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RESEARCH ARTICLE

Participatory Design Going Digital: Challenges and Opportunities for Distributed Place-Making

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Abstract. COVID-19 has urged researchers to explore new options for distributed participatory design, as physical meetings and workshops became unfeasible. This situation posed new challenges but also opportunities, in particular with respect to engagement and inclusion. This paper focuses on distributed PD with Irish teenagers to support place-making during this period: to build relationships with each other and the community. In a two-week online summer school, teenagers explored a concern or highlighted a unique aspect of their local community and designed digital artworks in response. Activities and materials were designed to support reflection, empowerment, inclusiveness, emergence, and playfulness for participatory place-making. Analysis of the summer school provides insights and guidance on the design of online PD for engaging experiences, especially in the context of place-making.

Keywords: Digital arts, Local communities, Participatory design, Place-making, Summer school

1 Introduction

People living in rapidly developing rural (rurban) areas are dealing with challenges posed by growing digitalisation, urbanisation, and migration (de Lange and de Waal 2013; Dörk and Monteye 2011; Slingerland et al. 2020b). In response, Participatory Design (PD) has started to explore how researchers can help people in those communities to overcome differences, support mutual learning, and find a common ground between participants (DiSalvo et al. 2013; Hess and Pipek 2012; Simonsen and Hertzum 2012; Titlestad et al. 2009). In this community-based PD, citizens build a relationship with their living environment through participatory projects. PD methods have also been used to enhance place-making, for example, when citizens measure their environment (e.g. air quality) (Disalvo et al. 2009), or take researchers on neighbourhood walks to talk about their community (Crivellaro et al.

2016). Such place-making processes enable strong and cohesive communities while encouraging proactivity and agency to shape local issues and the local environment.

In PD, analogue workshops are the established method (Klammer et al. 2011). Face-to-face relationship and trust-building play an important role in participatory design, especially when participants may experience power differences (Kensing and Blomberg 1998; Loebbecke and Powell 2009; Öberg et al. 2009; Patel et al. 1997). Place-making is also typically supported through face-to-face meet-ups in which citizens explore issues and jointly develop solutions while in their neighbourhoods (Fang et al. 2016). The benefits of face-to-face workshops have left the opportunities and challenges of using virtual tools for distributed PD relatively unexplored (Ali et al. 2021; Danielsson et al. 2008; Gumm et al. 2006; Patel et al. 1997; Walsh 2011). On the one hand, building trust and dealing with power dynamic can seem challenging in distributed settings (Öberg et al. 2009; Simonsen and Hertzum 2012). On the other, research into online communities has shown that this trust building is possible in distributed settings (Masden et al. 2014). However, alternative activities and materials may be required in distributed PD, to enhance traditional PD values such as empowerment and mutual learning (Ali et al. 2021; Hanzl 2007; Miller et al. 1992; Obendorf et al. 2009).

Although the call for understanding ways to successfully organise distributed PD is not new (e.g. Hess and Pipek (2012)), it has gained momentum due to the COVID-19 pandemic (e.g. Ali et al. (2021); Bakırlıoğlu et al. (2020)). While originally designed for face-to-face delivery, the work presented in this paper was performed in a distributed format due to travelling and social distancing restrictions as a result of the pandemic, and hence entailed exploring new methods, materials, and activities for distributed PD (Obendorf et al. 2009). The PD work took place with teenagers in a community setting, and aimed to support place-making of teenagers in their local context. The exploratory research was guided by the following research question: *How can distributed participatory design activities and materials be designed to build trust and engage teenagers in place-making processes?*

The next section explores the foundations of PD, including its democratic and pragmatic motivation, and its perspective on trust building, power dynamics, and mutual learning. From the PD literature five working principles are identified: inclusion, reflection, playfulness, empowerment, and emergence. The method and result sections describe the distributed two-week summer school design and organisation, and the extent to which it adhered to the five principles. The discussion and conclusion of this paper include insights and guidance into how PD can be organised in a distributed way, especially in the context of place-making, and which activities and materials enhance the distributed PD experience.

2 Foundations of participatory design

PD has two main underlying motivations. The first is a democratic motivation, as PD researchers believe that 'people who are affected by a decision or event should have an opportunity to influence it' (Schuler and Namioka 1993, p. xii). The second motivation is pragmatic: 'quality can improve with strong and effective participation of people involved' (Schuler and Namioka 1993, p. xii). PD researchers argue that user involvement is critical because future users are the experts in their work practices, supported by current technologies, and will ultimately be the ones using the new technologies (Blomberg and Henderson 1990). For that reason, PD researchers presume that the quality, and effective and efficient use of technology increase when users are involved in their design because users better understand what the technology entails.

PD researchers engage in an on-going inquiry as to what participation means in relation to power dynamics, which stakeholders need to be included in the design process, to what extent voluntary and unconstrained participation is possible, and which methods and design tools are appropriate (Bratteteig and Wagner 2016; Robertson and Wagner 2013; Simonsen and Robertson 2013). As such, the field of PD constantly explores principles of participation and corresponding design processes to understand how they can be designed for people to be full partners in the design process (Kensing and Blomberg 1998; Simonsen and Robertson 2013). The next paragraphs outline different principles addressed in PD literature, reviewed from frontier findings that are documented in PD handbooks (Schuler and Namioka 1993; Simonsen and Robertson 2013) and academic articles reporting on PD projects. These findings were drawn together in a working set of five principles, used as an analysis framework in this paper, which is revisited in the discussion.

2.1 **Inclusive**

Inclusion is a principle strongly reflected in PD through its democratic foundation, with participation its defining quality (Simonsen and Robertson 2013). Pragmatically, the literature argues that including different voices in design, results in technology that is more accessible and resilient in changing situations (Simonsen and Robertson 2013). However, it cannot be assumed that inclusion will always be a harmonious process. Disagreement and tensions can be expected in any process that includes multiple voices, and it can be mediated through dialogue (McCarthy and Wright 2015).

Since PD moved beyond the work domain, for example into the city, issues of representation and stakeholder identification have become more complicated to address up front (Björgvinsson et al. 2012). PD researchers need to identify which stakeholders to involve and to consider representation of the groups who will

be impacted by the technology to be designed (Robertson and Wagner 2013). Researchers are necessarily dependent on gatekeepers and community leaders to make sure all voices are included (Le Dantec and Fox 2015). Independent of the domain in which PD is applied, taking participants seriously is key (Grønbæk et al. 1993) and they all should get something out of the design process (Bødker et al. 1993). Differences between participants are overcome by finding the means to talk to each other as equals (Emspak 1993). The use of low-tech prototyping has been shown to be useful for this purpose (Ehn 1993; McCarthy and Wright 2015; Muller 1993). It is the role of the designer to establish this inclusive environment that enables true participation of all stakeholders (Bødker et al. 1993; Carroll and Rosson 2007).

2.2 **Reflective**

Reflection, or mutual learning is, as a principle, often described as a 'user gain' in participatory design (Bossen et al. 2010; Ehn 1993; Greenbaum and Halskov Masden, 1993). The main notion is that all participants, professional and non-professional, learn from each other and increase their knowledge and understanding throughout the design process (Simonsen and Robertson 2013). This can be achieved by reflecting on each others' experiences, experimenting with prototypes together, and creating a shared understanding from these experiences (Holtzblatt and Jones 1993; Robertson and Simonsen 2013). Because different groups of people work together in a PD project, it is essential that they learn about each other to understand the different ways of reasoning and to create mutual respect (Bratteteig et al. 2013; Hess and Pipek 2012). Dialogue between participants that supports dissensus and diverging perspectives may also encourage reflection on and understanding of differences between people (McCarthy and Wright 2015). Designers of PD processes need to particularly think about how reflection is encouraged and supported through dialogue (McCarthy and Wright 2015; Robertson and Wagner 2013).

2.3 **Playful**

Especially during the early developments of PD in Scandinavia in the 80s, playfulness was included as a principle of PD in the exploration of language games and collaborative enquiry (Brandt et al. 2013; Ehn 1993). Ehn (1993) goes as far to say that participation in design can only be successful when it is fun. Muller (1993) also found that enjoyment during design workshops contributes to a satisfying outcome. On the other hand, Brandt et al. (2013) sees playfulness as a way for participants to cross differences between them and to openly explore future designs and practices in a creative setting. Playful settings during PD workshops can thus help to spark participants' creativity, and encourage collaboration in diverse groups.

2.4 **Empowering**

Empowerment is another principle of PD that arises when participation is organised from a democratic motivation (Blomberg and Karasti 2013; Titlestad et al. 2009; Trigg and Ishimaru 2013). The concept of empowerment in PD projects can diverge and is not always explicitly explained (Schneider et al. 2018). It often relates to changing or at least reflecting on the power dynamics in a workplace and beyond (Blomberg and Karasti 2013), to create a balanced situation in which users and designers both influence the design process (Holtzblatt and Jones 1993; Miller et al. 1992; Muller 1993). Restructured power relations require that users of technology gain more control over shaping, defining, and directing the technologies that impact their lives (Bannon and Ehn 2013; Blomberg and Karasti 2013). Overall, empowerment in PD is about reconfiguring power dynamics and enabling participants with skills and tools to understand how they can make things better in their lives (Obendorf et al. 2009).

2.5 **Emergent**

Emergence is one of the PD principles that the field is most unsure about, in terms of how to design for emergent and sustaining outcomes of PD projects (Robertson and Simonsen 2012; Simonsen and Hertzum 2012) as long-term engagement is necessary for proper inquiry into emergent outcomes (Robertson and Simonsen 2012), and is often left unexplored (Simonsen and Hertzum 2012). A key characteristic is that emergence happens without anticipation or intention (Simonsen and Hertzum 2012). In an ideal situation, participants are able to further evolve the designed technologies without help of researchers (Björgvinsson et al. 2012; Blomberg and Karasti 2013; Bratteteig et al. 2013; Carroll and Rosson 2007; Hess and Pipek 2012; Robertson and Wagner 2013). However, participatory design activities are often not sustained or embraced by another body when researchers leave (Kensing and Blomberg 1998). Long-term commitments require secured funding and continuing relationships, which are hard to establish (Blomberg and Karasti 2013; Robertson and Simonsen 2012). By moving from developing IT artefacts to a focus on *infrastructuring*, with a stronger focus on building network infrastructures that sustain after the project is ended (Bødker et al. 2017; Hess and Pipek 2012), PD researchers are increasingly addressing the issue of emergence and sustaining outcomes in PD (Kensing and Blomberg 1998).

2.6 **Community-driven participatory design**

Community-driven Participatory Design, which emerged from PD moving beyond the workplace into other communities, has its own challenges and questions (Carroll and Rosson 2007; DiSalvo et al. 2013; Huybrechts et al. 2017). In Community-driven Participatory Design, community members take part in PD

projects to design technology to facilitate community life (Carroll and Rosson 2007), gain insight into the environment (Disalvo et al., 2009, 2014), or to create social connections between community members (Hampton and Wellman 2003). As such, PD in a community context is often applied to the purpose of place-making: strengthening a community's relationship with their living environment (Slingerland et al. 2020a, b).

Participation of neighbourhood-based community members relies on intrinsic motivation for the issue at hand (Carroll and Rosson 2007). Further, who is part of the community is less well defined, participants may heavily differ in terms of skills, and community settings, in general, are less structured and less static compared to a work environment (Carroll and Rosson 2007; Dalsgaard 2012). Considering the five principles just presented, designers of PD processes have to consider carefully who to invite to each PD session (inclusive), how to encourage mutual understanding and respect (reflective), how to overcome differences through play (playful), how to deal with power dynamics in a community (empowering), and how to prepare the community to sustain the initiated PD process (emergent). In other words, the principles of PD are still relevant in a community context. Nonetheless, PD facilitators need to consider carefully what kinds of activities enable manifestation of the principles, which may be other types of activities than in 'traditional' PD.

2.7 **Moving PD Online**

In a further extension, especially during COVID-19, with limited opportunities to meet in person, researchers have become more interested in applying PD in distributed and online settings (Gumm et al. 2006). In the 90's, Distributed Participatory Design (DPD) explored ways of remotely designing together. This research mainly took place in a context of large user groups designing a commercial information system together (Gumm et al. 2006; Öberg et al. 2009). Researchers were interested in how a DPD approach could scale up PD processes, most often in asynchronous settings (Walsh 2011). There is little work, however, on how to transform traditional small-scale in-depth PD workshops to distributed settings with synchronous interaction (Patel et al. 1997). Other researchers (e.g. Hagen et al. (2007) or Klammer et al. (2010)) build on DPD insights to include digital methods, such as mobile diaries, in PD. These explorations with DPD and digital PD methods have only been applied in professional contexts (Klammer et al. 2011), and not in the context of citizen communities.

2.7.1 **Opportunities**

Both Hanzl (2007) and Miller et al. (1992) found that distributed PD enables distant contacts to work together and recognised the benefits of collaborating remotely. In her review of IT for participation, Hanzl (2007) found that

participation through IT can improve mutual understanding between different stakeholders. In a study of the use of TelePICTIVE, participants indicated that the online tool gave 'intelligent assistance in the design process', and helped to avoid conflicts (Miller et al. 1992), demonstrating the potential of distributed PD in supporting the principles of participatory design. Digital PD methods have found to be very suitable in the ethnography phase of design (Klammer et al. 2011). Mobile diaries allow to collect more personal data on domestic and private daily practices. Such tools reinforce the role of participants as contributors to the design and research process (Hagen et al. 2007).

2.7.2 Challenges

There are also challenges with distributed PD and digital tools in PD. When participants use digital tools for design in a distributed setting, researchers are required to constantly monitor what participants are doing and if they need any support (Hagen et al. 2007; Klammer et al. 2010). Identifying suitable participants (Bratteteig et al. 2013; Carroll and Rosson 2007) and making sure all voices are included is more challenging in a distributed format (Hess and Pipek 2012). Power asymmetries often result when participants are not physically together (Loebbecke and Powell 2009). In remote settings, participants experience their contribution to be less evident, complicating participant engagement (Grudin 1993; Hess and Pipek 2012; Miller et al. 1992). The facilitator plays an even more important role in distributed PD (Carroll and Rosson 2007), to select appropriate tools (Dalsgaard 2012) for participants to develop trust and talk to each other as equals (Emspak 1993; Hess and Pipek 2012). Interaction in a distributed setting is less direct, but participants have shown to be able to find a common ground (Obendorf et al. 2009), although the opportunities for reflection are limited (Hess and Pipek 2012; Miller et al. 1992; Titlestad et al. 2009). As working remotely takes a more prominent place in our lives, more research needs to be done to understand how distributed PD processes can adhere to the principles of PD, for participants to reflect, question, and create shared meaning through collaborative design (Holtzblatt and Jones 1993).

2.7.3 Do's and don'ts of online PD

These earlier explorations of applying PD methods and tools in online and distributed settings allows to frame an initial idea about the *do's* and *don'ts* of online PD. Clear *do's* are strong and explicit facilitation in online settings, to keep participants involved and to foster interactions that build trust. Another *do* is constant monitoring, which may be done by a facilitator or somebody else, to support participants during their engagement, check for representation, and to keep track of group dynamics. Third, *do* use digital PD methods in ethnographic stages of design processes, where it has been found to be very suitable.

On the other hand, a *don't* is to think that online PD requires less preparations and involvement of the researcher. As mentioned above, distributed settings ask for a good selection of tools and a suitable process, with less option to improvise in comparison to face-to-face settings. *Don't* use a platform that is limited in how participants can interact. Interaction in distributed settings is less straightforward, hence multiple options need to be available for different kinds of participants to join.

3 Method

Research-through-design (Koskinen et al. 2011; Stappers and Giaccardi 2011), using methods from design practice to generate (1) a design and (2) new knowledge (Zimmerman and Forlizzi 2014), is applied in this study to understand how the five PD principles manifest themselves in a distributed setting. The design generated is the summer school, including activities, materials, and prompts designed specifically for this purpose. The generated knowledge is insights into organising distributed PD, given the five principles.

3.1 Summer school

The two-week summer school (Figure 1) took place with a group of 11 to 17 year olds from Northrock,[1] a rural community that is rapidly developing. The summer school was initially designed to be a week long, with face-to-face sessions every day, culminating in an exhibition of work on the final day. It was to be run in a local resource centre using macs and software supplied by the research team. However, in the event of COVID-19, the summer school moved completely online and teenagers participated from home using their device of preference. With regards to location; the devices, software and environment in general were beyond the influence of the study once it moved online. While online delivery can allow for greater accessibility in some regards, it also builds in greater capacity for inequalities in terms of availability of devices, quality internet connection and software. In addition to this, it meant that there was less opportunity for the research team to give individualised support on an ad-hoc basis. As a result, while the digital arts summer school initially planned on supporting the young people in acquiring a range of digital media skills, in its actual delivery it focused most on digital image making, as this was most easily supported in the time frame and in respect to the devices and software available to the participants. The theme of the summer school was to learn about digital arts, and to design and make a digital artefact to express and explore people's experience in their own community.

[1] The fictive name Northrock is used for the purpose of anonymity.

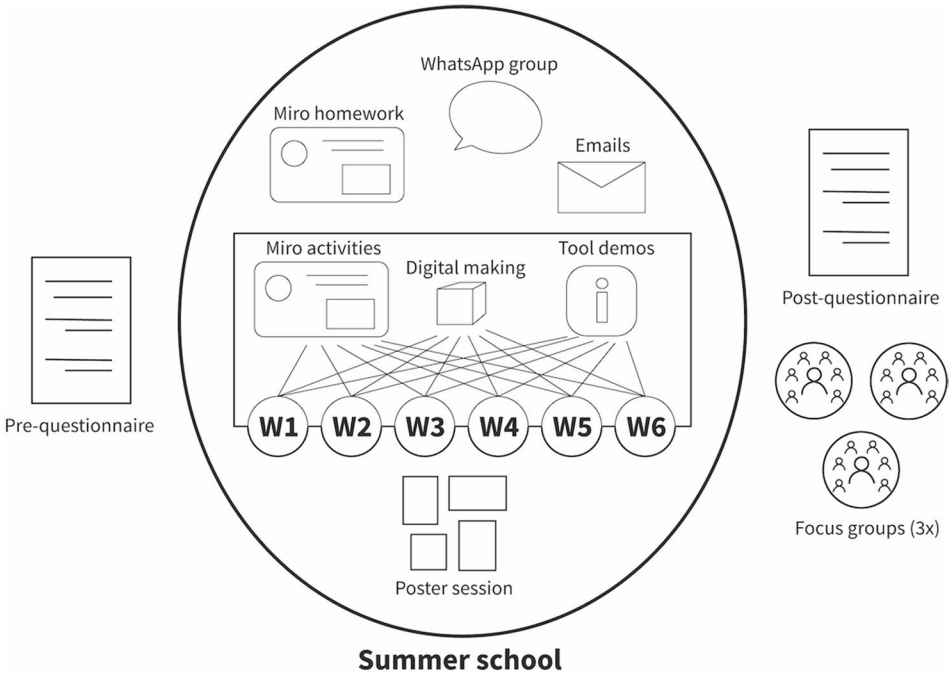


Figure 1. Overview of the activities that were done before, during, and after the summer school; where W1 represents Workshop 1, etc.

As shown in Figure 1, teenagers filled out a pre-questionnaire before the summer school started and were asked about what they (dis)like about the Northrock community, their previous experience with digital arts, and preferences for specific media. The summer school itself consisted of six workshops and a poster session to hang their physical artwork up in their own neighbourhood (see also Table 1). Two facilitators assisted the workshops, each lasting 1 to 1.5 hours, and taking place on Zoom™. The facilitators designed activities to help teenagers explore their own ideas and artwork using the online collaborative whiteboard tool Miro™, digital making tools

Table 1. Summer school activities.

	Workshop topic	**Homework activity**
W1	Introduction	Analyse existing artwork
W2	Brainstorming & critiquing ideas	Develop idea
W3	Develop prototypes	Strategy to share idea
W4	Sharing the artworks	Create social media post
W5	Finalising the artworks	Prepare presentation
W6	Final presentations	Fill our post-questionnaire
W7	Poster session	n.a

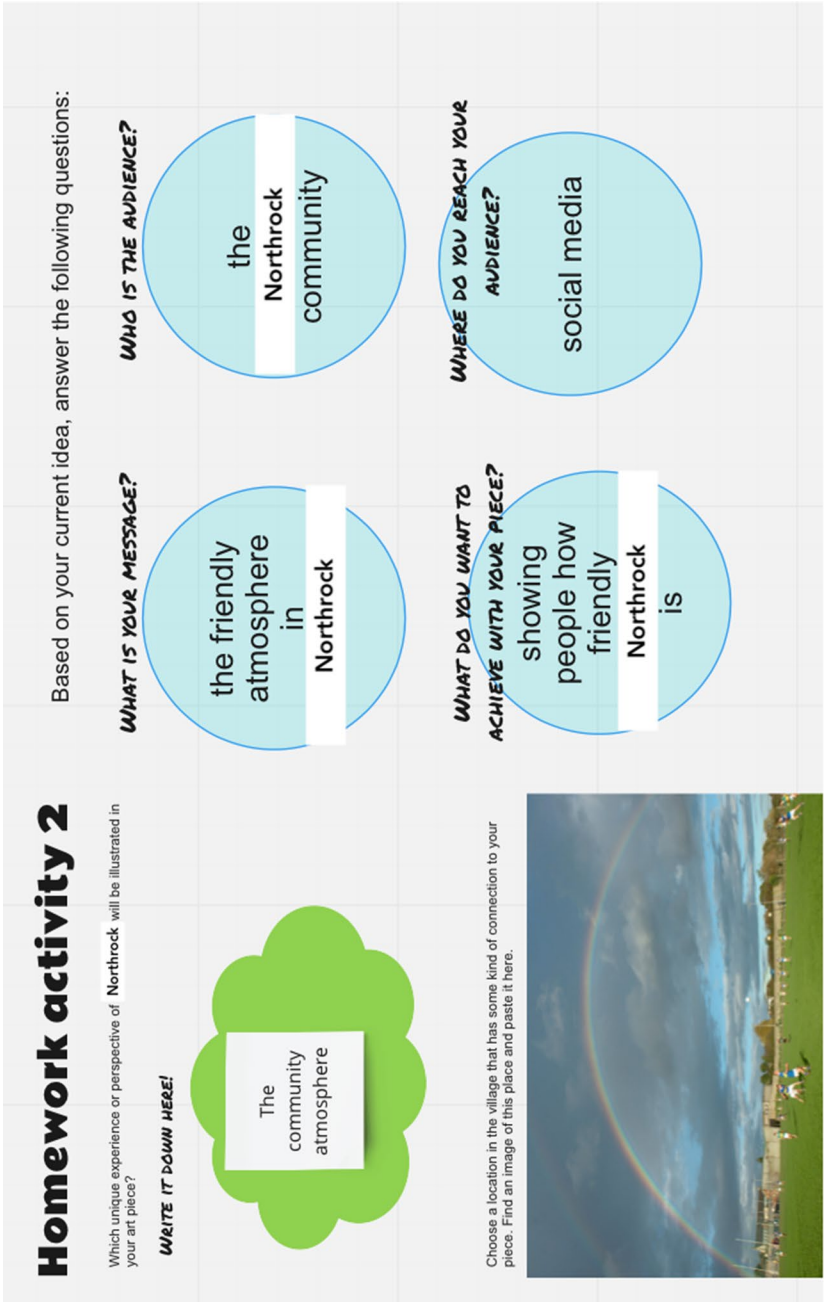


Figure 2. Example of an activity on the whiteboard tool Miro™, via www.miro.com.



Figure 3. Output of a digital making activity, creating a breaking news item on www.breakyourownnews.com.

(such as create your own breaking news item), and demoing tools; illustrated in Figures 2 and 3. The purpose of using artworks in the summer school was to lead the teenagers to a visible end result. The facilitators used artworks to stimulate an open, creative, and playful setting. Furthermore, the notion of an artwork is open enough for teenagers to relate to it and work on it in a way that suits them, allowing for various levels of detailing and focus, following the skills and interests of the teenagers.

Every workshop ended with a homework activity (see Table 1 and Figure 2), prepared on each participant's personal Miro™ board. Teenagers and facilitators stayed in touch through a WhatsApp™ group, joined by those who wanted to. Emails were sent after each workshop to summarise what had been discussed and to distribute the homework.

Teenagers filled out a post-questionnaire, reporting on activities they enjoyed the most and the least, which artworks or ideas they found the most interesting, and whether they shared their own artwork with anyone outside the group. Out of the eleven teenagers who participated in the summer school, nine teenagers joined one of the three focus groups to further reflect on their experience during the summer school, what they learned about it in terms of the Northrock community, and which aspects, materials, and activities were helpful and less helpful to them.

Table 2. Overview of the participants, including their age and gender. Names are fictive.

Participant	Age	Gender
Aaliya	17	female
Arthur	15	male
Beth	11	female
Brian	13	male
Dawn	16	female
Deidre	12	female
Liam	15	male
Lucas	13	male
Patrick	15	male
Teresa	14	female

3.2 **Participant recruitment**

Participants were recruited through local schools and the youth club, and fifteen teenagers signed up for the workshop of which eleven participated from beginning to end.[2] Participants were given fictive names to ensure anonymity during data analysis and dissemination, see Table 2.

3.3 **Data collection and analysis**

The workshops in Zoom™ and the focus groups were recorded and transcribed before analysis. After each workshop, the two facilitators wrote down their thoughts, ideas, and experiences on field notes. All other materials that were made or used during the summer school, including pre- and post-questionnaires, Miro™ boards, the making activities, and the artworks, were collected and imported to NVivo™ analysis software with the transcripts and field notes for analysis.

The two facilitators independently analysed the data with an open coding procedure (Aronson 1995; Graneheim and Lundman 2004), focusing on the research question: *How can distributed participatory design activities and materials be designed to build trust and engage teenagers in place-making processes?* This process resulted in two lists of codes, one per researcher. Axial coding followed, focused on code relations and patterns, to come up with a single code list. Codes on which both researchers agreed were placed on the list. Similar codes relating to the same topic were identified and, in some cases, combined. Disagreement about importance of a code was solved by going back into the data to further explore the code, to decide whether the code should be omitted or added. This led to a list of twenty-four main codes providing the basis for close coding the

[2] This study has approval from the University Ethics Committee. All participants (or their adult guardians) who completed the summer school gave their written informed consent for participation and data collection.

data. Researchers compared their coding results to reach final consensus on the main topics and themes that emerged from the data.

4 Findings: applying the principles to online PD

The final coding scheme of 24 codes was mapped onto the five principles for online participatory place-making (see Table 3). This mapping was based on the extent to which the researchers identified moments during and after the summer school that point towards these principles.

4.1 Inclusive

Inclusivity concerns the extent to which the summer school was appropriate for a diverse group of participants, and supported all participants in sharing their experience and taking part in the discussions.

4.1.1 Supporting inclusion through tools and activities

To enable participants to feel included and welcome, one of the facilitators, who grew up in Northrock, shared her personal experience of growing up in this community with the group. Participants could engage in different ways, for example using the chat, by unmuting the microphone, or by making notes on the Miro™ boards. Group activities were alternated with one-on-one sessions, to engage everyone in the way they preferred. The field notes and post questionnaire responses reflect that participants made use of these different options of engagement and selected one that felt comfortable to them.

A disadvantage of using the Miro™ boards was that it allowed participants to adjust drawings and comments of other participants, which happened for example to Brian and Lucas: 'Yeah they seem to be trolling us. They are just ruining your drawing of a farmer.' Three participants expressed frustration with this kind of trolling in the post questionnaire. Miro™ also supported creative and flexible engagement: during various workshop moments participants started to explore and engage with Miro™ in a way that works for them. In the focus group, Brian said: 'I suppose just even like the Miro board and the different questions on it makes you kind of think. Like about the different things you could do and stuff and use for ideas.' In the post-questionnaire, ten participants mentioned the use of Miro™ as one of the things they most enjoyed in the workshops. Overall, Miro™ had a positive effect on the design process and supported inclusion.

4.1.2 Tools and activities that hindered inclusion

Working remotely also brought technical challenges, for example configuring the Zoom™ settings appropriately, for participants to share their screen and change their names. Some participants suffered from a poor internet connection and

Table 3. Mapping of analysis codes on the five principles.

Principle	Related codes from analysis
Inclusive	Designing for equitable participation Difficulties engaging in the process Facilitation Constraints and benefits to creating artwork using digital tools Constraints and benefits to working remotely on creative ideas Efficacy of summer school process Descriptive definitions of rurban
Reflective	Articulating experience Critical thinking Supporting individual reflection and refinement of idea Knowledge making regarding challenges to and strengths of the community Summer school creating opportunities for provoking dialogue Public space queried by summer school activities
Playful	Moments of dedicated engagement with the process Creative exploration of design idea
Empowerment	Creating change in the community Motivation to create work Difficulty to refine ideas Relationship between design decisions or aesthetic choices and ideas chosen
Emergence	Experiences of diversity in the rurban setting Building empathy through design Emerging social participation Relationship building through summer school process Ways of connecting with the community

could therefore not use their camera or missed parts of the workshops. Participants used different types of devices (mobile phone, tablet, or desktop computer) to join the workshop, which also caused experiences to differ. Participants on mobile phones and tablets could not view the Miro™ board and the Zoom™ chat at the same time, complicating interaction during parts of the workshops.

There were moments where it was difficult to motivate participants or engage them in activities. The field notes reflect the challenge of having participants remotely engage in a discussion or react to each others' statements and ideas. Inclusion was hindered during some of the peer feedback sessions, when participants received anonymous feedback that was less useful and very general, for example 'We need more memes', as feedback to one poster that used memes. The anonymous mode of the Miro™ tools supported inclusion for the most part, while limiting the facilitators options for inquiry and discussion.

4.2 **Reflective**

In the summer school, reflection was recognised during moments where participants articulate their personal experiences in the community, think critically and express these thoughts, and gain new insights about the community through designing their artwork.

4.2.1 **Articulating experience and knowledge-making about the community**

The digital making exercises were especially helpful to articulate personal experiences of the community, for example to create a breaking news item about their idea (see Figure 3). During workshops, participants were often asked to present their idea to the other participants or the facilitators, which opened up moments for participants to talk about their experience of the community. Teresa, for example, explains her experience of the community being welcoming, friendly, and helpful: 'Yeah, like, the youth cafe. Like everyone would, I don't know, if somebody was short of money or something, somebody might give them extra.'

While during the workshops limited discussion happened between participants, the focus groups contained moments where participants developed their viewpoints on the Northrock community, based on the experience of other participants. Aaliya's artwork focused on showing that women wearing hijabs are not different from other women in the community. In the focus groups, both Lucas and Patrick state to have gained new insights into the challenges that Muslim women face in their community. 'Like one simple, probably meaningless thing can change completely what people think about you when they see you' (Lucas). And Patrick added: 'I learned about Aaliya and it was a bit difficult to be a Muslim in the society, cause the percentage is very low. Cause she was feeling insecure when she was wearing the hijab.' The ideas of Brian and Arthur also opened their own perspectives according to the focus groups, for example: 'I don't like

farmers, like their working and stuff. But I didn't know that they weren't gaining enough money that they need. That was a surprising thing.' (Beth).

4.2.2 Critical thinking, reflection, and dialogue about the community

Some activities required participants to critique examples of digital arts or the ideas and artworks of their peers. Most participants felt uncomfortable critiquing the work of their peers: participants first provided positive feedback and were reluctant to come up with points for improvement. One of the field notes after Workshop 4 states: Critical reflection on ideas is hard, it only comes from us and not from their peers. During the focus groups two participants reflected on critiquing each others ideas: 'I hate to say things I don't like.' (Molly)

'At least you feel like a little like a bully almost.' (Lucas) The challenge to encourage critique was alleviated through the Miro™ boards, as participants could write their critique there in an anonymous way.

Summer school activities were designed to support individual reflection of participants on their ideas, for example by asking participants to explain their idea from time to time. This helped Lucas to further refine his idea about the youth cafe: 'Well it was a nice place to hang out, I guess I made some friends and yeah just a nice place to chill out, cause there weren't really many rules.' This conversation led to Lucas further focusing on the memories he has of the youth cafe, and including pictures of these memories in his final artwork. The homework activities on Miro™ were, especially at the beginning, helpful, as further down the summer school, more participants started to miss homework activities, as they 'became less useful once I had my idea in my head.' (Patrick).

Following the statements above, in which participants express having discovered new things about their community, the conclusion seems warranted that the summer school successfully provoked dialogue about the community. In workshop two, for example, Lucas and Brian worked on Brian's idea to build appreciation for farmers.

> 'Even during the lockdown and stuff, farmers still worked and stuff and they didn't really get much credit for it. Like nurses and stuff they got so much credit as front line workers, but technically farmers are also front line workers, but no one really noticed that.' (Brian)

Lucas (in response to Brian): 'That's true.'

In the focus groups and post-questionnaire, participants reflected on the diversity of ideas that were presented during the summer school. Dawn, for instance, said: 'It was cool that there were so many different ideas and that like.. one topic really.. everybody had something different to give to.' In the questionnaire someone wrote: 'We all had really different views, opinions and ideas and that's what made the workshop for me.' In total, eleven comments were made about the

diversity of the stories and the Northrock community in general, that participants did not realise before. Diversity of stories opens up the opportunity for dialogue.

While there seemed to be limited dialogue between participants about their ideas or the Northrock community in general, some comments on the Miro™ boards did show that participants varied in opinions about some of the issues that were raised. For example, Brian's idea about farmer appreciation sparked comments on the Miro™ boards on eating meat and the influence of vegans on the popularity of farmers. Although the facilitators aimed to spark discussion by specifically mentioning these comments when they were placed on the Miro™ boards, participants did not engage in an actual discussion in the group.

4.3 **Playful**

Playfulness is manifest in a collaborative, creative, and open setting in the summer school. Moments where participants creatively explore their ideas or the tools provided, show they are engaged in the process.

4.3.1 **Miro™ supporting playful behaviour**

The Miro™ boards showed to be particularly supportive of playful behaviour; they were intuitive to use as participants filled out the prompts prepared, but also started to draw and try out different features that Miro™ offers. As such, the platform enabled a playful, creative and exploratory setting.

Each participant had their personal Miro™ board on which to work on their idea. A few participants revisited their Miro™ boards, to adjust the activities they had done, or to catch-up on the homework they had missed. As homework was not mandatory, this is considered to be a sign of engagement of participants with the process. In their final presentations, five participants stated they are proud of their end result.

4.3.2 **Creative exploration of design idea**

Participants used various techniques to explore their design idea and develop it into an artwork. In each of the workshops, one tool was introduced to create digital arts and most participants ended up using Canva™. Three participants started their artwork with sketches on paper and designed it further using computer software. The other participants went directly to the computer. Molly explains her process of creating her poster: 'I did my small notebook. I ran a few ideas and find a piece that I like.' The digital making exercises during the workshops helped participants to explore their idea. Teresa talks about creating a breaking news item: 'I like the breaking news one too, because as you said it looked quite real and I just thought that it's kind of fun to create your own news kind of thing.'

4.4 **Empowering**

The principle of empowerment is recognised in moments where participants talked about their motivation to create the artwork, based on their own vision and idea of the community.

4.4.1 **Autonomy in making decisions during the summer school**

Teenagers wanted to participate in the summer school to learn something new, or to specifically learn about digital media. Most of the teenagers had a community-based issue in mind for the topic for their artwork. For example, farmers not getting enough credit for their work, people not appreciating the nature around the community enough, or the need for the whole community to respect the COVID-19 restrictions. The underlying motivation in most teenagers' ideas was to evoke awareness on a specific topic and to create some kind of change in the community, as Brian explains: 'I think people just doesn't appreciate how farmers and how their food gets on like their plate when they eat and stuff. Like that's kind of really it.' Participants like Brian were observably autonomous in making decisions about the focus of their artwork, and the facilitators adjusted the further processes according to these decisions.

Facilitation supported the teenagers to reflect on their ideas, and to help them to narrow it down, or take it to the next level.

> For example, the facilitator asked Molly 'What do you want people to do when they see your piece?'.
>
> Molly: 'Eh, I guess for people to go and walk more. To listen to the sounds around them, just like notice the smallest things, like the birds tweeting in the background.'

Some participants tended to be led by the facilitators' feedback and had less strong personal opinions on what they wanted their artwork to evoke. They struggled to outline the message their artwork should bring:

> Molly: 'cause most of the feedback I got was like the message more clear and... I didn't really know how to do that, so I kind of just fixed the art piece itself.'

Throughout the two weeks, Liam, Arthur, Teresa, Deidre, and Molly had difficulty developing or expanding their initial idea. As evident in this conversation between the facilitator and Liam:

> Liam: 'Well it's just about like encouraging team work in sports and stuff.'

Facilitator: 'Yeah, that sounds good. [...] And why do you think that's important? Teamwork or to encourage teamwork?'
Liam: 'I am not really sure.'
Facilitator: 'You are not really sure?'
Liam: 'No.'

Participants showed different levels of autonomy and self-determination in creating their artwork. During one-on-one sessions between participants and one facilitator the struggle to translate their idea into an artwork became clear: 'I am not really sure '. Liam, Brian, Deidre, Teresa, and Arthur in particular needed guidance from facilitators to design their artwork. Facilitators adjusted their level of guidance according to the needs of participants, to support autonomous decision-making on where to go with their artworks.

Other participants felt more sure about designing their artwork. Lucas, for example, explains to the facilitator: 'I am thinking some kind of like a collage, just a lot of just things that ehm.. that the youth cafe means to me.' Specific activities during the workshops especially helped participants who were struggling before, to design their artwork. Participants were, for example, asked to think about colouring. Brian: 'I suppose like kind of like brightly kind of colours like happy, but like then not like too happy, because I don't know. Just something that catches your eye probably.' Teresa, at first struggling, shows more confidence in her design during the final presentation: 'Because I thought like everyone is welcome like even when they have a disability or like they're a different race or anything and you can see that in the picture, that everyone is there and feeling included.' The specific questions and guidance in the homework activities encouraged the decision-making ability of participants about their artwork.

4.4.2 **Determining the need for change in the community**

Aaliya, Liam, Brian, Teresa, Beth, and Molly's ideas aimed to increase awareness on a specific part of the Northrock community. Molly, for example, uses her piece to celebrate the nature around Northrock, and feels it is not appreciated enough by the community: 'Yeah it's kinda like thinking that the nature and wildlife around Northrock isn't that, like it isn't very noticed.' Participants were thus autonomous in deciding how they wanted their artwork to impact the community and were supported by the facilitators in whichever direction they choose.

The other five participants (Dawn, Deidre, Patrick, Lucas, and Arthur) wanted to not only create awareness, but also activate the Northrock community to take action. As Deidre explains: 'The message is to encourage girls to join Gaelic Football and this improves the community by having an equal amount of girls and boys in sports.' Her wish is that when girls from Northrock see her piece, that they join the Gaelic Football team. Another example is the work of Arthur, who wants to encourage the community to stick to the COVID-19 regulations, such as wearing face masks. He specifically designed the colour scheme of his poster for this purpose, hoping that it



Figure 4. One of the ice-breaker activities to support inclusion and playfulness.

leads to action: 'I feel like they're more serious colours, that would like maybe help people listen to them.' These examples of expressions of participants indicate that they felt eligible and able to make a change in the community. The summer school helped them to further outline their initial idea towards a digital artwork that could activate the community.

4.5 **Emergence**

The principle of emergence concerns the impact of the summer school beyond the organised workshops: whether participants continued working on their idea after the summer school or whether they engaged with the community as a response to their participation.

4.5.1 **Relationship building and empathy**

The ideas of six participants specifically concerned including a specific group of people in the community. These participants wanted to build empathy in the community through their design for this particular group. Brian, for example, felt that farmers were not appreciated enough by the community. Deirdre wants to include more girls in Gaelic football. Dawn and Lucas focused their piece on the reopening of the youth cafe, as they both feel teenagers lack a place to hang out.

Although participants had their own individual ideas and artwork, the summer school format supported the building of relationships between

participants and with the facilitators. The icebreaker exercises at the beginning of each workshop encouraged participants to share something personal (see Figure 4). However, as Brian stated in the focus group, the distributed environment made connection more complicated: 'It's just a bit more awkward talking to like a screen instead of a classroom environment or something.' Molly explains how the icebreaker activities supported connection: 'it kind of let me get to know people's personalities more.' Molly and Lucas discussed in the focus group that building relationships was challenging because most participants left their cameras off during the workshops. One participant mentioned in the post questionnaire that meeting new people was something they most enjoyed of the summer school.

4.5.2 Emerging empathy and social participation

Some participants started to share their reflections on what they learned in the wider community. Patrick designed his piece to attract volunteers for a local charity, supporting social participation: 'The main message of this piece is kind of just to you know give them more support and they need more recognition and, you know, not to abide them...' Arthur aimed to stress the importance of respecting the COVID-19 regulations, such as wearing a mask, to help local shops and restaurants serve their customers in a safe way. In fact, the ideas of seven participants (Aaliya, Dawn, Brian, Patrick, Lucas, Beth, and Arthur) reflect the social engagement of the teenagers with the local community. Nine participants discussed their ideas for the community, and some ideas of the other participants, with their parents; in that sense further spreading their message in the community.

Due to the COVID-19 pandemic, ways to connect with the community were more restricted than usual. Participants were mainly encouraged to think about digital ways of sharing their artworks with the community. Four participants decided to join the poster session organised after the workshop, in which the participants went into the community to hang up their posters at locations they deemed to be appropriate. One homework activity invited participants to think about sharing their artwork with the Northrock community. Most participants came up with the idea to hang up a poster of their artwork, or to share it on social media. Another homework activity asked participants to design a social media post to promote their artwork. Seven participants finished this activity. Two participants actually posted their artwork in a Northrock community Facebook group. Three participants who wanted to share their poster on social media, reflected in the focus group that they forgot about it, while one of them was really motivated and passionate about his idea. This indicates that emergence, in terms of sharing the outcomes of the summer school, may need to be further supported by the facilitators.

5 Discussion: distributed participatory design for place-making

The results have showcased how the five participatory design (PD) principles for place-making manifested themselves in the summer school in Northrock. In this section, the authors reflect on how designers of distributed PD need to deal with the 'distributed' element and what opportunities and challenges a distributed setting brings in relation to the five principles.

5.1 Designing for 'distributed'

The facilitators took various measures to mitigate challenges of distributed participation (Obendorf et al. 2009), considering the *do's* and *don'ts* described in section 2.7.3. The experience of using Miro™ during the summer school revealed extra advantages in distributed PD workshops. For example, the platform provided the flexibility to participants to use it in a way that they see fit, hence supporting inclusion, playfulness, and empowerment. To create their artwork, participants could choose from a range of digital tools, providing both constraints and benefits. Most participants did not have any experience in creating digital arts and the remote setting made it challenging for the facilitators to demonstrate many different tools for digital arts, and to help participants explore those. Participants were on their own trying out different platforms and all ended up creating a poster to present their ideas. Most participants used a digital tool that was relatively easy to learn to use. In the face-to-face setting, it would probably have been easier for participants to try out different and more challenging tools as receiving help and support from other participants or facilitators is more accessible when everyone is in the same room and for longer periods of time. This may have led to multiple media being utilised in the final art pieces. As such, the distributed setting hindered the exploration of different digital media for making artworks and led to more homogenous work in terms of the media chosen – i.e. poster design. An effective way of giving support in this type of exploration is, to our knowledge, yet to be found. Having said that, while the participants' work was homogenous in terms of media chosen, it was very diverse in terms of thematic exploration. If the summer school had taken place face-to-face, and the participants had all been in the same location spending greater amounts of time together, the ideas themselves might have been more homogenous, even though there would have been greater support for the use of a wider range of media. With regard to translation from the face-to-face setting and in response to the stringent COVID-19 restrictions in place at the time, the online summer school lost the opportunity to host an exhibition of participant work in order to share with the community. This initially was a step that was of great interest to the researchers in terms of opportunity to further any activist goals the participants might espouse.

Table 4. Identified challenges and opportunities of applying the five principles in a distributed setting.

Principle	Challenge	Opportunity
Inclusive	Prepare for various devices	Enable tailored participation
Reflective	Critiquing each other's work	Anonymous way to give feedback
Playful	Building trust	Many different tools to explore
Empowering	Giving true support to what participants need	Participant autonomy
Emergence	Facilitating the process of connecting with community	Involving family members in process

Attempts were made to exhibit the work online, via social media channels, but the participants themselves felt that this would not have the impact of an in-person exhibition.

Similar to traditional PD settings, facilitation was essential in helping participants further their design process. In the distributed summer school setting, facilitation became more prominent because there was little interaction between participants. This reflects Patel et al. (1997) who suggest that monitoring and mediation is required during all activities in distributed settings. In this research, five participants reflected in the focus groups how the facilitator helped them to refine their ideas, make decisions, and develop the artwork. They mainly seemed to have benefited from facilitation in the one-on-one sessions; participants did not mention that feedback of their peers was really helpful to them. Despite the lack of direct interaction between participants, mutual learning still took place as participants learned about the stories and experiences of other participants in relation to the community. In line with findings from Hanzl (2007) and Miller et al. (1992), the distributed setting of the summer school avoided conflicts between participants but nevertheless supported mutual learning and reflection. However, the distributed setting certainly posed challenges to facilitation in terms of the researchers' ability to 'read the room'; gauge levels of energy and concentration and adapt a more agile approach to facilitation in terms of responding and adapting to the energy of the group.

5.2 Reflection on the principles

The five principles for participatory design that this paper identifies have mostly been applied in traditional, analogue PD settings. Table 4 outlines the opportunities and challenges for applying the principles in a distributed PD setting, based on the findings of this research.

5.2.1 Challenges

Designing a PD process that suits all participants in a distributed setting is challenging as participants use different types of devices (mobile phone, computer, tablet) to join in. Dealing with the dynamic balance between structure

(supporting only one type of device) and flexibility (adjusting to the devices of the participants) is also described by Patel et al. (1997) as a challenge for facilitators in distributed PD. Related to this, is the challenge in supporting participants' autonomy and self-determination towards empowerment, as this requires a similar complex balance between providing structure and enabling flexibility (Carroll and Rosson 2007; Emspak 1993).

In terms of playfulness, the distributed setting influenced the interactions between participants, and between participants and facilitators (Hess and Pipek 2012; Titlestad et al. 2009). This process was challenged because participants tended to keep their cameras off and the usual moments to share personal stories (e.g. during breaks) were necessarily organised in a different way. The facilitators put extra effort into building relationships and trust with the participants, using ice-breaker activities. The extent to which trust is built also influences whether participants feel comfortable to critique each other's ideas, and, as such, whether reflection is supported. The facilitators experienced the need for extra effort in supporting critical thinking, and the anonymous option that tools as Miro™ offer make participants feel more comfortable to share critique. The lack of interaction between participants is a common challenge in distributed settings, because participants experience their contribution as less evident (Grudin 1993; Hess and Pipek 2012; Miller et al. 1992). In the summer school, the facilitators aimed to tackle this issue by building relationships and trust through the ice-breaker activities and by focusing on the impact that participants potentially can make on the community with their artwork.

5.2.2 **Opportunities**

One of the opportunities of distributed participation is the possibility to tailor the participation process, supporting an inclusive setting. In the summer school, participants could decide if they wanted to share their stories about the community in the plenary group, in one-on-one meetings, in the WhatsApp™ group, or on their Miro™ boards. In an analogue setting, tailored participation is more challenging, as everybody is in the same room. In terms of empowerment, the distributed setting benefits the autonomy of participants. Power relations and the group dynamic may be of less influence (Holtzblatt and Jones 1993), and participants experience more agency to participate in a way they see fit (Slingerland et al. 2020a). Enabling such tailored and personalised participation is mainly appropriate in small group settings, as for bigger distributed projects more structured approaches and processes are required to support the asynchronous way of working (Gumm et al. 2006; Walsh 2011).

As all of the participants used a device to join the summer school, playfulness was enhanced by offering different digital tools for participants to explore. Instead of connecting with the wider community, which was challenged due to lockdown measures, participants involved their family members in developing their idea and translating this into an artwork. As such, a different type of emergence was reflected through the summer school, more in the family setting rather than in public spaces. A combination of analogue and distributed participation could support the outcomes of participatory design to be shared in both of these places, reflected in the theory on *infrastructuring* (Bødker et al. 2017; Hess and Pipek 2012).

5.3 **Community-driven PD and place-making**

One of the challenges in community-driven PD is that participation relies on intrinsic motivation of citizens (Carroll and Rosson 2007). Using digital methods in PD could be a way to make participation tailored to the personal interest of individual citizens. The summer school participants showed that distributed PD, supported by digital tools, allowed them to use tools on their own terms, fitting their perspective and interest. The distributed summer school approach, presented in this paper, hence showcases a way to address this motivation issue in community-driven PD. Digital participation tools, applied in a distributed setting, reinforce participants' agency in the design process, as the summer school with the teenagers indicated.

PD in the community context often serves the purpose of place-making; connecting citizens with the place they live. In the summer school, place-making was challenged because the teenagers could not leave their homes due to the COVID-19 restrictions. Instead, this research showed opportunities to achieve place-making in the digital domain, already signalled by others as *digital place-making* (Foth 2017). The type of place-making that was observed during the summer school took place within the domestic domain, with family members playing an important role. The research brought new perspectives on opportunities for digital place-making, including family members and by the use of tools such as Google Maps to 'visit' locations that were temporarily inaccessible.

5.3.1 **Limitations and future research**

Using a case study approach brings limitations, especially when a single case is used (Yin 2003). The findings of this research are based on the summer school alone, and could be strengthened by studying more distributed small-scale PD workshops to further understand how the 'right' setting for PD can be achieved when participants join remotely. Further, the case study included teenagers, although from varying ages (11-17), a specific group of participants. This group is often seen as tech-savvy and hence one would assume digital PD methods to be particularly interesting to them. Nevertheless, this research found that teenagers

experienced the online workshops sometimes to be awkward, especially when other participants kept their camera's off. Yet, the teenagers did not report a lot of difficulty in using the digital tools used throughout the workshops, seconding their tech-savviness. While the tools used in the summer school are nowadays very common (e.g. Zoom™ and Miro™), presuming most people can use them rather easily, future research should focus on doing PD with (older) adults to see if a similar approach would hold.

Another specific characteristic of this study was that it translated a face-to-face event to an online format. This resulted in using tools and software that were widely available and easily accessible to researchers and participants. Perhaps when the summer school had been originally intended to be online, researchers could have invested time in finding more elaborate tools and methods to be used in online PD, which have already been explored by others (Klammer et al. 2010). Other tools may enable some of the interactions that this study found hard to support online, such as group discussions and joint reflections. The findings of this study open other research questions that concern PD tools for supporting mutual learning online, and whether the development of novel PD tools to be used in distributed settings is necessary.

6 Conclusion

While Participatory Design (PD) researchers, especially in community settings, mostly use face-to-face and analogue methods, the COVID-19 pandemic spurred interest in exploring methods for organising distributed PD (Ali et al. 2021; Bakırlıoğlu et al. 2020). To adhere to PD's underlying principles and foundations, other types of activities and materials are needed in distributed settings (Ali et al. 2021; Hanzl 2007; Miller et al. 1992; Obendorf et al. 2009). This paper defined, from literature, a working set of five principles for PD (inclusion, reflection, playful, empowerment, and emergence), and studied how these manifest in a distributed setting. A distributed summer school of two weeks was organised, involving the creation of a digital artwork by teenagers about their community. Making this artwork, teenagers engaged in place-making processes and learned new things about the community from each other. Qualitative data analysis on the summer school outlined which activities and materials supported the five principles of PD in a distributed setting, and which ones were less suitable.

The main findings of this research are that distributed PD can be inclusive to teenagers of different ages, a group often not included in place-making processes, when facilitators offer multiple ways to engage and to provide input to the workshops. In the summer school for example, participants valued the different tools and platforms (e.g. chat, Miro™ boards, group sessions, one-on-one facilitation).

This flexibility in participation at the same time requires a certain structure, to make sure participants do not get lost in the number of ways they can engage (Patel et al. 1997; Wallace et al. 2013). The other main finding is that facilitators need to be extra careful in distributed PD to facilitate the need to build trust and relationship with and between participants. In Zoom™ sessions, participants tend to keep their camera off and breaks do not bring the natural bonding moments as in analogue settings. Hence, facilitators of distributed PD workshops need to specifically consider what activities they will use to connect with the participants, and that enable participants to connect to each other.

The analysis of the summer school shows that distributed PD can adhere to its underlying principles, although some (e.g. inclusion and reflection) require extra attention or additional activities. As the interest for distributed PD has increased recently, the authors look forward to more work to help the PD community better organise distributed workshops that are inclusive, reflective, playful, empowering, and support emergence.

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Declarations

Conflict of interests The authors declare that there is no conflict of interest regarding the publication of this paper.

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