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Researching adaptations in equitable, diverse, and inclusive co-design practice during and beyond the pandemic: innovations in a design research realist synthesis

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Title

Researching adaptations in equitable, diverse, and inclusive co-design practice during and beyond the pandemic: innovations in a design research realist synthesis

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Abstract

Background

During the COVID-19 pandemic, public health requirements for physical distancing and restrictions on physical gathering significantly altered how co-design could be conducted in health care contexts, especially negatively affecting projects engaging individuals from marginalized communities. Rapid adaptations were made with varied levels of success. A conventional strategy for understanding these adaptations would have been a review of published literature. However, few detailed accounts had been published at the time, and many co-designers were still actively exploring how to adapt their methods.

Objectives

This research investigated co-design practices to learn what adaptations were successful in engaging marginalized communities, what adaptations might be applied in other contexts, and what might be sustained post-pandemic.

Design

The overall research design was a realist synthesis, focusing on what works, for whom, and in what circumstances. An initial framework of co-design principles that contribute to equitable, diverse and inclusive (EDI) participation was developed to structure the analysis of adaptations that were made. However, with changes still underway and many adaptations not published, innovations to realist methods were necessary. In addition to a literature scan, design research approaches (workshops, interviews, a Community of Practice, webinars, a Winter School, and conference presentations) were used to generate data and validate findings iteratively.

Setting and participants

The data collection and analysis took place mostly online. Design researchers, health researchers and design practitioners from three continents were engaged in the various activities over time.

Results

Adding design research approaches to the realist synthesis identified many adaptations that would otherwise not have been recorded or noticed. Substantively, there were significant numbers of successful adaptations aligned with four initial EDI principles, and three additional categories of adaptations were identified.

Conclusions

Adapting realist methods to include design research approaches can be fruitful, especially when the evidence and experience under investigation are actively in development. Many of the adaptations that were made during the pandemic can potentially be carried into post-pandemic co-design practice, increasing opportunities for engagement with individuals from marginalized communities. Disseminating these findings in ways that are useable by co-designers is the next step in this research.

Lived Experience or Public Contribution

This realist synthesis is focused on co-design practices of design researchers, health services researchers and design practitioners during the COVID-19 pandemic, and the adaptations that were made to engage individuals from marginalized communities. The study aims were derived from co-designers' earliest responses to the constraints of the COVID-19

pandemic by drawing from preliminary signals in academic and grey literature, and our own experiences. To gather evidence about adaptations, we invited participation by design researchers, health services researchers, and design practitioners on three continents. Through interactive workshops and interviews, their experiences formed the majority of the data from which we arrived at the results and conclusions for the study. As we describe in this article, to validate our findings, we presented the findings to others for feedback and reflections in several conferences and settings. As a reflective and validation step, we worked with a group of patient partners to review the findings on practice adaptations, and to prioritize and refine language and practice guidance that resulted from the research.

Plain language summary

There has been a growing trend toward involving people with experiences with healthcare to figure out good ideas for improving healthcare rather than leaving this work only to people working in healthcare systems. A common name for this trend is “co-design”. Co-design usually involves people meeting together in a place to come up with ideas that they all support. To help creative juices flow, activities usually involve making, sharing and talking about possible new ways of doing things. Sometimes it involves acting out how ideas would become real.

The COVID-19 pandemic changed many things. People couldn’t get together safely in-person, especially people at the margins of society. Activities, including co-design, moved online. This study looked at:

- how co-design practice changed during the pandemic by going online (what was good; what didn’t work so well)

- what changes would make co-design better after the pandemic

We used a research method called "realist synthesis" to identify changes and their results. We added activities to the usual method, such as workshops and an online community.

We learned that creativity and making in co-design, and maintaining the speed of co-design projects, were the biggest challenges. But there were changed practices that could improve co-design by going online:

- using more knowledge that communities have
- making participation in co-design possible for more people
- building people's skills and abilities

In this article, we highlight the challenges and potential improvements. We will report those in more detail in other articles.

Introduction

During the COVID-19 pandemic, public health measures such as physical distancing, limits on in-person gatherings, wearing masks, and stay-at-home protocols were intended to control virus spread. These measures had various secondary consequences, including disruptions to in-person health and social care, to child and respite care, to employment and income stability, to access outside the home [1], to the availability of in-person learning, and to research activities [2-4]. As design researchers, health services researchers and design practitioners (described in Table 1) involved in co-production and co-design for healthcare change, we experienced co-design practice being disrupted by these measures, which put participation and engagement at risk, particularly for marginalized communities, healthcare workers, and patients. We were

interested in investigating adaptations to co-design practice, to learn what adaptations were successful, what adaptations might be replicated in similar circumstances, and what might be continued in co-design practice beyond the pandemic in terms of online and hybrid (online and in-person) engagement [5].

Table 1. Descriptions of the roles of those involved in co-production and co-design for healthcare change in this project

Role	Description
Design researchers	Researchers who use or develop design methods to generate knowledge about design practice, participation, services, systems, or experiences [6, 7]. In health-related work, design researchers often examine how design methods can support problem framing, collaboration, service improvement, and care innovation [8].
Health services researchers	Researchers from a variety of disciplines who use a variety of methods to study healthcare and its effects, including access to care, institutional structures, funding and costs, technologies, and quality, experience and outcomes of care to improve healthcare delivery and systems. [9].
Design practitioners	People who apply design methods in professional practice, such as in service design, user-experience design, communication design, or product design [6, 7]. Their knowledge is often practice-based and may come from direct work with people, communities, organizations, and service systems [10].

Pre-pandemic co-design practice

Co-design methods in health emerged from participatory design during the late 1990s and the move from user-centred to human-centred design in the early 2000s [7] as an extension of technology-focused design efforts informed by socio-technical theory and cognitive ergonomics [11]. The intention of co-design is to understand the context of a design challenge, the people within those contexts, and their interaction with technology, using collaborative methods that access contextual, tacit and latent knowledge. Historically, co-design and co-production were most often characterized by in-person activities including structured workshops, *in situ* activities,

and ongoing participation during which designers and researchers work with participants to see "what people do, what they say, and what they make" [12, 13] through techniques such as participant observation, contextual inquiry, and participatory prototyping [14].

Prior to the pandemic, the participatory *co* aspect of co-design made use of structured in-person iterative dialogue and facilitation to support shared sensemaking, shared decision-making and consensus building over time [15, 16] towards innovations that are collectively shaped and owned [17], and it drew on techniques developed for technology design in unionized settings [15-18]. As for the *design* aspect of co-design, there was an emphasis on the use of physical manifestations of shared knowledge and understanding [19] in the form of tangible design artefacts and prototypes [20]. The use of visual methods and tools was central to facilitating boundary spanning knowledge exchange, understanding, and generating ideas among participants through making, showing, sharing, telling, and enacting [21, 22], with co-design often involving material and game like practices and tools, with rules to support engagement and creativity in the collaborative process [23, 24].

These co-design techniques align with the premise that design of technologies with the people affected by or affecting services and systems is likely to lead to more successful outcomes [13, 25-27]. Due to the situated nature of each project, changes and adaptations to process and techniques are common to respond to the context, group, goals, and circumstances of each project [28-30]. The premise of co-design is that adaptations in method are necessary under all these conditions.

Adaptations to respond to disruption

In the face of disruptions to in-person co-design practices under pandemic conditions, some co-design facilitators (including members of our research team) adapted their practices and

techniques, using readily available information and communication technologies [31-34], and making use of online and hybrid modes of engagement. However, compromises were evident in those adaptations, for example, selective inclusion due to inequitable digital access (e.g., [33, 35, 36]). During the initial weeks of public health measures and related disruptions, optimism that disruption (and the virus itself) would be short-lived was high. More broadly, within participatory research, adaptations were conceived as short term, people expected a return to 'normal' conditions, and in some cases, important or challenging projects were paused [32]. Necessary or less important projects were pushed forward in adapted forms, with a pragmatic awareness of shortcomings, but with varying levels of motivation and capacity to continue [37].

Although as noted, adapting to and situating co-design practice in each specific project's context is common in co-design practice, COVID-19 disruptions requiring adaptations were on a different scale. There was a limited knowledge base to draw on to guide the move to online and hybrid modes. The pandemic therefore created an opportunity for our research team to study adaptations reflecting both the *co* and *design* objectives of co-design practice and, in particular, co-design involving individuals from marginalized communities where the impact of the pandemic was the greatest [38]. Of note is that while we were concerned with losses – the ways in which co-design became impossible for some, was curtailed, or diminished [36] – the focus of this study was to accelerate adaptations with practical guidance in order to avoid a larger scale loss in capacity for co-design [5].

To orient this study, we drew on two perspectives. The first was the predominant research paradigm in design: pragmatism, emphasizing the centrality of human action and experience to produce knowledge (here, *what works*) in different contexts [39] with a focus on finding what is *useful* [40] to be shared as guidance for maintaining engagement in co-design for healthcare

change [5]. Due to the emergent practice-based nature of *data* on adaptations, the second perspective we drew on was a realist approach, in which the emphasis is on collecting and analyzing a wide variety of evidence to develop a *theory* or *program theory* of an intervention, that is, why something *worked* or is expected to work in what circumstances and for whom [41].

Realist approach

Realist methodology has grown in application since it emerged from realist philosophy into a mode of review, synthesis or evaluation [42] to the present when the use of realist approaches is growing within and beyond health services research [43]. Often chosen as an alternative approach to a systematic review [44], the process derives *CMOs*: statements that link contexts (the circumstances of an intervention in which mechanisms *work*) with a mechanism (the way in which an activity/action works) to outcomes (the pattern of outcomes when the mechanisms *work*) [44]. From these CMOs, *demi-regularities* are derived, that is, observable patterns of connections that appear to be repeated in the examined data among specific contexts, mechanisms and outcomes [42]. Since realist approaches are less concerned with conventional ideas of quality of evidence or an evidence hierarchy and more concerned with what works, these approaches are particularly suited to situations where the formal evidence base is limited, but where a plurality of evidence sources may exist. Realist approaches can include engaging people with expertise and/or experience with the phenomenon or intervention being investigated in an initial program theory, in the middle stages when identifying additional sources of data for the project, or in later project stages (e.g., revising the program theory or identifying what the follow-on activities might be, given the results of the project) [45].

Given that realist methods accept evidence plurality, are iterative and participatory, and have a theoretical focus on how things work, there are many similarities with design methods

underpinned by pragmatist philosophy. This suggests a degree of proximity of values between realist and pragmatist philosophies, in conceptions of what counts as evidence, the purpose and use of evidence, and perhaps even methodological rigour.

Methodological innovations

We introduced a number of innovations [46] to the realist synthesis method to increase "relevance, richness and rigour" [47] by broadening the range of evidence we considered, including new ways of gathering and synthesizing evidence, emphasizing iterative reflection and iterative reframing, and establishing practical guidance as an outcome. These innovations involved engaging with co-design practitioners and facilitators directly, rather than prioritizing reports of co-design work in academic and grey literature. This orientation to direct involvement reflects the design-based pragmatist approach and commitment to working with groups of participants with experiences and knowledge to engage with latent, tacit and explicit knowledge [9] and, when possible, to facilitate the generation of new knowledge [48] as guidance for co-design practitioners [49]. This approach was also (pragmatically) driven by a scarcity of published accounts of the details of co-design method at the time this study was conducted, which, we note, is a common gap in co-design reporting [50].

Methods

As we presented in our protocol for the study [5], our realist synthesis involved several data collection activities, with two stages of data analysis and synthesis, as illustrated in Fig 1.

Fig 1 – Realist synthesis process

1. Study questions

In our protocol [5], we outlined three study questions:

> … [W]ith a special focus on issues of equity, diversity, and inclusion (EDI): (1) How were co-design practices changed or adapted in what circumstances to give rise to successful or high-quality outcomes for participation? (2) What are the underlying mechanisms that explain how adapted co-design practices worked to enable participation in different contexts? (3) What generalized and context-specific recommendations emerge from these experiences to inform new approaches to post-pandemic co-design practice particularly considering EDI?

The first two questions orient the study to mechanisms in adaptations of co-design projects under pandemic conditions to enable participation by individuals in marginalized communities. The third question, driven by our pragmatist orientation, focused on implications and guidance for co-design practice and practitioners beyond the pandemic.

2. Initial theory

To develop our initial theory, we drew on our own experience in the early days of the pandemic, and our observations of the experiences of other designers and researchers who were commenting on social media and in collaborative meetings. We also engaged with resilience theory [51] as an orienting middle range theory [52]. We considered resilience theory to be useful in theorizing potential responses to the pandemic, that is, the way co-design facilitators might have been able to adapt their techniques to maintain functioning. We also considered that some techniques of co-design as practiced prior to the pandemic might be "brittle" – not as adaptable.

As we developed our initial theory, we anticipated that adaptations to co-design practice could be numerous since, within a single project, several techniques might be impacted. Co-design techniques number in the hundreds for different stages and purposes of co-design (e.g., [30, 53]). To manage this scale and complexity we developed our initial theory expressed as a framework reflecting principles for co-design work that contribute to equitable, diverse and inclusive participation.

3 a, b, and c. Search for evidence

Recruitment of participants

Participants in the various study activities included design researchers, health services researchers, design practitioners, facilitators, and coordinators engaged in co-design in health. Individuals actively involved in co-design with marginalized groups or communities were identified through convenience [54] and snowball sampling [55] from the research team's networks, a hand search, and a scan of social media posts relating to co-design [56]. The specific recruitment strategy varied by activity and recruitment and consent details are included below for each research activity.

3a. Literature scan

The purpose of the literature scan was to familiarize the research team with published examples of co-design practice adaptations as they emerged, recognizing that the literature would be relatively sparse given the nature of the research we were conducting. Between June 2022 and January 2023, we identified articles from the research team's collections gathered in the initial stages of the project, conducted a rapid scan using an AI literature search tool, Litmaps [57], and did a hand search of reference lists. Excluded articles were research protocols, and

those not in English, not health-related, or published before the pandemic. Three members of the research team reviewed abstracts to check for topical relevancy (SW, MM, KS). A rapid scan of social media sources (LinkedIn and Instagram) was also undertaken.

3b. Workshops

We adapted design techniques to explore designers' and researchers' recent and still-in-progress co-design adaptations affected by the pandemic that did not yet appear in academic or grey literature [50, 58-60]. To explore their adaptations, we conducted one in-person workshop, and six online workshops from November 2022 to January 2023.

In-person workshop

The in-person workshop was entitled "Remote co-design" and engaged design researchers, health services researchers and design practitioners at the Design4Health Festival in Sheffield, UK, June 22, 2022 [61]. Our aim was to test data gathering strategies for the online workshops, and to introduce the initial theory framework for feedback. In the workshop, participants were invited to reflect on the experience of the pandemic for themselves and their co-design teams, and the values that underpin their work. They were then invited to describe challenges they had experienced. To generate data about either resilience or brittleness in co-design practice, we used the initial theory framework as a prompt to ask participants about gains and losses experienced in example projects. Participants were then asked to identify, through dot voting on the framework, pivot points or shifts in practice. The initial theory framework elements that were voted for were then the focus of discussion about participants' specific projects. For details of the materials and structure of the workshop please see Additional File 1.

Recruitment and consent: We recruited from Design4Health Festival attendees. An information letter including consent information was emailed to attendees ahead of the in-person

event, including a package of example projects, example technique adaptations assembled by the research team, and workshop agenda, as preparation material. Each attendee consented in person prior to participation.

Online workshops

Six online workshops were conducted with design researchers, health services researchers and design practitioners who conducted co-design in health-related projects with individuals from marginalized communities moving into and/or during the pandemic. We adapted the workshop content and format from the in-person workshop to an online format.

Participants were emailed a pre-workshop package (see Additional File 2) about the workshop goals, the workshop activities, and the digital platforms, Zoom [62] and Miro [63], that would be used. The workshop materials used to support the structure of the workshop included: prompt cards reflecting the initial theory framework, and cards with quotes or summary statements from the literature scan that illustrated, in the research team's view, the principles and elements in the initial theory framework (see Additional File 3). Participants were also asked to be ready to discuss a project that they had worked on moving into and during the pandemic.

To prompt discussion in the workshops about practice decisions, participants were engaged in several reflection activities. Participants were asked to identify the initial theory framework principle that was most negatively affected (a "loss" from the perspective of pre-pandemic co-design practice) and most positively affected (a "gain") by the pandemic in their projects, the barriers and enablers for participation of individuals, the pivots and turning points that changed a project's direction or conduct, and the changes that were made that supported successful engagement of individuals, if any. After they reflected on the prompts, they recorded

their reflections briefly on virtual sticky notes and placed them on a Miro board [63]. Discussions to elaborate on the losses and gains followed, guided by the sticky note reflections and the interactions among the participants and the facilitators.

The data collected for analysis included participants' Miro board notes, research team member notes, and the verbatim transcripts of the workshops.

Recruitment and consent: Potential participants meeting the inclusion criteria (design researchers, health services researchers and design practitioners conducting co-design in health projects with individuals from marginalized communities during the pandemic) were identified from social media posts and the scanned literature, as well as research team members' professional networks. We did not restrict recruitment by geography; instead, we established a series of different times and date options to cover a range of time zones. Interested potential participants were emailed study information, and consent was obtained from all participants prior to workshop activities. Participants were assigned to a workshop according to their availability with a view to roughly balance numbers at three to eight participants per workshop.

3c. Community of Practice

We created an online Community of Practice [64] and invited people in the research team's networks and other individuals who are involved in co-design practices to join and participate. To initiate the Community of Practice, we posted summaries of articles from the literature scan, case descriptions of projects developed by participants who had attended the in-person workshop, as well as other project descriptions from designers and researchers who had not been present. Community of Practice members were invited to share their experiences of doing co-design during the pandemic in the form of comments, questions, or descriptions of their

projects. Our team blogged periodically, for example, adding links to new literature and emerging findings.

4. Data analysis and synthesis I

In mid-February and mid-June 2023, the majority of the members of the research team (KS, GH, PH, MM, NB, SK, LK, MZ, LAPG) held hybrid data analysis working sessions to analyze the transcripts from the workshops and social media posts in Atlas.ti [65]. The workshop data were considered the primary source of evidence. Transcripts from each workshop were uploaded to Atlas.ti for analysis first, and then social media resources were added to this data set.

The analysis approach was one of deductive coding of identifiable adaptations to co-design practice based on the initial theory framework with flexibility for adaptations to be clustered into new framework elements, identified through discussion among the team as coding progressed. As an initial training step, the team collectively tagged the data from one workshop using the initial theory framework. Three sub-teams, each consisting of two researchers, then continued the coding process for the remaining transcripts for one principle with a follow-up analysis meeting to review tagging consistency and resolve ambiguities or conflicts through discussion. This horizontal plus vertical analysis training strategy enabled the teams to then split up the remaining tagging. KS, GH, NB, MM, MA, MZ, LAPG and LK coded the remaining data from the workshops and developed ‘provisional CMOs’. These provisional CMO statements were then transferred to a Miro board, and an inductive sorting process was undertaken to discern patterns for clustering adaptations. This sorting process allowed for new clusters of adaptations to emerge beyond the initial theory framework.

The analysis of the data from the literature scan was carried out at the same time as the workshop analysis, using Excel [66] sheets (rather than other scoping/rapid review software) as

the total number was small. After initial data extraction of identifiable adaptations to co-design practice (KS, SW, MM), provisional CMOs were developed and these were then added to the Miro board alongside the workshop provisional CMO sorting.

Next, “demi-regularities”, or reoccurring patterns across the provisional CMOs, were identified and described [44]. The process of describing demi-regularities is integral in moving from volumes of statements about co-design practice to CMO statements describing distinct adaptive practices.

5. Interviews

To search for additional evidence where data was sparse, 15 semi-structured interviews were conducted by NH and MM between October 23, 2023, and December 22, 2023. The interviews invited participants to discuss their projects and the co-design adaptations they had made with specific questions on gaps identified in the preliminary CMOs. Identifiable adaptations to co-design practice in the transcripts were extracted and then coded by MM, MA, LAPG and LK using the initial theory framework and the new clusters of adaptations identified in the coding of data from the workshops and literature.

Recruitment and consent: Potential participants meeting the inclusion criteria (design researchers, health services researchers, design practitioners conducting co-design in health projects with marginalized groups/communities during the pandemic), were identified from cases previously identified by the research team either during literature scan, workshops, or from Community of Practice. Recruitment was by email, and interested potential participants were emailed study information and consent was obtained from all participants prior to interviews.

6. Data analysis and synthesis II

The CMOs generated from the data from the literature, workshops, case descriptions, and interviews were consolidated, and then sorted by the research team against the elements of the initial theory, and when CMOs did not fit the initial theory, they were clustered into coherent categories. All relevant CMOs generated from the different sources (articles, workshops, and interviews), along with their corresponding demi-regularities, were organized into the new clusters on the Miro board. Further, the research team collaboratively reviewed them and developed the refined and final CMOs for each cluster.

7. Validation

The research team carried out several validation efforts including six public webinars followed by discussion; a "Winter School" for early to mid-career individuals working with marginalized communities on equity concerned projects; two workshops at health research conferences engaging health researchers in the outputs of the realist process, with presentations oriented to the interests of each conference's attendees; and, post-workshop and webinar surveys. These activities were intended to enhance the rigour in the realist process [47], to share outputs, and to engage participants in feedback through active engagement with the initial theory framework, final CMOs, and the final clusters of adapted practice. For the final mode of validation, we planned a consultation with a community of patient partners involved in healthcare co-design efforts. For this consultation, we planned a dialogic process of review, reflection, and reinterpretation, engaging patients and caregivers with diverse lived experiences in validation of the outputs of the study.

Results

1. Study questions

We described our study questions above, but they are restated here for ease of reading: With a special focus on issues of equity, diversity, and inclusion (EDI):

(1) How were co-design practices changed or adapted in what circumstances to give rise to successful or high-quality outcomes for participation?

(2) What are the underlying mechanisms that explain how adapted co-design practices worked to enable participation in different contexts?

(3) What generalized and context-specific recommendations emerge from these experiences to inform new approaches to post-pandemic co-design practice particularly considering EDI?

We considered that the initial study questions described in our published protocol could be operationalized with two clarifying definitions.

Firstly, we acknowledged that we were unlikely to have access to participants' views of the success or failure of their participation in co-design since the focus of the synthesis was adaptations already made in co-design projects. As well, there is currently no consistent approach to evaluation of participants' involvement in research, and we knew that it would be unlikely that we would be able to find comparable participant feedback across multiple projects in multiple locations. Therefore, we considered designers' and researchers' self-reported "gains" in continuing co-design in projects with individuals from marginalized communities to constitute a positive outcome in terms of adaptations to practice.

Secondly, borrowing from the New Frontiers in Research Fund's *Best practices in equity, diversity and inclusion in research practice and design* guide [67], we defined individuals from

marginalized communities in this study as "individuals from underrepresented groups, which include, but are not limited to, women and gender minorities, Indigenous Peoples (First Nations, Inuit and Métis), racialized individuals, persons with disabilities, and members of the 2SLGBTQIA+ communities."

2. Initial theory

The result of our review of relevant publications on participatory design [7, 12, 13, 15-22, 68, 69] and design justice [70-74] was the "EDI Framework" of co-design principles summarized in Fig 2. In the EDI Framework, we added elements in the grey boxes in Fig 2 to exemplify how the principles might be enacted or observed. For example, individuals' *Safety* could be ensured in online or hybrid co-design activities through attention to cultural safety and through making sufficient space, time and actions to maintain and support individuals' wellness while online.

Fig 2. EDI Framework: initial theory framework

At this stage, 42 initial rough theories were generated by the research team, expressing our early view both of potential areas of brittleness and adaptation for each of the principles in the Framework (see Additional File 4), and they were used by the team as guidance and prompts for coding topics, techniques, and ideas in the data from the evidence search.

3a, b, and c. Evidence search

3a. Literature scan

The scan of the research team members' own collections resulted in a list of 26 articles, and these were used as a training set to conduct a rapid scan using an AI literature search tool, Litmaps [51], which generated a list of 381 articles, including the original training set. Articles

not in English or published before 2020 (n=262) and duplicates (n=19) were excluded. A hand search of the reference lists in the 77 articles yielded an additional 25 articles, after full text review 68 articles were excluded because they did not involve health projects, were not related to the pandemic, or were study protocols only, or were duplicates (2). The result was a set of 34 articles [33, 75-106] for full review: see Fig 3 and Additional File 5. In addition, a small number of social media sources (n=18) were identified from LinkedIn and Instagram (n=16 blog posts, n=6 website pages).

Fig 3. Diagram showing the process of identifying, screening, and determining eligibility of published materials in the literature scan

3b. Workshops

In-person workshop

Eighteen attendees at the Design4Health Festival participated in the in-person workshop, which was facilitated by team members (JL, SW, KS, PH, CR). The primary purpose was to test the structure and design of materials to support the collection of practice adaptations. As a result of our experience with the in-person workshop, we decided that for the online workshops, we would retain the prompts to participants around gains and losses, with a more intentionally structured discussion of those gains and losses to elicit more detail on technique adaptation.

Online workshops

The online workshops were held between November 3, 2022, and January 9, 2023, across five time zones (EST, MST, PST, GMT, and AEDT). Participants were primarily situated in Canada with some from the United Kingdom and the United States, and one from Australia. The

project topics presented and discussed in the workshops were diverse, covering inpatient, outpatient, congregate settings and other health contexts. See Table 2 for details of the participants, their geographical location, their roles and their project areas.

Table 2. Online workshop participants' characteristics by location, role, and project area

Insert Table 2 here (located at the end of this document)

The main workshop activities were designed to explore participants' experiences maintaining and adapting their co-design projects using virtual "dot voting", to indicate the areas of co-design practice they perceived as experiencing the most impact during the pandemic, first voting and discussing "losses" and then "gains". Fig 4 is an example Miro board activity that illustrates the dot voting in one of the workshops for the selection of most-impacted principles.

Fig 4. Example of an online workshop dot-voting activity on "gains"

Following dot voting on the principles impacted, topics with higher numbers of votes were brought forward for structured dialogue to share experiences in further detail at the next level (elements described in the grey cards). Participants were led through in discussion in three steps: 1) to elicit more detail of gains and losses, 2) to elicit the barriers and enablers (resources and tools, people and skills, processes and ways of thinking) for participation, and 3) to identify the 'pivots' or turning points participants had made in their projects ("We had intended to but weren't able to because…"/ "We were able to make it work because…"). Participants' responses were recorded on virtual sticky notes. This activity was split into two (losses and gains) supported by a sequence of prompts; see Fig 5 for an example of the Miro board "gains" activity sheet and Fig 6 for a close-up of some of the participants' posts on the "gains" sheet from one of

484 the workshops). The facilitators then engaged the participants in an audio-recorded structured
485 discussion to elicit more details of related practice adaptations.

486 **Fig 5. Example of the Miro board "gains" activity sheet from one of the workshops**

487

488 **Fig 6. Close-up of some of the participants' posts on the "gains" sheet from one of the**
489 **workshops**

490

491 We used the relative frequency of dot votes by participants across the workshops as an
492 input to identify additional data that we might need to collect in the next stage of the realist
493 synthesis. The votes from all online workshops are tabulated in Additional File 6.

494 We observed that the principles of Accessibility and Capacity Building were mentioned
495 most often as "gains" in terms of adaptations while Creativity and Making and Timeline and
496 Pace saw the most "losses". This led to identifying Creativity and Making and Timeline and Pace
497 as areas for specific focused attention and for further evidence gathering.

498 We transferred the data from the workshops into one Miro board organized by EDI
499 Framework principles for analysis in the next stage of the study, Data analysis and synthesis I.

500 **3c. Community of Practice**

501 While no new data were generated by activities on the Community of Practice platform,
502 it was used as a recruitment source and as a dissemination tool for collected data. Fifteen project
503 summaries were created from project descriptions and example adaptations shared by attendees
504 in the in-person and online workshops. These project summaries were released during the data
505 analysis phase to fulfill the goal of accelerating guidance. They were case descriptions of

adaptations within example co-design projects, and they were not used in the analysis in this realist synthesis.

4. Data analysis and synthesis I

After extracting data from the workshop transcripts and the literature using Atlas.ti as described above, the data from the workshops yielded a total of 448 initial CMOs and from the literature, 90 initial CMOs. Of the total number of initial CMOs, 538, 157 were excluded from the next step because they were essentially duplicates of other CMOs, or, though they were deemed relevant to the study, they did not have enough detail to describe practice adaptations. For example, in the case of the Creativity and Making principle, the intent to enable participants' creativity in co-design sessions was described in many CMO statements but few details were provided about the nature of attempts to achieve the intent. This led to the prioritization of this EDI Framework principle for additional evidence searching. In the first round of data analysis and synthesis, we identified ten clusters of similar CMOs (and the associated demi-regularities). The process of describing demi-regularities was integral in moving from the high number of statements about co-design practice adaptations to CMO statements describing distinct adapted practices.

As illustrated in Fig 7, CMOs representing adapted co-design techniques aligned with the EDI Framework principles of Context Specific and Community-Based Knowledge, Safety and Capacity Building & Empowerment. However, in each case, the aligning CMOs showed resilience in ways that lead to a rethinking of the contours of the EDI Framework. In the case of Safety, for example, the CMOs confirmed mechanisms focused on participants – as is usually conceived as the focus of the Safety principle – but also on co-design facilitators, including an emphasis on psychological safety, a broader notion of personal safety, and a new dimension,

529 focused on personal safety in the home, now that participating individuals were participating
530 from their homes, and their home life was more exposed than in in-person workshops prior to the
531 pandemic.

532 **Fig 7. Clustering of CMOs from the literature scan and workshops by the end of Data**
533 **analysis and synthesis I, starting from original EDI Framework principles**

534 **Legend for Fig 7**

535 Green - EDI Framework principles

536 Dark blue - practice adaptations clearly described

537 Light blue - generalized descriptions lacking clarity (dotted line)

538 Yellow - overlapping concepts

539 Solid line - Strong evidence

540 Broken line - Some evidence

541 Dotted line - Weak evidence

542

543 The CMOs that aligned with the Accessibility principle appeared at this stage to
544 potentially merge into the Capacity Building and Empowerment principle, as the identified
545 resilience was focused not only on individuals participating in co-design, but the facilitators as
546 well. Concerns about participants' adaptation to new technologies tended to emerge as a
547 predominant focus of resilience for the Accessibility principle rather than, as is usually
548 conceived, predominantly on accessibility issues related to disability or impairment that could
549 limit participation.

550 While conceptually similar to EDI Framework principles, some CMOs describing
551 adapted co-design techniques indicated a different emphasis in practice. These were co-design

552 techniques that were categorized as Intermediaries and Proxies, and Assembling. The demi-
553 regularities showed a new or enlarged purpose for engaging intermediaries and proxies than
554 usually experienced prior to the pandemic, and a new role for Intermediaries (e.g., trusted
555 community organizations for recruitment) and Proxies (respected community representatives)
556 pointed to a new potential mechanism for engaging individuals from marginalized communities.
557 With respect to the Assembling category, this encompassed a variety of adapted practices
558 showing that facilitators of co-design during the pandemic assembled a wider and more varied
559 set of techniques and activities than they had tended to be used in in-person, pre-pandemic
560 practice, in order to enable participation of a wider group of participants. This category appeared
561 at this stage to subsume an EDI Framework principle, Timeline and Pace, in that variations in
562 both timeline and pace usually involved different techniques and activities that inherently
563 involved longer time and slower pace to engage participants.
564 There were gaps in the evidence that did not enable the research team to confirm the
565 resilience of co-design techniques in Creativity and Making and Democratic Practices principles.
566 Some indications from CMOs supporting the new Assembling principle pointed to adaptations of
567 techniques for Creativity and Making, but the evidence at this point was not robust. As noted
568 above, though there was plenty of description that ‘creativity was achieved’ or ‘intended’, for
569 example, there was very little evidence about adapted techniques for making. As for the
570 Democratic Practices principle, there was some indication that new and adapted practices related
571 to Transparency of process and of data might enhance participation, mitigate power dynamic
572 issues, and participation in analysis. However, there were not enough data to identify at this stage
573 a range of resilient adapted techniques for means focused specifically on democratic decision-
574 making, a key to the Democratic Practices principle.

5. Interviews

A total of 15 semi-structured interviews (see Table 3 for characteristics of participants by location and role) were conducted by NH and MM between October 23, 2023, and December 22, 2023. After deductive coding of identifiable adaptations co-design practice from these interviews, 313 initial CMOs were constructed and the CMOs were categorized into clusters aligned with the EDI Framework and the additional provisional clusters identified in the Data analysis and synthesis I stage.

Table 3. Interviewees' characteristics by location and role

Interviewee	Country	Role
1	UK	Interaction Designer
2	Canada	Facilitator with policy orientation
3	Canada	Communications strategist
4	Canada	Psychotherapist & health program consultant
5	US	Health designer and researcher
6	Canada	Health designer and innovator
7	Australia	Facilitator, researcher and designer
8	UK	Design researcher
9	UK	Health designer and researcher
10	Canada	Health researcher
11	Italy	Health designer
12	Canada	Co-design researcher
13	UK	Design researcher
14	Canada	Human centred designer
15	Canada	Health and design researcher

6. Data analysis and synthesis II

In this stage, our analysis started with reviewing the CMOs that had emerged in Data analysis and synthesis I stage from the data from the literature and the workshops. As shown in Fig 8, we added the 313 new CMOs that emerged from the interviews, and then excluded 117 CMOs that were largely duplicates of other CMOs or lacked detailed descriptions of adaptations.

We then reviewed the clustering of CMOs under the other Principles and the new cluster categories, and in particular were able to identify how the clusters of CMOs arising from the interview data strengthened our tentative analysis from the Data analysis and synthesis I stage concerning the Creativity and Making and the Democratic Principles. Finally, within each resulting cluster, guided by the demi-regularities, we refined the CMOs into 55 final CMOs.

Fig 8. The trajectory of CMOs in Data analysis and synthesis I and II

The evolution of the EDI Framework Principles and new clusters is shown in Fig 9.

Fig 9. Evolution of adaptation clusters by CMOs by the end of Data analysis and synthesis II, starting from original EDI Framework principles

Legend for Fig 9

Green - EDI Framework principles

Dark blue - practice adaptations clearly described

Light blue - generalized descriptions lacking clarity (dotted line)

Yellow - overlapping concepts

Light orange - principles less resilient

Dark orange - new cluster of adaptations clearly described

While the clustering of CMOs describing adaptations in practices related to Context and Community Based Knowledge were confirmed during interviews, we concluded that adaptations were less observable and therefore we consider that this principle in practice may be less resilient in online or hybrid modes. We also confirmed that the use of Intermediaries and Proxies, a new

611 classification, may act as an emerging practice area to mitigate some of the access to Context and
612 Community Based Knowledge that was made difficult with the loss of in-person and *in situ*
613 activities.

614 For Safety, and Capacity Building and Empowerment, we were able to confirm
615 adaptations were made that upheld those principles and extended them. The principle of
616 Accessibility was supported by positive adaptations in Transparency, Assembling, Capacity
617 Building and Empowerment by adjusting Timeline and Pace in practice. However, for the
618 Creativity and Making principle – a significant contributor to the *design* part of co-design –
619 adaptations were less observable, leading to our conclusion that co-design techniques in this area
620 are less resilient than other areas of co-design practice.

621 With respect to Democratic Practices, and specifically relating to decision making
622 methods, adapted techniques remained under-represented in all the data we considered. We
623 suggest that this may reflect a larger gap in co-design reporting and discussion in the field and
624 might not necessarily indicate the absence of democratic practices in co-design during the
625 pandemic.

626 In sum, seven clusters of CMOs describing adaptations that showed adapted practices
627 were identified after analyzing and synthesizing all the data (Fig 9):

628 1. Emphasizing context-specific and community-based knowledge
629 2. Using intermediaries and proxies where necessary
630 3. Flexible safety
631 4. Enhanced transparency
632 5. Assembling co-design practice techniques
633 6. Building capacity

7. Including creativity and making

For each of these categories – except for the seventh, 'Including creativity and making' – there are a number of CMOs describing adapted techniques (*mechanisms*) that led to participation by individuals from marginalized communities (the desired *outcome*) in the *context* of hybrid or online-only co-design. The techniques embedded in the CMOs are described in other forthcoming publications as practical guidance for co-design practitioners in online or hybrid co-design. Also, some of the techniques may also be applied in in-person co-design.

7. Validation and evaluation

While the research team triangulated the data across different forms of evidence and sought additional evidence (interviews) where evidence was limited, the team also engaged in validation efforts [47]. Four complementary methods of validation were undertaken, six public webinars, a Winter School for early to mid-career individuals (n=12) working with marginalized communities on equity-based projects, and two workshops at health research conferences engaging health researchers in the outputs of the realist process. The webinars were followed by questions and clarifications, and discussion about the application of the presented material in the attendees' settings. The conference presentations were oriented to the interests of each conference's attendees (*n*=35) (e.g., older adults, design researchers, health services researchers, caregivers). The research team presented the developing evidence and described example adaptations with invited audience questions and comments, and engagement in reflection activities. Though we had intended to gather evaluation survey data from attendees, response rates to the post-webinar and post-conference surveys were very low and consequently not useable with any confidence. The activities, however, allowed for sharing outputs and engaging

participants in feedback through active engagement with the EDI framework, final CMOs, and the final clusters of adapted practice.

The final method of validation was a consultation with a community of 23 patient partners involved in healthcare co-design efforts. In this consultation, we engaged patients and caregivers with diverse lived experiences to validate whether the emerging findings relating to adaptations would increase inclusivity and equity in research and healthcare [107]. A dialogic process of review, reflection, and reinterpretation was undertaken, including three one-hour online sessions, separate deliberative (anonymous) assessment/feedback sessions, with written anonymous feedback. From this work, language and comprehension was addressed for the translation of results from data to practice guidance as well as confirming the face validity of the final CMOs and seven final clusters of adaptations.

These validation steps confirmed the research team's interpretation of the data and the high-level results, confirming significant adaptations and capacity building during the pandemic with new practical guidance on techniques. Validation steps also confirmed the findings of the absence of robust evidence of adaptations of Creativity and Making practices.

Discussion

Realist approaches have been applied less frequently to understanding the processes giving rise to the production of knowledge through research or design, as in the case of the work presented here. Masterson et al. [108] conducted a realist synthesis to identify what, in co-production or co-design of health and social care, enables inclusive and reciprocal engagement of service users; Evans et al. [109] conducted a realist evaluation to find what gives rise to effective public involvement in research. However, we note that Masterson et al. [108] consulted only

peer-reviewed literature to identify CMOs, and Evans et al. [109] interviewed a sample of researchers and research participants to develop eight case studies as the evidence to review.

Though the process we followed in this study was largely true to current guidance on realist synthesis [41, 43, 45, 52, 110, 111], we shifted the usual practice of consulting the literature to focus on data residing within examples from design researchers, health services researchers and design practitioners and in their practice. We found this to be necessary for several reasons. First, codesign practitioners focus on the execution of design projects and do not necessarily publish their work as health services researchers do when using other methods, and the tradition of writing about and publishing on design techniques is less common due to publishing conventions [22, 50]. Second, the events we were looking at —changes in practice due to COVID-19—were recent, so that, even if there were an intent to publish, there is a significant lag in available evidence. Third, design practice and technique are characterized by an iterative approach with an assemblage of different techniques [30, 53] including collective making, to elicit not only explicit knowledge but also tacit and embodied knowledge [48]. These distinguishing features of design would not have been sufficiently captured if we had reviewed only the literature. Indeed, representation of design techniques, their materials and outputs, remain underreported or often not reported in any sufficient detail to be useful [50, 59].

The pandemic in large part slowed (or prevented) progress in co-design projects around the world, and the advantage of engaging with designers and researchers while conducting or having recently completed their projects was that their experiences were retrievable even if not yet documented. This proximity to experience, usually hindered by the long cycle of project completion > manuscript preparation > > word count limitations > manuscript review > publication, was invaluable to understanding the creative and sometimes stalled efforts of

designers and researchers to cope with changed circumstances the pandemic created. In similar work where there has been a question about research practice, interviews are the main mechanism for gathering realist evidence [41]. Even though their actions were proximal, several participants had forgotten some of the rapid adaptations that they had made and only recalled them when others prompted their memories with similar or contrary experiences and challenges.

We were able to see that in fact some co-design practice, freed somewhat of the constraints of place and time, could in fact evolve to more equitable and inclusive participation after the pandemic [32]. We were also able to make some observations about the resilience – or its obverse, brittleness – of some co-design practice and approaches and the ability of some practitioners to 'gracefully extend' [112].

We also observed that as a creative practice itself, co-design appears to be best advanced as practitioners meet (in person, online or hybrid), share experiences, and discover techniques that others have 'invented'. While academic (and grey) literature is often viewed as the best evidence to review and report and learn from, we have seen that involving and engaging practitioners in discussions of their practice and methods is a useful, efficient and effective way to generate knowledge and to mobilize knowledge. This led us to appreciate that the Community of Practice that we developed in the first instance as a mechanism to collect and share data might be better positioned as a mechanism to continue the advancement of practice.

What we designers and researchers with a design orientation are looking for in the data is (potentially) slightly different from the majority of realist approaches. From the outset of our project, we were thinking about possible outcomes and how they might be applied; how we might impact or change design practice with a greater emphasis on explanatory clues about how to change practice. This may be related to the distinction by which design requires external

validity (relevance) whereas scientific research prioritizes internal validity (consistency) [113]. Designers have an eye on what change can be made in the real world whereas researchers have both eyes on a consistent description. The mantra of 'useful' evidence (to move on to the next step) is one that resonates with both realist and design methods. For designers "useful" it is about putting knowledge into practice, and for realist work it is about the next version of theory. For those working in the 'research' paradigm but with a goal of describing how a possible better future might be achieved, adopting a designerly mindset appears to be useful.

While conceptually realist and pragmatist approaches can be seen as distinct [114], there is an argument to be made for their complementarity. Design-based reasoning is characterized by abductive reasoning whereby successive inputs of ideas, concepts, references and knowledge (of different types) provides opportunities for framing and reframing of a challenge or problem area [27]. A portion of this is expressed in co-design methods as seeking out contextually relevant information and experiences (context) and the integration of the contextually specific experience (lived experience) of impacted individuals or groups. This is conceptually close to the idea of "context" in realist synthesis, with the framing and reframing of a design situation as engaging with "mechanisms" by which change might be achieved (through a designed output "outcome"). Much as realist synthesis seeks to establish what works to produce a particular outcome and in what circumstances (looking at multiple available views or sources of evidence), design will seek out knowledge and experience that is relevant in often diverse ways. Much as realist synthesis is pragmatic in its goal of "evidence" by accepting limitations, diverse sources, gaps, and potentially divergent insights (holding multiple versions of truth), design also aims towards an outcome that is pragmatic [115], deriving insights that support action that is plausible (satisficing) as explored by Herbert Simon [116] and then elaborated in *Designerly Ways of*

Knowing by Nigel Cross [117]. Both realist and designerly processes include iterative cycles of expansion, reflection and synthesis towards a solution that is understood to be fit for a situation (pragmatic) [118] within design but is considered realist for realist scholars.

Next steps

The next steps for this research are focused on dissemination and knowledge sharing. As mentioned, publications are planned to discuss at a more detailed level the details underlying the final refined CMOs and practice guidance, and in particular, the detailed techniques and tactics that co-design practitioners can use to ensure meaningful engagement with individuals from marginalized communities.

Limitations

As we primarily included projects that were experiencing adaptations during the pandemic, we have a smaller proportion of the evidence derived from projects where a co-design project was unable to proceed. Given the speed and severity with which pandemic conditions escalated we chose to use a very broad definition of "successful co-design" as co-design **t**hat was able to continue with some adaptations, using a framework of principles for co-design to orientate the analysis and interpretation. Interrogating more fully the "losses" to co-design under pandemic conditions more broadly as well as the "losses" experienced because of shifting to online and hybrid modes may be worthy of further study. In addition, while we were able to engage patient partners and other researchers and practitioners in validation steps, we were unable to involve healthcare providers and allied roles who may also have relevant experience of co-design adaptations under pandemic conditions. Recruiting prior co-design participants for research on co-design itself remains a gap. While we made every effort to engage in validation

with a wider group of both potential healthcare provider interest holders (potential co-design participants) as well as co-design researchers and practitioners during webinars, the survey method we chose to evaluate the webinars was not successful. It is not unusual to have little success with validation surveys for realist work and others have reported similar challenges with validation steps beyond the research team. The extensive nature of the data we collected is illustrative of an unresolved, practical challenge in validation at this stage of a synthesis process in large-scale realist work.

Conclusion

Taking a realist approach with a pragmatic mindset, we collected data and evidence about co-design projects that had and had not been documented. It was primarily in practitioners' recounting and sharing of the stories of the projects with other practitioners during workshops that information emerged about the detailed adaptations, frustrations and successes. We were able to reflect on our team's starting premise that the impact of the pandemic on equitable and inclusive participation in co-design was mixed. While realist approaches are not often used to improve research practice and techniques, we have shown that a realist approach, extended by pragmatist efforts to generate new knowledge through primary data collection with practitioners, can be used to identify opportunities for methodological advances. It requires involving practitioners directly in generating the evidence that can drive new collective knowledge to be shared broadly. The use of materials to enhance dialogue among practitioners during the workshops allowed access to tacit and latent knowledge that enhanced the richness of the data on practice adaptations. This involves going beyond inviting people with lived experience or expertise to comment on the findings emerging from researchers' work to integrating their experiences into the data.

Declarations

Ethics approval and consent to participate

A detailed protocol for this study was reviewed and approved by the Ontario College of Art and Design University Research Ethics Board (#102157 and #102248) [Approval September 22, 2022; amendment: October 23, 2023], by the University of Alberta Research Ethics Board 1 (#Pro00124577) [Approval October 10, 2022; amendment: September 11, 2023]; and by the Emily Carr University of Art + Design Research Ethics Board (#100511) [Approved October 13, 2022; amendment: December 13, 2023]. In each case, the protocol and the Research Ethics Boards applied the Canadian ethics standards in the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS 2 (2022)* [119]. All participants received full information on the study and on their right to withdraw consent to participate at any time without giving reasons and were able to ask questions prior to participating. All participants gave informed consent before participating in the study.

Consent for publication

Not applicable.

Availability of data and materials

In accord with the study protocol approved by the Research Ethics Boards, we did not obtain consent from participants to deposit study data, which are comprised of created artefacts and workshop and interview transcripts, in a public repository. However, de-identified data that support the findings of this study can be made available upon reasonable request by contacting the following institutional email: research@ocadu.ca.

Competing interests

The authors declare that they have no competing interests with respect to this study and this article.

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Authors' contributions

KS conceptualized the study and its research goals, and secured funding for the study. KS, JL and PH developed the methodology. KS, PH, GH, MM, NB, JL and CR collected data and were involved in the analysis and synthesis of data. Validation of the results was carried out by KS, MM, NB, GH and PH. The data were curated by MM; resources for the study were procured and developed by MM, KS and NB; and various parts of the study were managed by MM, KS, GH, NB and CR. Preparation of visualizations for the study results was done by MM, NB, KS and PH. Writing of the original draft was done by PH, and critical review and revisions of the manuscript drafts was done by KS, MM, GH, NB, JL, CR, and PH.

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Additional files

Additional File 1: Details of the materials and structure of the in-person workshop (pdf)

Additional File 2: Online workshops pre-workshop package (pdf)

Additional File 3: Workshop materials used to support the structure of the online workshops (pdf)

Additional File 4: Forty-two initial rough theory statements (pdf)

Additional File 5: Articles reviewed in literature scan (pdf)

Additional File 6: Tabulation of dot voting (pdf)

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Table 2. Online workshop participants' characteristics by location, role, and project area

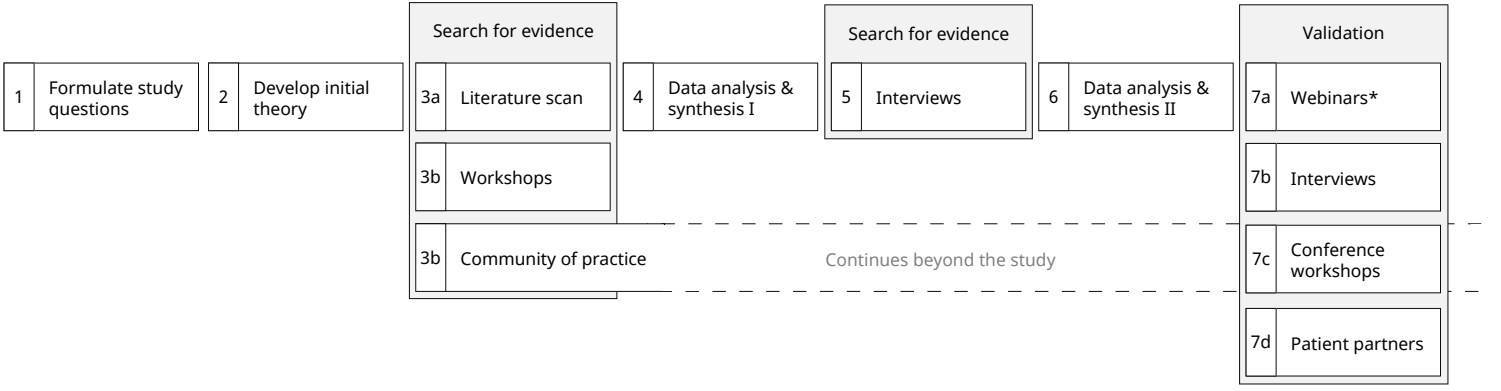
Workshop	Participant	Country	Role	Project area	Community/ marginalized group involved
1	P1	Canada	Design researcher	Health communication	Highly vulnerable populations, homeless, English as second language, low literacy, multiple vulnerabilities
	P2	Canada	Design researcher	Community capacity building (opioid response)	People with lived and living experiences of substance use
	P3	US	Strategic designer	Collaboration mechanism (opioid crisis)	--
	P4	UK	Pharmaceutical industry	(Did not present)	--

	P5	UK	Researcher	Mental health services	Mostly unpaid carers over 18 who support someone living with severe mental illness
2	P1	Canada	Design researcher	Health Communication	Low literacy, English as a second language, marginalized and groups at high-risk for COVID
	P2	Canada	Policy analyst	Emerging practices	--
	P3	UK	Design researcher	Mental health management	Black mental health day service users in Northwest London
	P4	UK	Design researcher	Participatory investigation	Patients and families previously excluded from investigation processes
	P5	UK	Researcher	Disability services	Disabled community group
	P6	UK	Researcher	Medical devices	--
3	P1	Australia	Design researcher	Inpatient stroke rehabilitation	People with physical and/ or cognitive challenge after stroke

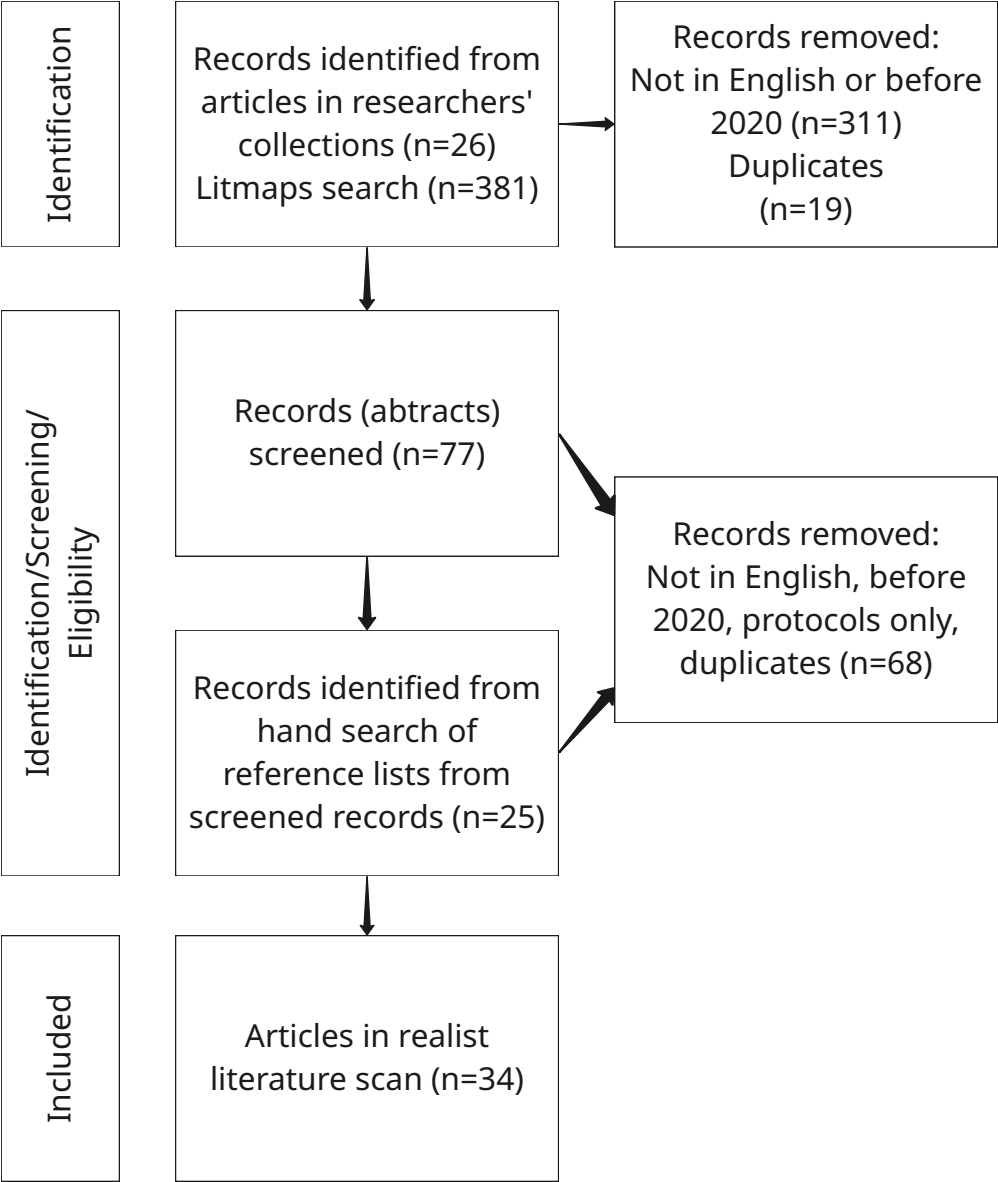
	P2	US	Design researcher	Adolescent health care	Young people marginalized by race, class, gender, gender identity
	P3	Canada	Human-centered designer	Algorithm checklist	--
	P4	Canada	Design researcher	Rehab & recovery services	People with lived experience of stroke, spinal cord injury and brain injury
	P5	Canada	Design researcher	Long-term care	Long-term care home residents, families, and staff
4	P1	Canada	Design researcher	Hospital emergency room signage and wayfinding	Diverse equity deserving people visiting patient areas
	P2	Canada	Quality improvement specialist	Clinical information design	--
	P3	Canada	Researcher	Health communication	People living with dementia, and their caregivers
5	P1	Canada	Design researcher	Aging & mental health	Older adults

	P2	Canada	Researcher	Post discharge intervention	Diverse equity deserving groups
	P3	Canada	Service designer	Covid vaccination	Diverse equity deserving groups
	P4	Canada	Researcher	Rehab & recovery services	Diverse equity deserving groups
6	P1	Canada	Design practitioner & facilitator	Mental health & substance use services	Diverse youth and young adults (gender and sex)
	P2	UK	Design researcher	Older adult services	Older adults with complex needs
	P3	US	Research assistant	Mental health	School students in a small, rural Ugandan town

1214 Note: -- indicates that the participant declined to provide this information


1
Formulate study questions
2
Develop initial theory
Search for evidence
3a
Literature scan
3b
Workshops
3b
Community of practice
4
Data analysis & synthesis I
Search for evidence
5
Interviews
6
Data analysis & synthesis II
Validation
7a
Webinars*
7b
Interviews
7c
Conference workshops
7d
Patient partners
Continues beyond the study
*Webinars took place after Data analysis & synthesis I

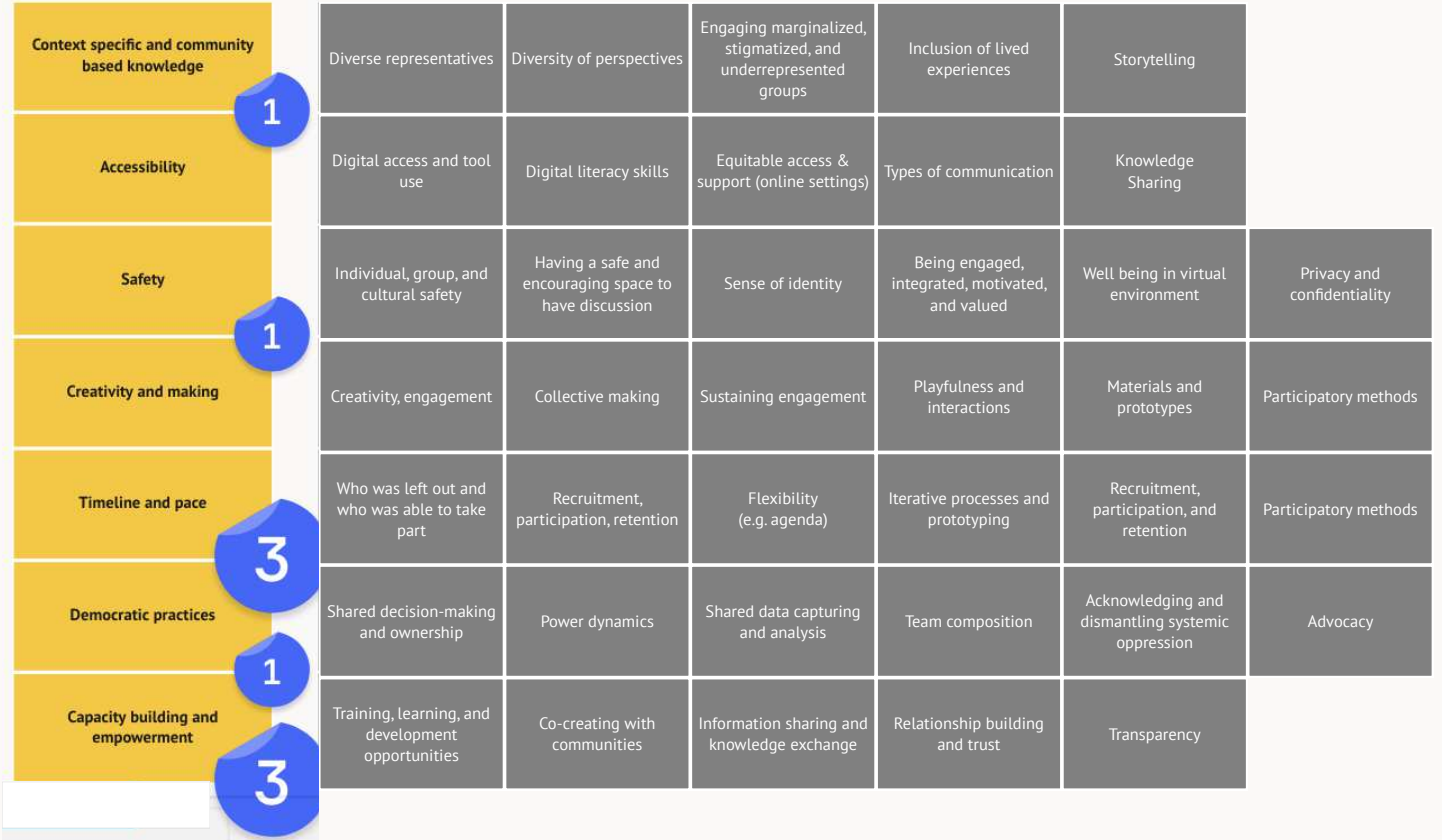
Context specific and community based knowledge	Diverse representatives	Diversity of perspectives	Engaging marginalized, stigmatized, or under-represented groups	Inclusion of lived experiences	Storytelling	
Accessibility	Digital access and tool use	Digital literacy skills	Equitable access & support (online settings)	Types of communication	Knowledge Sharing	
Safety	Individual, group, and cultural safety	Having a safe and encouraging space to have discussion	Sense of identity	Being engaged, integrated, motivat-ed, and valued	Well being in virtual environment	Privacy and confidentiality
Creativity and making	Creativity, engagement	Collective making/ making together	Sustaining engagement	Playfulness and interactions	Materials and prototypes	Participatory methods
Timeline and pace	Who was left out and who was able to take part	Recruitment, participation, retention	Flexibility (e.g. agenda)	Iterative processes and prototyping		
Democratic practices	Shared decision making and ownership	Power dynamics	Shared Data capturing and analysis	Team composition	Acknowledging and dismantling system-ic oppression	Advocacy
Capacity building & empowerment	Training, learning, and development opportunities	Co-creating with communities	Information sharing and knowledge exchange	Relationship building and trust	Transparency	


Identification
Records identified from articles in researchers' collections (n=26)
Litmaps search (n=381)
Records removed:
Not in English or before 2020 (n=311)
Duplicates (n=19)
Identification/Screening/ Eligibility
Records (abtracts) screened (n=77)
Records removed:
Not in English, before 2020, protocols only, duplicates (n=68)
Records identified from hand search of reference lists from screened records (n=25)
Included
Articles in realist literature scan (n=34)

Equity, Diversity, & Inclusion: Top Gains

Please vote to identify the **3 areas** (yellow cards) you believe were most **positively** impacted by the pandemic.

2 minutes for voting & 10 minutes for discussion



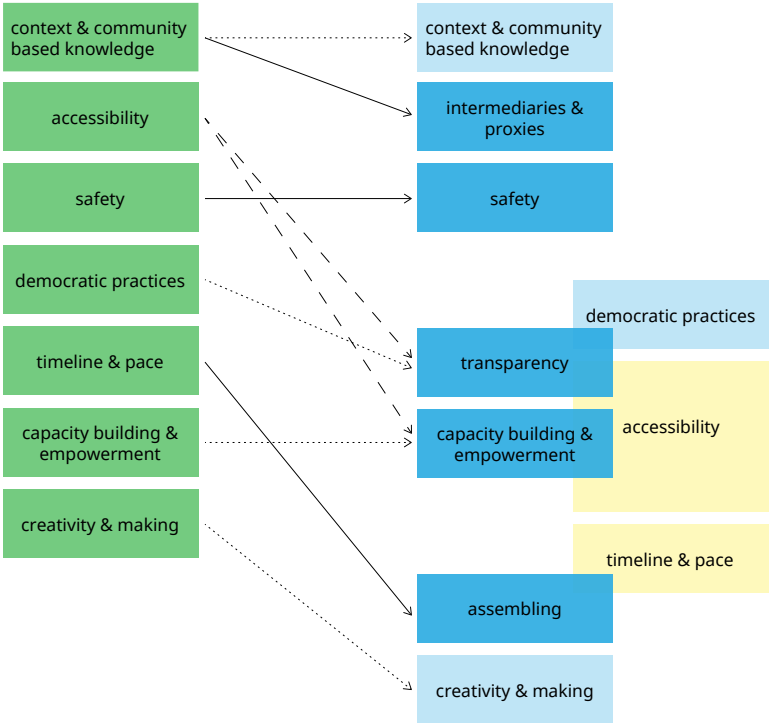
Pandemic Gains

1. From the previous frame, select the gray card that is most relevant to your experience.
2. Drag your chosen card into the top of table.
3. Use your color sticky note to respond to the prompts.
4. If you have time, choose another gray card and repeat the process.
5. Discuss: Why did it work? Was it co-design or was it something else? What would you take forward?

15 minutes for activity & 20 minutes for discussion



Relationship building and trust	Digital access and tool use	Being engaged, integrated, motivated, and valued
Bringing in specialized speakers to present on emergent COVID-19 clinical practices for the province	meet in person because in person was felt to be less formal, more opportunity for networking, relationship building	We intended to leverage an existing project to do a small local communication project to support our collaborators in an emerg department
The committee were practitioners, administrative leaders and researchers delivering critical care COVID-19 care	we developed approaches throughout the project to enable this a bit	we had already established relationships with motivated, interested and involved collaborators
Partnership with provincial critical care system agency (had the professional network and operational resources to create this)	use of Teams function, good (better) facilitation, guidelines, online etiquette etc. Pre-sensitizing materials	digital tools for collaboarting in real time on protopying and evidence translation enabled us to collectively create new ideas and tools on a regular and rapid basis
Created a committee of CC clinical leaders to pool their network of specialist speakers	It took a while for people to adapt to online working, still felt formal and business like at times	we leveraged our exisitng skills on digital protpying and online working and sharing among the team and opeded this process and tools up to our stakeholders directly
Positioned the Rounds as the system's best effort at collecting and presenting on emergent practices (not mandated policies or standards) - Knowledge sharing	more emphasis on pre workshops communication, sending out preliminary materials, agreeing protocols e.g. visual chair etc	This process emerged out of high levels of motivation and engagement with the issue in front of us
The Rounds continue to exist, as a knowledge exchange platform (provides a pulse on practice challenges, and a more timely feedback loop with the field to discuss ongoing clinical practice challenges, now outside of COVID	felt that for groups that dont know each other prior to moving online its best to have some f2f contact then move online	We changed from a small scale team that was relatively selfcontained within co-desing projects to a large ever changing group of collaborators and stakeholders some persiting throught out the project and others coming and going as their own needs were being served



EDI framework principles

CMOs clustered by EDI framework principles

Number of CMOs in Data analysis/synthesis I

Sources	*Number*
Literature	90
Workshops	448
Subtotal	538
*Excluded**	*157*
Total	**381**

** Duplicates or not enough detail to describe practice adaptations*

Demi-regularities developed from workshop CMOs (79) + literature CMOs (30) = 109

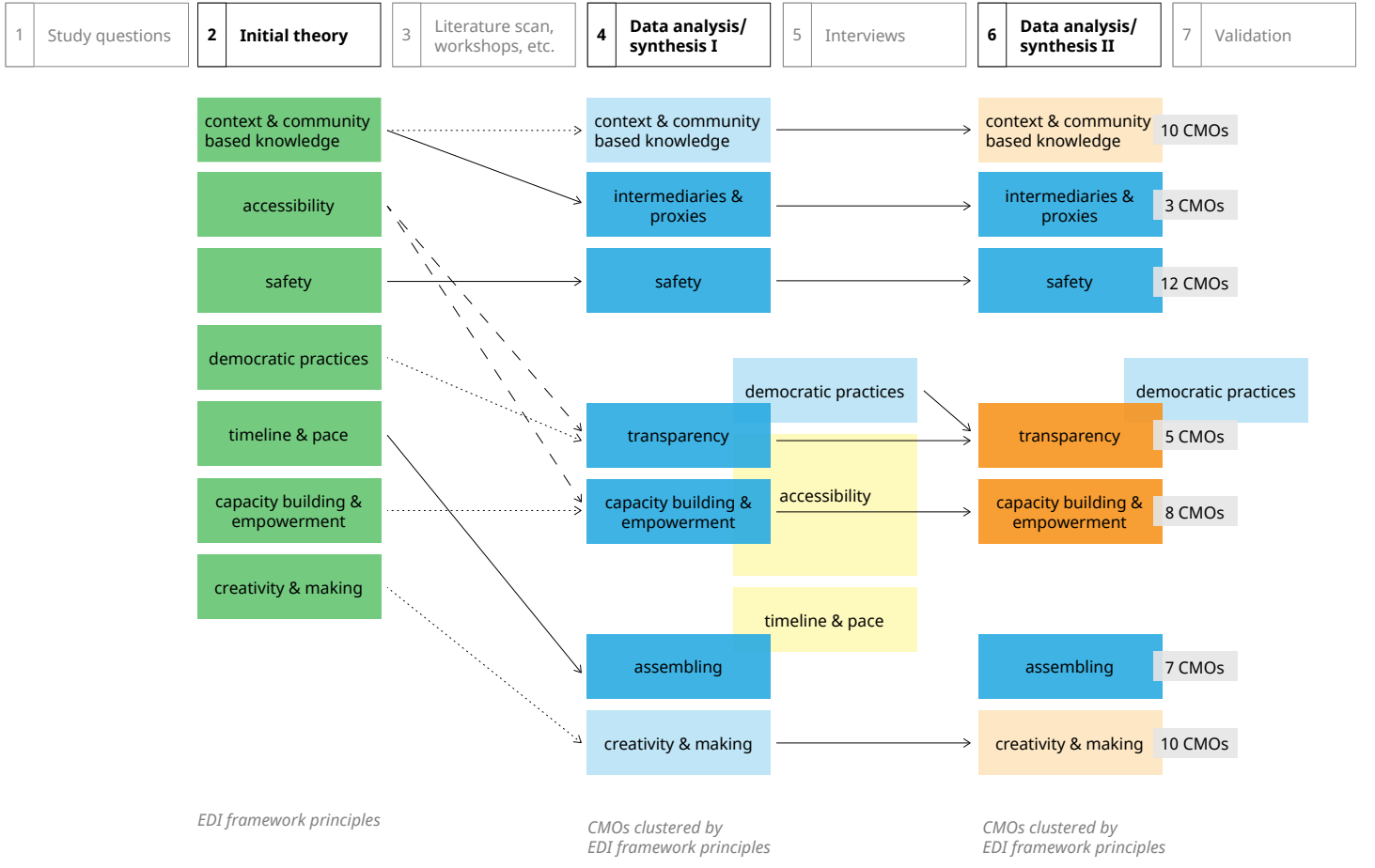
Number of CMOs in Data analysis/synthesis II

Sources	*Number*
Literature & Workshops	381
Interviews	313
Excluded from interview CMOs*	117
Total	**577**

Demi-regularities developed from interview CMOs = 57

Number of refined, clustered CMOs after Data analysis/synthesis II

55


1 Study questions
2 Initial theory
3 Literature scan, workshops, etc.
4 Data analysis/ synthesis I
5 Interviews
6 Data analysis/ synthesis II
7 Validation
context & community based knowledge
accessibility
safety
democratic practices
timeline & pace
capacity building & empowerment
creativity & making
context & community based knowledge
intermediaries & proxies
safety
democratic practices
transparency
accessibility
capacity building & empowerment
timeline & pace
assembling
creativity & making
context & community based knowledge
10 CMOs
intermediaries & proxies
3 CMOs
safety
12 CMOs
democratic practices
transparency
5 CMOs
capacity building & empowerment
8 CMOs
assembling
7 CMOs
creativity & making
10 CMOs
EDI framework principles
CMOs clustered by EDI framework principles
CMOs clustered by EDI framework principles

Supplementary Files

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- AdditionalFile5.pdf
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