participants of collective creativity. The fourth orientation focuses on collaboration between designer-people, adopting a distinctive attitude to people, who, given appropriate tools and engendering inclusive and creative third spaces (Muller & Druin, 2012), become creative contributors to the design process (Manzini, 2015, 2019). In all these orientations, Mattelmäki and Visser (2011) observe, collaborative engagement is required, as well as the development of an interdisciplinary methodology of knowledge exchange (Winters & Mor, 2008), whereby mutual learning can be supported (Fuad-Luke, 2009). Here we focus our attention on the

fourth orientation, seeking to amplify and support mutual learning to nurture collaboration between participants including designers and non-designers.

Zahedi (2011) contributes to an emerging body of literature that identifies a connection between mutual learning and co-design (see also DiSalvo et al., 2017; Robertson et al., 2014; Smith et al., 2017). Simonsen and Robertson (2013, p. 2) define co-design as "a process of investigating, understanding, reflecting upon, establishing, developing, and supporting mutual learning between multiple participants in collective 'reflection-in-action'". This statement emphasises that co-design requires participant learning and foregrounds mutual learning as a key part of the practice of co-design. The literature, though, does not specify the nature of this connection or its implications for the practice of co-design. This is a relevant issue because mutual learning influences both the co-design process and its outcomes (Bødker et al., 2004). Bødker et al. (2004) call for the active integration of people directly affected, arguing for a pragmatic need for mutual learning between designers and users, embracing its inherent democratic stance and aligning with the fourth orientation outlined by Mattelmäki and Visser (2011). This underscores the need for more research to deepen our understanding of mutual learning and co-design.

Origins of mutual learning in co-design

Co-design can be traced back to the early 1970s with the emergence of the work of Kristen Nygaard and colleagues in the Scandinavian countries (Muller & Druin, 2012; Simonsen & Robertson, 2013; Spinuzzi, 2005). At that time, there was a move to include trade unionists and workers in the design of computing technologies introduced in the workplace rather than imposing new solutions in a hierarchical manner (Ehn, 2017). In the UK, co-design took inspiration from the works developed by the Tavistock Institute in London, which conducted action research projects. Mumford (1987) built upon the emerging field of design research (Archer, 1981; Cross, 2001), Tavistock's experience, and upon the 'soft systems' methodology, developed by Checkland (1981). The soft systems methodology focused on supporting dialogue as the basis of the design process, emphasising mutual learning. Since then, co-design has been used in human-computer interaction (HCI) and design interaction and recently been expanded to other design disciplines, such as urban design, architecture, social innovation and public participation (Meroni et al., 2018; Zahedi et al., 2017).

In Europe, researchers laid the foundations of an approach based on democratic social constructivism and participatory action research (PAR) methods and techniques (Bannon & Ehn, 2013; Spinuzzi, 2005). Nygaard and Bergo's (1975) research revealed that a local knowledge production strategy needed mutual learning. Such learning was considered the cornerstone of an emerging methodology. As Ehn (2017, p. 10) states, "our ambition was to unite participatory actions research in the field with systematic theoretical reflections aiming at a productive interplay between academic and local knowledge production". This statement illustrates co-design as a form of community engagement (Selloni, 2017), which strengthens community-research partnerships as means of investigating communities and their sociocultural issues (Davis et al., 2011), and in turn enhancing community conditions (Balazs & Morello-Frosch, 2013). It also outlines how co-design borrowed from Lewin's (1946) work and PAR with a vast social research tradition (McNiff, 2002; Walter, 2009; Whyte, 1991).

Co-design also found inspiration in Freire's (1970) emancipatory learning notion, which helped assemble epistemological strategies. As Ehn (2017) explains, two strategies were aligned: (i) the 'decentralisation' of power underpinning local knowledge production (Nygaard & Bergo, 1975) through central strategies and local actions around disruptive practices in the workplace; and (ii) the emphasis on community-contextualised learning as the means for emancipation and liberation (Freire, 1970), which opposes

traditional theorisations of learning (formal learning based on knowledge acquisition). Combining both strategies, co-design developed methods and techniques to study the dynamics of social life through an approach focused on collaborative enterprise, mutual learning and reflection (McNiff, 2002). As Sanders (2017) states, mutual learning in co-design was originally perceived as an emergent type of learning, happening there in all the interstices between social real-world situations and in between hands-on designerly activities. The notion of such learning in co-design situations was aligned with Freire's (1970) pedagogy of emancipation.

This changed when co-design became more prevalent in the United States, where trade unions were less powerful in the workplace, with a corresponding move from democratic aspirations towards functional product features (Spinuzzi, 2005). With this shift the (often implicitly understood) notion of mutual learning shifted away from Freire's (1970) emancipatory aspirations; it was considered a taken-for-granted process (Robertson et al. 2014). This created a gap in understanding between co-design and mutual learning (Brereton & Buur, 2008; Karasti, 2001). We propose in this paper that research attention should be focused on addressing this mismatch between theory and practice.

Case studies

This section presents the methodology adopted and discusses three cases associated with Leapfrog, a three-year (£1.2m) UK Arts and Humanities Research Council (AHRC)-funded research project. Leapfrog used co-design as the methodology to bring people together from diverse backgrounds and with different levels of expertise to engage in dialogue to develop transformative agency through community engagement. This entailed a process involving communities in co-design situations and developing engagement tools to take into those communities to support effective engagement. Partnerships were built on the triad of university–public–community.

The three cases were conducted in the Highlands and Islands of Scotland (UK), with a total of 15 co-design workshops and 277 participant interactions, where we explored the connection between mutual learning and co-design. The overarching aim here was to explore whether and how mutual learning contributes to co-design with external stakeholders with real-life challenges to address. The first case describes a six-month project on the Isle of Mull with five non-profit organisations aiming to develop engagement skills and supporting tools to re-animate engagement of disengaged people. The second case focuses on a nine-month project with 12 service providers and third-sector partners who address loneliness and social isolation of elderly people in rural communities. This project aimed to develop effective ways to engage with lonely and socially isolated people and share best practices. The third case discusses collaboration with a social enterprise committed to sustainability and focused on engaging wider local communities in the renewal of the social enterprise's physical assets and future services.

Methodology

The methodology that guided these three cases followed a PAR approach, informed by ethnographic and co-design methods. PAR is an interdisciplinary research umbrella that covers an extensive range of approaches, which have change and action as common key drivers of research (Walter, 2009). It has two objectives: (i) to produce knowledge and action that has a direct and meaningful use for the communities researched; (ii) to empower those communities through the construction of local knowledge, aiming to enhance their sociocultural and economic conditions (Reason, 1998). We used the PAR approach to acquire a greater grasp of how the communities produced knowledge through mutual learning in designerly engagements.

PAR illustrates a spiral of research stages where each stage informs the following one (McNiff, 2002). Each stage is also represented by a cycle within the steps of 1) planning: systematising experience and problematising, 2) action: reflecting and choosing action, 3) reflecting upon the action: observing the course and consequences of action and change, 4) systematising learning: coding and organising insights and 5) dissemination: validating and sharing new knowledge (Loewenson et al., 2014, p. 13). The three cases were structured as action research cycles, allowing each one to inform the next one. The researchers also looked at the idealised model of co-design developed by Fuad-Luke (2009, p. 149), which illuminates four phases: (i) initiation and planning (collective catalysing), (ii) informed participatory design (collective understanding and exploring), (iii) PD with design team (collective designing and deciding) and (iv) doing and learning (collective actioning). A schematic idealisation of this was used as the theoretical basis for elaborating a research design capable of supporting mutual learning, onto which the researchers combined ethnographic and creative co-design methods and drew on reflective and analytical techniques.

Ethnographic methods were employed to reveal the dynamics of social interaction that would otherwise go unnoticed. The researchers devised creative tools for engagement and data collection to support not only the co-design workshops but also ethnographic encounters. Co-design methods were used to accommodate participants' agencies and orchestrate collective creativity, geared towards co-articulating shared goals. The data-gathering sets of each case study were analysed separately with a three-step process of affinity diagramming. This is considered "an interpretive, reflective method that is used to achieve new insights and ideas - not to provide definite, objective answers" (Harboe & Huang, 2015, p. 96); thus it follows abductive reasoning (Simonsen & Friberg, 2014). At the end of the project, data triangulation was deployed to consolidate our insights.

A methodological framework to study mutual learning in co-design

We developed a methodological framework encouraging positive change and action in the communities we collaborated with. PAR provided a meta-process where each case study was configured as one action research cycle. The research design focused on the infrastructure of each action research cycle following five steps: 1) preparation for co-design, 2) co-design situations, 3) follow-up, 4) systematising learning and 5) dissemination (see Calvo, 2019). Each 'research situation' was designed based on the insights from previous ones. Figure 1 illustrates the research design with two-way gears, reflecting the flexibility and responsiveness of a research design to the contextual changes that may arise. The varied sizes of the gears symbolise the estimated amount of time for each step.

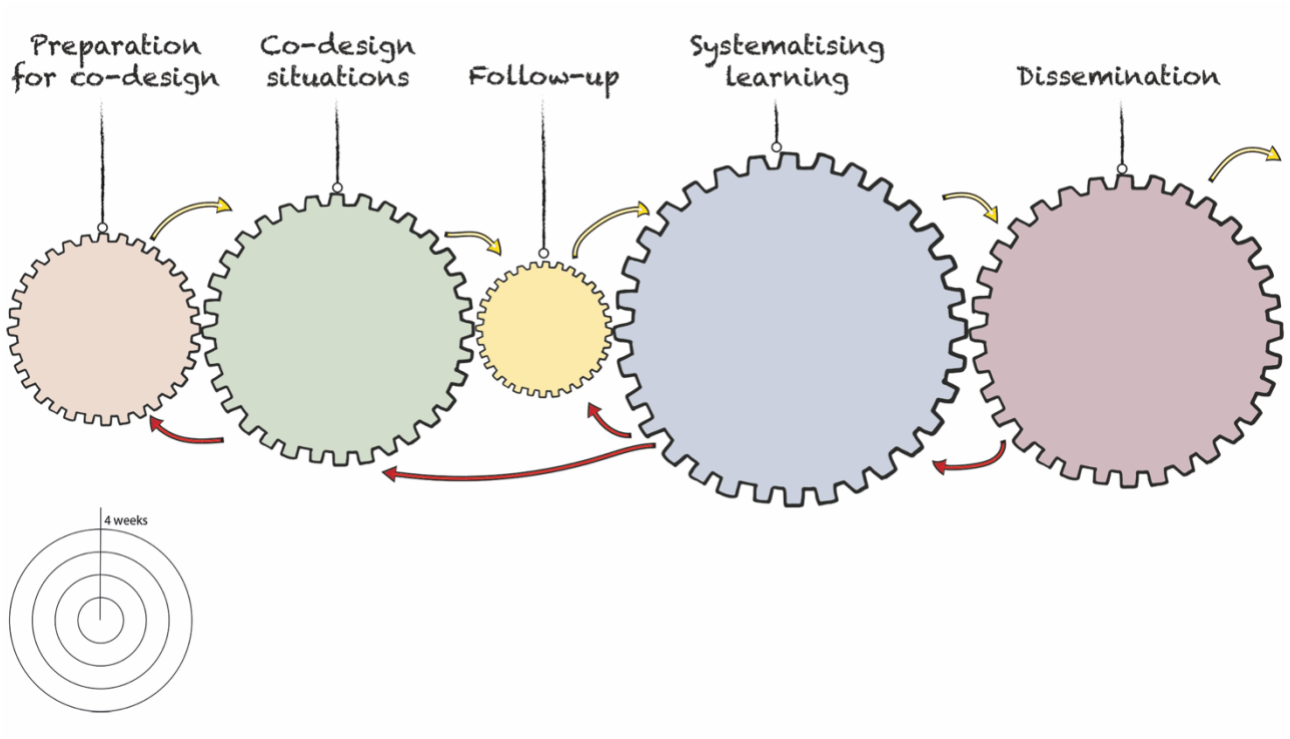

Figure 1: Methodological framework scheme. Source: Calvo (2019).

Preparation for co-design
This first step of three stages is depicted with small, exchangeable gears, meaning that one stage informs the others and vice versa. This involved (i) initiation and planning and collective catalysing, (ii) historical research and (iii) interviews.

Co-design situations
Step two comprises several stages: (i) a catalysis situation, (ii) a co-design workshop, (iii) prototype testing, (iv) delivery and (v) design ethnography: reflective group interviews, participant observation and reflective drawings.

Follow-up
The follow-up step methods are (i) participant observation and (ii) conducting reflective interviews, observing the course and consequences of the co-design situations in perspective.

Systematising learning
This step comprises the analysis and involves (i) affinity diagramming, which embeds (ii) stimulated recall analysis (Messmer, 2015), (iii) narrative inquiry (Chase, 2008) and (iv) production of second-order reflective sessions.

Dissemination
Following PAR principles, the last step aims to close the circle by presenting to the participants and other relevant audiences the theoretical concepts uncovered by the study. This involves dissemination, validation workshops and showcases.

This research design gave us flexibility and consistency between the case studies, allowing us to draw out insights focused on mutual learning whilst being responsive to the tangible needs of the participants.

Case one: Co-designing on the Isle of Mull

The first case involved four visits to the island in which three ethnographic encounters, four in-depth semi-structured interviews and three co-design workshops were facilitated with a total of 13 participants with contrasting backgrounds and experiences, including the following non-profit organisations: Highlands and Islands Enterprise (HIE), Mull and Iona Community Trust (MICT), Ulva School Community Association (USCA) and Tobermory Harbour Association (THA). The participants included volunteers, community managers, trustees and chief officers. Overall, their shared motivation was to collectively develop skills and tools to support engagement activities within their respective communities and enhance participation, as participant 3's statement reflects:

> *"It is just to get more tools or experience on how to increase participation in the community […]. Things happen in Mull because community members make them happen."*

The co-design workshops in this case study were conceived as a progressive sequence, from initial conversations to prototyping. The workshops created spaces for design-participant interactions, gradually gaining trust and building mutual understanding in in-between designerly activities and coffee breaks. Once we established interpersonal bonds, we gained access to some participants' natural settings, for example during the THA community event in Tobermory and with USCA in Ulva Ferry, where participant observations were conducted, as well as semi-structured interviews (Image 1). For the research team, it was crucial to build trusting relationships with the participants and to be able to gain access to natural settings so that we could experience first-hand and empathise with some participants' everyday life constraints. In turn, we were also able to identify those learning moments by being there and bringing their voiced perspectives to the fore. We also observed the sequence of methods we were using and assembled them into an emergent research design with five steps: (i) co-design situations; (ii) learning from the context; (iii) delivery; (iv) access to natural settings; and (v) systematising learning. All steps were synchronised with the four visits in which we conducted the fieldwork.

Image 1: Participant observation at Ulva Ferry with USCA members.

We identified a strong component of mutual learning associated with the designerly engagements we facilitated. Mutual learning emerged between the participants in the process of building trust, respect and mutual understanding through sharing perspectives and ideas, questioning each other's ideas and co-developing early prototype ideas. This was evidenced when the research team discovered that some of the participants began collaborating on some community development projects after their involvement in the co-design workshops. Insights were gathered around how the co-design situations supported knowledge exchange about participants' skills and ways of engagement. This led to building trust and certain levels of collaboration. The emerging productions were the eventual result of mutual learning. One insight from this process was that participants were not aware that they were learning by participating and doing. Towards the end of the project, via conducting design ethnographic methods (participant observations) in natural settings, we began unpicking some of the participants' notions of mutual learning. Participant 10 said the following about learning during a community event in Tobermory:

> *"There is very important learning behind these events. All the schools on the island are very used to community events, helping to put their efforts into entertaining other people. There is a lot of exchange between different organisations. They are also in the schools, so they know each other […]. The children learn from a very young age about being part of the community."*

Mutual learning went unnoticed through the participants' eyes, in that all interviewees were unaware of the degree of their knowledge production, competencies, skills and/or dispositions to engage in co-design situations or even in volunteering within their communities. Participant unawareness of learning was identified as a challenge to overcome, as Mündel and Schugurensky (2008) suggest: how does one make explicit an implicit process of mutual learning? We used this insight of a lack of participant awareness (and reflection) to inform the next case study project.

Case two: Co-designing to address loneliness and isolation

The second case took place through six visits to the Inverness, Aviemore and Moray area in the NE Highlands of Scotland, engaging with a total of 17 participants. The participants came from social enterprises and public service providers, including Badenoch & Strathspey Community Transport Company (BSCTC), Health and Social Care Moray, Family Outreach, Art Therapy, Let's Eat Forres, Unit Credit and TSI Moray. The participants had diverse roles, from social care officers to well-being coordinators, art therapists, volunteers and more. All the participants wanted to address the loneliness and isolation of elderly people in the rural areas of Inverness, Aviemore and Moray. The case focused on developing tools that could enable them to share assets, resources and best practices – tacit knowledge produced through their everyday ways of working.

Image 2: Co-design workshop 2: sharing personal stories through playing.

Responding to the understanding developed in case study one, we refined the research design, devising and facilitating a series of co-design situations (Image 2), in which we assembled collective and individual reflective activities (Image 3). The aim here was to draw out participant learning awareness. To help the participants reflect more on their learning process (when they are not used to such actions), we designed and introduced a reflective journal, with prompt questions and drawing tasks, to capture their thinking and emergent learning moments. We also observed that, in each case, the spontaneity and improvisation of everyday life affected and modified the course of events and thus the methods deployed. For instance, gaining trust and access to natural settings had a different pace in this case. In the first case, participant observations came late in the project, hampering the collection of enriched data about participant learning. Therefore, the research design was reformulated reinforcing the use of design ethnography methods at the start and what produced early interactions with key participants to begin building trust right from the start.

Image 3: Reflective sessions.

The first stage, ‘preparation for co-design’, helped us gain an in-depth grasp of participant motivation. In the second stage, ‘co-design situations’, we observed how the quantity of participation directly influenced not only the quality of the co-design process but also mutual learning. The participant observations called for attention to personal stories as vehicles for sharing experiential learning to mutual learning. In the third stage, ‘follow-up’, we gathered insights pointing out that the learning happened through participation and socialisation, through experiencing, playing, listening and having fun and observing how people behaved. As participant 1 said:

> *"By listening, by having fun, we were connecting in that moment of hearing the stories, hearing other people's opinions in a good atmosphere that it was not a debate or people trying to get rid of others. It was comfortable, fun, and sharing. It was playing."*

This statement was shared with all the participants interviewed, and it emphasises the insight that personal stories enable mutual learning in a two-way, collective process of communication. Different learning channels were activated through listening, empathising (emotional connection) and hence better understanding people's identities, values and the motivations behind their stories.

In the fourth stage, 'systematising learning', we used affinity diagramming to analyse the data, which suggested that the co-design situations and the follow-up interviews elicited the participants' awareness of mutual learning. Participant 8 commented on this:

> *"It certainly broadens my understanding and feelings of how to relate to people and systems [...]. I think the game and having fun in those activities were essential to learning [...]. In terms of how the learning happened, well, most was interactive and fun. For me, that is the peak experience of learning."*

All the participants interviewed expanded their understanding of mutual learning, through human interaction and collective fun, key conditions for mutual learning. They also reinforced their dispositional learning towards embracing openness from the divergence of ideas brought to co-design. The role that quotes from other participants played in this is significant: offering statements in a lexicon natural to the participants helped them recognise their own mutual learning experiences.

Case three: Co-designing tools for renewal projects

This project comprised a close-knit collaboration with the Newbold Trust, a social enterprise committed to sustainability in Forres, NE Scotland, with seven visits involving a total of 31 participants from the Newbold Trust, the Findhorn Foundation and Forres local community groups, e.g. Sky Delights (Nairn), Roots, Fruits and Leaves (Across Moray), Manna Juice (Elgin), Roseisle Gardens (College of Roseisle) and The Bread Kiln (Garmouth). The trust had a Victorian house and about seven acres of grounds, most of which were neglected due to financial constraints. We initiated a co-design project that involved the renewal of both its physical assets and its identity as a social enterprise. The aim was to explore innovative ways to include wider local communities in the physical transformation of those neglected spaces and envision future uses. We also wanted to extend our use of early interaction and sharing participant statements on learning as a stimulus for more collaborative learning. We also deployed reflective journals to support independent reflective tasks and encouraged the participants (and the researchers) to embed reflective practice to raise awareness of our ways of learning in such designerly informal environments.

Figure 2: Route of the facilitated walk.

After a series of co-design activities, including role-playing, switching roles and prototyping, walking (see Careri, 2002; Ehrström, 2016) emerged as the method to engage such communities. Touring the Trust's grounds became the method for engagement. One member of the Newbold community facilitated the

walks following a route around the grounds (Figure 2). We moved, walking in small groups, comfortably observing our surroundings and letting ourselves be embraced by the environment (Image 4). Through walking, we shared our ideas on future uses for the different physical assets. These conversations sparked mutual understanding through mutual learning. Here, we consciously removed graphic artefacts to create a third space (Muller & Druin, 2012) based on the participants' voices, placing a focus on human-to-human interactions and also encouraging statements on reflection on learning to be shared naturally through conversation.

Image 4: Catalysis workshop facilitated walk activity.

In terms of the research design, we employed participant observations during the 'initiation and planning' stage, which allowed us to establish favourable conditions for attempting an immersive approach. Our stay with the Newbold community facilitated our immersion as we got to know the participants in a more natural (informal) context, away from the more formal ones associated with the workshop contexts.
We also introduced two new methods in the 'co-design situations' stage: the catalysis workshop and test prototypes. The catalysis workshop was designed to enhance the construction of group dynamics and to animate the sharing of personal stories of their experience. The test prototypes emerged when some participants identified actual situations for trying out the prototype tools with wider communities that involved experimentation. This situation favoured letting the participants take the lead.

Analysing the methods used and the gathering of data from the participants, we observed that the greatest volume of insights was revealed during the co-design situations stage. Yet, the reflective interviews of the follow-up, along with the reflective journals, proved crucial in identifying specific learning situations during the project. The sense of ownership was embedded in the group dynamic right from the start. Interestingly, the breadth and depth of results were quite like case two. As in case two, mutual learning happened through participation and socialisation, learning through experiencing, playing, listening and having fun, using all the senses. Participant 6 stated:

> *"We learnt in different channels, visual, auditory, kinaesthetic etc. – our feeling channel, then our dreaming, our relationships channel and our cultural channel. My impression of what you did reinforced that notion of learning as you have to approach it from different channels and not just sitting and trying to figure it out with your brain."*

The participants acknowledged having learnt through their experience, listening and sharing different perspectives on the different spaces explored through the facilitated walks. This reinforced the idea that stories enable mutual learning. During the reflective interviews of the 'follow-up', we began unpicking the impact (transformational agency) upon the Newbold community. As participant 1 said:

> *"The process helped to open ourselves up, and our relationship is a little different now. We are more comfortable. For instance, we used to have a non-flexible system. Every week we had, like, a business meeting, and we decided during the process we would have meetings when we really needed them."*

The community had adjusted their organisational ways of interaction based on a change in interpersonal relationships, which suggests that the co-design process contributed to enhancing interpersonal relationships (see Calvo & Sclater, 2020). This process was ignited by mutual learning moments that drew from verbal-only interactions at the beginning of the project then were reinforced by more explicitly designerly interactions once the group was more familiar with each other. The use of only verbal activities at the beginning of the co-design workshops was explicitly experimented with during this case study to support mutual learning, interspersing these activities with collective reflective activities. The knowledge co-produced by these verbal-only activities was then used as the content of other designerly activities/interventions later in the project, amplifying and building upon the meanings transcribed by the participants' exchange and learning processes.

Throughout these three workshops, we experimented with different approaches to understanding mutual learning in co-design while at the same time being respectful of the needs and motivations of the participants. This, to our minds, is an ethical concern. A developmental research design suggests a strong commitment to establishing egalitarian relationships.

Discussion

Increasingly, co-design projects reflect new emerging themes and goals that are socially ambitious, going beyond the design process that shapes designerly innovations (Akoglu & Dankl, 2019). We argue that mutual learning is a key part of the co-design process (as do Muller & Druin 2012 and Simonsen & Robertson, 2013). Further, though, we contest that the structure of co-design projects can be configured to enhance mutual learning and that this may also lead to positive impacts on participants beyond the tangible outputs of a co-design project.

In case study one, we found that informal learning was present if the researchers probed for it through explicit interview questioning and that this learning was very much situated towards the end of the project. Responding to this in the second case study, we introduced a more explicit and reflective co-design structure to help reflect on processes. Also, we introduced reflective journals and statements from the participants to be shared across the group to get people thinking about mutual learning without it being imposed from the outside in the design researcher's language.

We found that this prompted informal learning to be recognised by the participants and took place earlier in the project. For the final case study, we extended the notion of reflective language between participants and prompted more and earlier mutual learning and built activities around walking, where the focus was on human-to-human interaction. Analysis of the activities indicated that mutual learning in this mode was not significantly different to the previous two case studies, but that combining informal walking and reflective talking activities with more explicitly designerly activities did have a positive effect on mutual learning. Further, the bond developed during a combination of walking and wa orkshop led to impactful, long-term relationships between the participants.

This combination of walking and a workshop is an indicator, we believe, of a shift in approach for co-design activities that may prove to be more effective overall, but on the weight of the research undertaken so far will have a positive effect on the informal, mutual learning present between participants of a co-design project.

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