Bricolage: Aligning with Climate Action through Playful Participatory Design in Speculative Scenarios

Bengi Agcal [a], Ines Ziyou Yin[b], Marty Miller[c], and RAY LC[c]

[a]Faculty of Critical and Creative Studies, University of British Columbia, Kelowna, Canada; [b]School of Design, Hong Kong Polytechnic University, Hong Kong, Hong Kong SAR; [c]School of Creative Media, City University of Hong Kong, Hong Kong, Hong Kong SAR

*Correspondences should be addressed to RAY LC: LC@raylc.org; Level 7, 18 Tat Hong Ave, Kowloon Tong, Hong Kong SAR.

Bengi Agcal is a Master of Fine Arts Student at the University of British Columbia, Faculty of Critical and Creative Studies. https://www.linkedin.com/in/bengi-agcal/

Ines Ziyou Yin is a PhD researcher at the Hong Kong Polytechnic University, School of Design. https://orcid.org/0000-0001-8739-1304

Marty Miller is a Postdoctoral Researcher at the City University of Hong Kong School of Creative Media. https://orcid.org/0000-0002-3720-9751

RAY LC is Assistant Professor of Creative Media, City University of Hong Kong School of Creative Media. https://recfro.github.io/

Bricolage: Aligning with Climate Action through Roleplay-based Participatory Design in Speculative Scenarios

This work explores collaborative roleplaying interventions as a climate education tool, addressing the disconnect between actions and consequences in climate action. Participants assumed one of the roles of Architect, Collector, Engineer, and Explorer in a fictional scenario, engaging in teams to create personal, embodied experiences through speculative ideation and design-making. The team-based creation and trading mechanisms fosters engagement for encouraging pro-environmental behaviors in a participatory public workshop format. Results suggest that the design process empowers participants to combat environmental problems actively. Overall, this research offers a novel approach to climate education, fostering empathy, instilling hope, and inspiring pro-environmental action through participatory play and making.

Keywords: participatory play; climate action; design fiction; interaction design; role play

Introduction

As the urgency of the climate threat intensifies, governments and organizations are ramping up efforts to educate the public about sustainable behaviors. This has led to public campaigns for climate action and policies like charging for unsustainable choices and promoting water and electricity conservation programs (Leach et al., 2016; Springmann et al., 2017; Gonzalez Fischer & Garnett, 2016). Despite these efforts, policies and campaigns often face resistance by attributing climate responsibility to individual consumers (Gonzalez-Arcos et al., 2021). Additionally, the pessimistic, fear-inducing climate data presented in these campaigns may create avoidance mechanisms and induce eco-anxiety (Jane Davy, n.d.; V.Helm et al., n.d.).

Recognizing the limitations of current strategies, there is a need for educational interventions that engage the public without inducing fear or placing the entire climate

responsibility on consumers (Krajewska, 2017). Art has proven effective in fostering climate engagement by stimulating creative thinking and contemplation (Krajewska, 2017; Roosen et al., n.d.). While existing art projects address climate change, involving participants actively in the creative process may have a more significant impact than passive observation (Archive, n.d.; Art for Climate Justice, n.d.; Imagine 2020 (2.0), n.d.; Reservations, n.d.).

Playful interactions are preferable interventions for behavioral and mental changes, exposing people to non-threatening, pseudo-personal experiences within a fictional scenario devoid of real-world consequences (Cai et al., 2023; DeKoven, 2013; Thabrew et al., 2018). Gamestorming has long been investigated as an approach for change-making (Bai et al., 2019, p.350; Gray et al., 2010, p.17) and adult education based on constructivist learning theories (Bai et al., 2019, p.351; Boghian et al., 2019, p.51). Engaging people through collaborative, playful activities has also been proven effective in sustaining involvement and rehearsing for climate futures (Lépy et al., 2014; Soden et al., 2020). Approached as an action and practice of discovery (Newstead et al., 2018), this research proposes merging collaboratory art-making with participatory play within a speculative fiction scenario to actively influence climate-related behaviors.

Speculative Design for Influence

Speculative design mediates possible futures through tangible artifacts (Dunne & Raby, 2013, p. 2), fostering discourse on alternatives (Dunne & Raby, 2013, p. 6). Material speculation visualizes and criticizes possible futures (Wakkary et al., 2015, p. 97; 2016, p. 45). HCI studies explore climate change through speculative thinking (Biggs & Desjardins, 2020; Chopra et al., 2022; Gaver et al., 2015; Pirmoradi et al., 2021; Soden

et al., 2020), materializing speculation (E. B.-N. Sanders & Stappers, 2014, p. 12).
Some use speculative probes (Biggs & Desjardins, 2020; Gaver et al., 2015), while
others co-create speculative artifacts (Chopra et al., 2022; Soden et al., 2020), reflecting
bricolage (Lévi-Strauss, 1972; Louridas, 1999).

Speculative storytelling changes behaviors and beliefs for social good (LC &
Mizuno, 2021, p.2), evident in projects educating children about climate change (Doyle,
2020; Rousell et al., 2017). High school students engage in speculative storytelling,
crafting 'future' voicemails (Doyle, 2020, p. 2755), prompting considerations and
solutions (Doyle, 2020, p. 2759). Another project stimulates speculation among children
with avatars, reflecting imagined futures (Rousell et al., 2017, p. 14), empowering
critical thinking. However, there's a lack of exploration of speculative storytelling from
adults' perspectives.

This research investigates engaging adults aged 18 to over 50 in speculative
experiences to 'rehearse climate futures' (Tyszczuk, 2021, p. 12) for intervention and
influence.

Role-playing for Participatory Speculation of Climate Futures

Role-playing is a valuable method for participatory speculation on climate futures,
encouraging diverse perspectives (LC & Mizuno, 2021, p. 10). This research integrates
role-playing into speculation, using board games, digital games, and live-action role-
playing (Fernández Galeote & Hamari, 2021; Flood et al., 2018; Tychsen et al., 2006).
Participants adopt different roles, fostering collaborative tasks within fictional settings
(Driscoll & Lehmann, 2014). Role-playing has recently addressed climate change in
board games, simulation negotiation games, digital serious games, and participatory
play (Crookall, 2013; d'Aquino & Bah, 2013; Abraham & Jayemanne, 2017; Doyle,

2020). Applications range from education to policymaking and system design (Martin et al., 2011; Valkering et al., 2013).

Role-playing offers advantages like rapid learning, active participation, and immediate feedback on decisions (Flood et al., 2018, p. 17). It challenges existing values and potentially changes mindsets about climate action (Flood et al., 2018, p. 17; Luostarinen & Schrag, 2021, p. 186). Diverse perspectives emerge, with occasional disconfirming statements adding nuance to role-playing expectations (Zhang et al., 2021). Importantly, this method promotes reflexive learning, allowing players to perceive the impacts of their decisions (Flood et al., 2018, p. 12).

However, most role-plays focus on negative scenarios, lacking positive interventions for a promising future (Doyle, 2020; Luostarinen & Schrag, 2021, p. 186). Scholars emphasize the need for more hopeful narratives to foster a collective sense of responsibility (Doyle, 2020, pp. 2749–2750). Positive ecology-related storytelling has been explored in digital games, not physical role-plays (Neset et al., 2020).

This project addresses this gap by using collaborative, physical role-playing to co-create positive interactions and climate-related stories, fostering behavior change. The approach investigates physical role-playing as a participatory tool for generating knowledge and driving behavior changes. The co-created outcomes aim to illuminate participants' concerns, interests, and desires amid climate change uncertainties.

Research Aim and Questions

This research thus aims to address the potential loss of climate engagement during the design and speculative phases of current art-based interventions. Focused on a speculative intervention design strategy, the study leverages collaborative, participatory interactions to answer two key questions:

- How can collaborative situated role-playing and design-making be as active interventions in fostering climate education and environmental speculation to the public?

- What considerations and reflections towards the current and future environments can we learn from the process of participatory activities, the co-designed artefacts, and the follow-up feedback from the participants?

Methods

In this study, we executed a participatory design-based sustainability intervention, crafted an excursion workshop, and held a subsequent exhibition to showcase the resulting artefacts. Our research design was guided by a constructivist paradigm, which embraces the axiology of raising awareness, the ontology of multiple realities, and the philosophies of phenomenology and interpretive understanding (Mertens, 2023, pp.16-20). Given the constructivist paradigm's focus on qualitative research methods (Flick et al., 2004; Guba & Lincoln, 1989, 2005; Rehman & Alharthi, 2016), we employed qualitative techniques with participatory research as the main approach.

Three participatory design workshops were conducted, all situated at a secluded beach and a river basin. The artefacts co-created by participants during the workshops served as supportive data (Hanington & Martin, 2019). Following each workshop, feedback on the activities and insights about the experiences were collected from participants through open-ended group discussions and in-depth one-to-one interviews (Lichtman, 2013; Willig & Rogers, 2017) to address the two research questions. Thematic analysis (Nieman, 2023; Vaismoradi et al., 2013) of the transcripts of the discussions and interviews was later conducted to interpret participants' opinions and report research findings (detailed in the Results section).

Participant Recruitment

For the on-site workshops, 29 participants were recruited, including 7 males and 22 females of diverse nationalities, aged 18 to 50. Demographic information is available online (Bricolage—Appendix, n.d.). Recruitment primarily occurred through social media and websites. Participants were not provided with intervention details during recruitment; only a brief research purpose and activities description was given. All participants were informed that the event was part of a research project, and their anonymous inclusion required consent, which they provided by signing consent forms. Each participant volunteered without any reward or incentive.

Workshop Rundown

Three rounds of participatory design workshops were conducted in different locations in Hong Kong and Japan, all held at secluded beaches and river basins. Each workshop employed an interactive, speculative intervention approach utilizing role-playing.

The workshop began by dividing attendees into four teams with different roles—Engineers, Architects, Explorers, and Collectors. These roles aimed to stimulate contemplation about future environments and encourage design thinking on environmental issues. Participants were instructed to collect interesting, usable, or attractive items related to their roles while hiking until reaching a event venue. Items collected ranged from tree branches to broken water pipes.

A base camp was established at the open space, where teams were briefed on a prompt depicting one specific fictional scenario relevant to an environmental issue. Aligned with the event venue, landscape, and fictitious scenario, the teams were prompted to address the issues of energy resource depletion, biodiversity degradation,

waste accumulation, and the elevation of sea levels. To foster independent contemplation, event vocabulary avoided terms like 'sustainability,' 'climate change,' and 'global warming,' withholding information about the climate action component. Details about task prompts for each team can be found online (*MAKE FOR GREEN,*n.d.).

The scenarios asked the participants to roleplay as a community of survivors in a coastal settlement, prompting contemplation about causal effects and possible solutions of environmental issues. Participants were then tasked with designing tangible artefacts as speculative solutions using available materials and basing their designs on their roles and the location. Following the prompt disclosure and the briefing of tasks and goal, teams dispersed in the surrounding area to work on the tasks through collaborative bricolage, that is, collectively making do with whatever they had collected (Lévi-Strauss, 1972; Louridas, 1999). Each team had two hours to complete their artefacts.

Barter and exchange game rules were encouraged to promote resource sharing, reusing, and recycling behavior:

(1) They can exchange tools among themselves.

(2) They can trade goods for supplies provided, including paper, scissors, glue, etc.

(3) They can create their own rules of exchange, such as trading one hour of using scissors for a rock.

(4) The goods they traded to the supplies can be exchanged with other teams, allowing negotiation to reduce exchange costs or direct exchange with the supplies depot.

The rules functioned as a fictional economic system, enabling teams to determine the values of items. After two hours, teams presented their creations to the community.

Throughout the process, three researchers and two students facilitated the event and observed interactions, recording insights through notes and photos.

Figure 1. The illustration of the workshop process.

Follow-up Interviews

Following each workshop, a group discussion moderated by one of the researchers was held, aiming to swiftly gather opinions. However, group discussions may lack diverse insights due to mutual interference (Litchman 2013, p.292-293; Willig & Roger, 2017, p.501). To complement this, one-on-one interviews were conducted by other researchers to delve deeper (Willig & Roger, 2017, p.501). During the group interview, researchers spoke with individual interviewees one by one. Each interview lasted 15-20 minutes, revealing participants' backgrounds, sustainability involvement, views on the future, and event experiences.

Both group and individual interviews were in an open-ended format, enabling the participants to express their thoughts without being influenced or led by a pre-determined set of questions and expectations. All interviews were audio-recorded with participants' consent, adhering to established practice.

Results

Results are presented through thematic analysis of interview transcripts, supported by

the illustrations of artefacts and researchers' observation logbooks. Each author

highlighted key terms and phrases relevant to the research questions. Not all participants

commented on these themes due to the open-ended nature of the interviews; only those

aligning with the research aim and questions were analyzed. Common discourse topics

emerged and were synthesized into various codes, which were then integrated into

broader themes and sub-themes. The interview findings revealed three major themes:

a) Role-playing, ideation, and design-making

b) Intervention effects on participants

c) Views on the present and the future

Each theme is discussed in the following subsections. Except for Taking

Responsibility under the Intervention Effects on the Participants, the participants made

no disconfirming statements. The results from the interviews and their subsequent

analysis are presented in this section.

Role-playing, Ideation, and Design Making

Gamification through Role-playing

The role-playing and gamified process of the intervention facilitated full participant

engagement and allowed them to draw connections to their past gaming experiences.

The scenario provided a backstory, assigning participants roles and tasks akin to

characters and missions in digital games. This gamification also yielded positive

reinforcement, consistent with findings in game-related studies (Bai et al., 2019;

Boghian et al., 2019; Flood et al., 2018; Gray et al., 2010).

Two participants likened the intervention to their digital gaming experiences. One remarked, "You always make something. It's almost like a role-playing game" (P1), while another stated, "Feels like Minecraft, like go fetch wood. It is nice to get your hands dirty and make something creative" (P3). Participants felt rewarded when accomplishing tasks, such as procuring items and trading them for materials to create artefacts, similar to winning in a game (P1, P3).

Bricolage with the Found Materials

While playing with the found objects, the participants queried the materials, considering their functionality, value, and tradeability, tradeability, akin to artefact analysis (Hanington & Martin, 2019, pp.23-25). They took ownership of the materials and 'traded' them with other teams.

Participants re-evaluated material usage in the context of the fictional prompt. One remarked,. 'We have to rethink the function of particular objects, but objects echo the real world. We can see the life behind the objects due to the human touch behind collecting them' (P20). As a result of such physical and mental interactions, a team of Collectors created an artefact that encouraged others to play with by drawing, hitting, and making sounds (see Figure 1). 'We were creating or trying to present art in traditional forms like paper, but this approach expanded. For instance, sound can

represent time, winter, and place (the sea). You can use your imagination to get more

perspective during environmental observation' (P21). Repurposing found materials as

drawing or music tools showcased multiple functions of recycled waste to promote

reuse.

Figure 2. Interaction with an artefact (left). Participants observing the materials (right).

From Exploration to Situated Making

Participants tailored their designs to fit situated scenarios, ensuring alignment with

speculative contexts for climate disasters. For instance, the rising tide and flowing

stream simulated rising water levels, inspired 'Architects' in their creation. One

described addressing the climate disaster of rising sea levels and ideating solutions with

found materials. "When you get the prompt, the first thing you think is, will we ever

have enough land to live? Our first concern was a floating house because that's the only

way people can survive. The shape of the greenhouse was inspired by a sandwich box"

(P15). Another reported a similar workflow, starting with critical thinking about the

environmental issue and addressing it accordingly. "Currently, the most salient problem

is global warming. Once we were exposed to the sea, we decided floating is a good idea

for survival" (P14).

Besides facilitating collaborative ideation, immersion in the natural environment

enabled participants to test their designs. For example, P14's team floated a paper cup

across the stream to test their 'Floating Garden' design.

Figure 3. Floating Garden prototype test (left). The design sketch (right).

Reflections of Cultural Diversity in Design-Making

With participants from 10 different nationalities, their diverse backgrounds influenced their design choices, as reflected in interviews. Participants drew inspiration from technological infrastructure in their countries, incorporating interpretations of this infrastructure using available materials. For example, P9 from the 'Engineer' team mentioned water and steam turbines commonly seen in their hometown, inspiring their team to make a water turbine for reusing natural resources.

Participants who had witnessed environmental disasters resonated more easily with scenarios and tasks. For instance, P13 from the Maldives couldn't help but think about their country's sinking threat while doing the task, leading their team to design a floating home (see Figure 4). Similarly, another team member from India shared their motivation for designing the floating home, influenced by floods in their hometown. "We wanted to avoid danger the most. Many buildings in my country have been submerged in floods. A floating home has less chance of being damaged compared to ones on land" (P11). These personal encounters with disasters inspired their designs, making them not only task-appropriate but also reflective of potential real-world

designs.

Figure 4. Swimming house.

Intervention Effects on the Participants

Understanding Nature and Being Empathetic

Observing the environment fostered a closer bond with nature for participants. Initially confused by the game rules, they gradually immersed themselves into role-play, interacting with the beach and trash in unexpected ways. 'In the beginning, we didn't have any ideas and didn't know what to do' (P21). 'I just kept on exploring, and I felt like I was moving closer to nature when I was searching' (P4). As the event progressed, they pondered the origins and uses of materials, gaining new perspectives. "I came here, ventured out, and collected trash, and the next time I go to the city and look at the trash, I'll probably think this could end up on the stream of water" (P17).

Some empathized with local residents and considered the impact of trash on living beings. "'I now understand better how turtles and seagulls eat trash and die by choking. When I look at the trash at the beach, I can't distinguish if it is supposed to be food or dangerous trash" (P3). One team empathized with nutria near the river, creating artefacts depicting how rising water levels would affect these animals. These interactions deepened participants' understanding of environmental damages and how nature functions.

Figure 5. Participants observe the wildlife.

Empowerment in Co-Creation

Co-creation and active role-playing empowered participants and instilled a sense of efficacy. Crafting artworks addressing environmental issues made them feel impactful, motivating them to take action beyond the intervention. "There are many problems we are trying to find solutions to existing in the world. This event is simple but helpful for changing our mindsets so that we can do something better to protect the environment" (P11). Assessing the effectiveness of their product against environmental issues, participants felt hopeful and productive. "We can use trash and make the ocean a tiny bit better like this. Slight changes are better than nothing" (P7). They sensed their positive impact during the intervention and expressed interest in hosting or joining similar events. "There are so many opportunities and projects we can do" (P11). These statements reflect how feelings of empowerment translated into proactivity and increased environmental engagement for the participants.

Taking Responsibility

The workshop prompted participants to become more proactive about the future. After visiting a polluted natural location and role-playing to address environmental problems, participants reported heightened awareness of human impact. "Once you see the issues in the actual place, you would not forget because you feel like having an attachment to this place and this Earth" (P17). Collaboration during the intervention emphasized the importance of collective efforts for creating a desired future. "People need a connection to survive and think; we can't be individual beings" (P21). Some participants expressed intentions to pay more attention to environmental sustainability in the future. P2, a member of the Explorer team, pledged to recycle more and consume less. Others planned to initiate their own intervention projects to spread awareness within their community. "We can come up with more ideas like this. For instance, we can recreate artefacts out of plastic bottles" (P7). "We should keep an alert on wasting. We can do more things like beach and trail cleanups" (P4).

However, not all participants felt empowered by the intervention. Two disagreed, believing individual actions are ineffective in fixing environmental issues. After witnessing the pollution's extent, one expressed helplessness: "I am not in a position to do anything about climate change individually. I'm just an end-user, and won't put a dent on [climate change]" (P10). Another participant, shared a similar sentiment: "Individuals don't make a difference, but big corporations do, and it's hard to change them" (P20). Given the scale of the climate impact made by the corporations in contrast to the individuals, these participants lacked the belief that individual actions can be effective (Zhang et al., 2021).

Views on the Present and the Future

Acceptance of a Polluted Present

Exposure to the beach's trash led participants to acknowledge it as an integral part of the landscape, such as trees or rocks. Playing with it, they observed its origins and potential harm, becoming accustomed to its pervasive presence. "The new species we found (Oyster merged with Styrofoam) is proof of how polluted the ocean has become. Styrofoam is one of the worst things. Yet it is everywhere" (P18). "We learn that trash and the landscape are part of a whole. You accept that this is how reality is now" (P3). Fully aware of human-caused pollution, some saw no alternative but to accept it. "Wherever there are humans, there's trash, no matter how hard people try to clean up" (P17). However, accepting a tarnished nature was challenging for some, conflicting with their previous optimism. "I wanted to swim at the beach yesterday despite being told it would be dirty. A part of me still believed that we should be able to swim at any beach." (P1). Overall, participants recognized the enduring presence of trash in the environment.

Figure 6. Oyster merged with Styrofoam (left). Participants playing with the materials (right).

Trust in Techno-centric Solutions

Despite awareness of environmental damage and the current state, participants maintained hope for the future. The speculative nature of the scenario allowed them to imagine potential futures, fostering optimism and trust in technology-driven solutions against climate threats. Collaborating towards environmental goals bolstered confidence in technology. Actively engaging in problem-solving reinforced this trust, with some expressing faith in their roles: "I feel good about the future. We (Engineers) take action to put knowledge into practice" (P9). Others believed that since human activity caused pollution, technology could also reverse it: "We pollute it, we can also take it back. We have the technology. It will take time to take nature back. We can use technology to make our future clear" (P7). This feedback supports our original aim of creating a non-intimidating climate intervention and suggests that our positive approach was effective in inspiring hope in participants.

Resonance to the Real Life

Participants recognized the speculative scenario as a reflection of present reality and technological constraints. They appreciated the prompt's time constraints, symbolic of humanity's limited time to combat climate change: "It makes sense that we were given limited time to design. In the real world, humans only have very little time left to fight against climate change" (P13). Similarly, participants noted that since the speculative scenario reflected reality, they could relate further to the prompt and realize the value of the materials: "The story helped in creating value for the final artefacts" (P12). "This (climate disaster) is actually happening, like flooding, so I could fully immerse myself and explore with hope that something will work out in the end" (P13). This alignment with reality highlighted the urgency of climate action.

Participants also evaluated the sustainability of their creations and the life cycle of found materials. Engaging in ideation and design prompted them to consider the environmental impact of their artefacts. Despite using mostly trash, participants also relied on additional supplies like tape and glue, leading to skepticism about the sustainability of their creations: "I'm very skeptical of the so-called sustainable products now. Even for our making, we still needed a lot of artificial materials like wire and tape, in order to explore the idea of sustainability, which is paradoxical" (P18). Some teams imposed self-limitations to minimize waste, refusing to use provided materials unnecessarily and ensuring all materials were utilized effectively through careful trading.

Discussion

Event Outcomes

The findings of this study suggest that participatory role-playing serves as and effective tool for climate education. Climate interventions often face challenges due to fear and a perception of distance from the issue, leading to inertia (Jane Davy, n.d.). Our participatory role playing approach, addressed these barriers. The fictional scenario created a sense of urgency, presenting climate change as an immediate concern. Assigning roles as Architects, Collectors, Engineers, and Explorers in a local setting brought environmental issues closer, fostering personal experiences through speculation and design-making.

In addition to creating a play-based climate change intervention, this study aimed to explore how participants' sentiments toward climate change manifested in the making process and the final artefacts. Creating, material speculation, and trading fostered hope and encouraged pro-environmental behaviors. Participants reused beach

trash, contemplating collective futures and current pollution. They engaged in pro-environmental behaviors like recycling, reusing, and cleaning during artefact creation and trading.

Interviews revealed that participants felt empowered through the design process, inspiring them to participate in similar initiatives and actively address environmental problems. Exploring the natural landscape during creation enhanced participants' empathy for nature and living creatures impacted by human activities, leading to an acceptance of trash as a current reality. Overall, this study suggests that, beyond educating the public, making can cultivate empathy for nature, instill hope for the future, and inspire pro-environmental action.

Views of the Future

Previous research (Burke et al., 2018) demonstrated art's potency in climate communication, as participatory art projects can sway opinion among those undecided about climate change. This research focused on viewers rather than participants, they posed the question, 'Are participatory practices of art production more effective than passive viewing of an artwork (p.18)?' While our study didn't directly address this comparison, it aimed to develop intervention design strategies for participatory art production. The process of conducting the workshops, the artwork that resulted from them, and participant feedback highlighted a set of design characteristics that can enhance the benefits of participatory interventions as a tool for climate education.

- Avoid emphasising the environmental aspect when promoting the event to prevent bias and attract a broader demographic.

- Encourage roleplaying with a fictional scenario to overcome temporal barriers and immerse participants in the experience.

- Incorporate subtle game elements promoting sustainable behaviors like recycling and reusing.

- Introduce an environmental issue for teams to engage with and learn about (Rising water levels, depleting energy sources, pollution, loss of biodiversity).

Luostarinen et al. (2021) demonstrated playful interactions enable adults to 'rehearse the future'. We discovered that combining the aforementioned criteria with a playful approach created a safe space for thinking about the future of climate change. The event's focus on climate change wasn't disclosed during participant recruitment, ensuring a diverse group with varying perspectives and sustainability knowledge. Despite differing backgrounds, participants played togrther as survivors, setting aside identities to tackle environmental challenges together.

This research delved into public attitudes toward the future, finding participant-created artifacts as valuable data sources. These artifacts offer insights into creators' sentiments, work habits, and experiences. They reflect optimism in technocentric solutions, such as crafting floating structures for rising sea levels or designing recycling systems. Additionally, they depict environmental conditions, offering a compilation of public speculations from a land-specific and multicultural viewpoint.

Limitations

While valuable, the research could improve in demographic analysis, methods, and design motivation. Focusing solely on collectivist Asian populations leaves a gap in understanding individualistic cultures. Recruiting participants from Western countries is

essential to assess intervention performance in diverse cultures, requiring adjustments. Additionally, the workshop skewed towards more female (22/29) and younger (18-25) participants, potentially introducing biases. Future research should balance gender and age representation for broader perspectives.

Regarding methods, while our approach raises awareness and influences behavior, insights into lasting impact are lacking. A follow-up evaluation is essential to determine lasting behavioral changes. Pre-workshop surveys and interviews can gauge opinions, while post-workshop interviews provide insights into lasting changes.

Furthermore, the workshop's design was motivated by having an exhibition. Further examination is needed to assess design motivation without an exhibition. Conducting similar workshops, some with possible follow-up events and some without, can reveal differences in participant enthusiasm and evaluate the exhibition's necessity.

Conclusion

In conclusion, this research proposes motivating public climate action through participatory play and art-making with constrained speculative scenarios. Throughout the workshop experience, participants play as various roles, collectively creating artifacts, and actively engaging with climate change issues. This participatory arts intervention, accompanied by role-playing, sparks future speculation and criticism of the current state while empowering individuals to confront climate change situations. However, improvements are needed in demographic analysis, research methods, and design-making motivation to include more diverse populations and to balance genders, ensuring the elimination of biases and overgeneralization. Further study can be continued by holding additional workshops, and by conducting surveys and interviews

to evaluate short-term and long-term effects. Through this research, we anticipate interventions involving participatory play and making for pro-environmental behaviors, such as recycling, sustainable consumption, and cleanup. Overall, this research offers a new method for discussing and responding to environmental changes.

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