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DESIGNING WITH AMBIGUITY: ITERATING EQUITY IN GAME JAM DESIGN

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Abstract:

This paper examines how inclusive, pluriversal, and transversal design lenses can reimagine game jams with youth, supporting and qualifying them as equitable, transformative, and empowering interventions. Through Design-Based Research, leveraging theoretical and retrospective analytical insights from a contemporary research and innovation project that developed and experimented with five cultural game jams, we examine how the design and iteration of these as collaborative game-making spaces can foster creativity, equity, and new forms of collective care.

We initially frame the emerging field of game jams and their design, along with framing the three design lenses of inclusive, pluriversal, and transversal design. Through a retrospective analysis of the iterative processes involved in planning, designing, executing, and evaluating five cultural game jams with youth as participants and partners, we discuss how these lenses might inform more just and participatory design processes and propose relevant design questions. They offer valuable frameworks for addressing power, fostering care, and enabling young people to imagine and shape their futures. The paper presents a theoretically grounded and practice-based framework for designing game jams that enables ethical, inclusive, and co-creative participation through the lenses of inclusive, pluriversal, and transversal design approaches.

Keywords: game jam, design, inclusive, pluriversal, transversal

1. Introduction: Jamming Otherwise

In a time marked by social fragmentation, cultural contestation, ruptures in shared values, and persistent systemic inequalities, the question of *how* we design is as important as *what* we design (DiSalvo, 2022; Manzini, 2016). Designing together across diverse backgrounds, professions, disciplines, and lived experiences offers a promising way to reconceptualise design as a pluralistic, situated, and relational practice. The paper explores how game jams, beyond their novelty, outcomes, or playful experimentation, can serve as generative spaces that foster participation rooted in care, mutual recognition, and agency. It thus begins with a proposition: reimagining the design of game jams through the lenses of inclusive, pluriversal, and transversal design not only broadens the potential of what these events can become but also examines the often-unseen norms that influence who gets to participate, what counts as knowledge, and how participatory futures are envisioned.

This paper explores how game jams can be reimagined as more than just fast-paced gatherings of programmers and creatives. It examines how concepts of care, collectivity, collaboration, and agency might influence and reshape the core design processes of these events. By paying attention to their structures, temporalities, materials, partnerships, and values, game jams can be seen as deliberately designed spaces that amplify the voices of those often marginalised in the development of both games and culture. The paper analyses the iterative development of a cultural game jam format as a multi-stakeholder design intervention, based on a retrospective analysis of one pilot and four subsequent interventions. Through an abductive mode of inquiry, concerns emerged regarding equity, responsibility, empowerment, agency, care, and inclusivity. These concerns guided the integration of three theoretical design approaches, inclusive, pluriversal, and transversal, as frameworks for imagining, questioning, and enabling more ethical, inclusive, and co-creative forms of participation, creativity, and cultural innovation within game jam design processes and results. The paper therefore presents a theoretically grounded and practice-based framework for designing game jams that foster more equitable, inclusive, and co-creative participation, drawing on perspectives from inclusive, pluriversal, and transversal design approaches.

2. Background: Game Jam Design, Inclusion, and Diversity

Game jams are increasingly recognised as participatory and creative spaces for innovation, learning, and community-building. Typically fast-paced and collaborative, these events invite participants to design game prototypes and concepts within a limited timeframe, often guided by thematic prompts or design constraints (Kultima, 2015; Fowler et al., 2016). While game jams are widely celebrated for their potential to foster creativity, experimentation, and social interaction (Kultima, 2015, 2018; Meriläinen et al., 2020), they also raise important questions around accessibility, participation, ethics, and inclusivity (Aurava & Meriläinen, 2022). Much of the existing literature emphasises the playful and social aspects of game jams, such as enjoyment, skill-building, and informal networking. However, there is limited research on how game jams are deliberately designed – as

processes and formats – to foster inclusive, ethical, and caring conditions for participation. In particular, there is a lack of critical attention to the intentions, values, and power relations embedded in jam design practices – that is, how organisers shape the conditions of participation, the organisers' motivations, and whether participants are engaged merely as jammers or as co-creators of the jam itself (Kultima, 2023; Lai et al., 2021). Although participants often highlight elements of fun, learning, and community, less is known about how jam formats can support deeper forms of collaboration across differences, for example, cultural backgrounds, ages, institutional roles, or prior experiences, and how they might move beyond surface-level networking to become generative, caring, and empowering design environments (Holflod et al., 2024; Lai et al., 2021).

While game jams increasingly address themes such as technological innovation, serious play, and societal issues (Abbott et al., 2023; Boulton et al., 2018; Lai et al., 2021), their potential to engage with cultural diversity, ethical-relational design, and inclusive participation remains underexplored. Notable exceptions, such as the Sámi Game Jam focusing on Indigenous culture (Kultima & Laiti, 2019), inclusivity game jams (Pierce & Zaeemdar, 2024), diversity jams (Deen et al., 2015), and cross-cultural online jams (Park et al., 2023) – highlight that inclusive game jam design is possible but not yet widespread. While the Inclusivity Game Jam emphasised exploring systematic structures of oppression and how to counteract them, through the participants' thematic explorations (Pierce & Zaeemdar, 2024), other papers report potentials in using game jams for curricular redesign to foster inclusive spaces in education by examining diversifiers and encouraging students to engage with multiple perspectives and identities (Bozdog & Sloan, 2024). Although these examples highlight inclusive practices in game jams through participants' conscious exploration of themes and issues, a recent review emphasises that game jam settings must be carefully designed and organised to support safety, inclusion, and positive communication (Aurava & Sormunen, 2023). This suggests that current research on game jams and inclusivity focuses more on the themes and outcomes of the jams themselves than on the initial design and participatory processes before, during, and after, as inclusive and equitable design spaces and practices.

Moreover, recent work has shown that cultural inclusivity continues to lag in the global games sector (Park et al., 2023), underscoring the urgency of designing jam formats that foreground plural values, diverse identities, and ethical collaboration. While related formats such as social hackathons and civic innovation labs increasingly engage with questions of inclusion, justice, and participation (Faludi, 2023; European Commission: Directorate-General for Research and Innovation & Pottaki, 2022), these initiatives differ from game jams both in form and intent – and typically focus more on event execution than on the design processes that shape them.

As indicated, most existing game jam literature focuses on the outcomes of the events, such as the games produced, skills gained, or participant experiences, rather than the design processes, organisations, and intentions that shape those events. Yet these upstream design decisions – how jams are framed, who is invited, what roles participants can

take, and what values are foregrounded – greatly influence the extent to which game jams can become inclusive and diverse environments. As such, there is a significant gap in understanding how game jams and the design practices leading up to them can be deliberately structured to cultivate ethical and empowering conditions for participation – and how participants and youth can become active stakeholders in the design, processes, and evaluations of game jams (Costa et al., 2025). This paper addresses this gap by examining how inclusive, pluriversal, and transversal design can serve as ethical and theoretical lenses for reimagining game jam design and innovation, enabling participants to move beyond conventional roles as end-users and become partners in design and innovation (Hasche et al., 2020). We do so by applying the three lenses in analysing *Cultural Game Jams* (CGJs), a game jam format specifically designed to support inclusive, relational, and culturally situated game design environments. Developed within the context of an EU project, CGJs are collaborative design interventions held at cultural heritage sites across Europe. The CGJ format brings together cultural heritage institutions (CHIs), creative industries (CIs), higher education institutions (HEIs), and youth citizens (YCs, aged 16–25) in transdisciplinary and co-creative game-making environments and processes (Costa et al., 2024). Through iterative processes, the CGJs emphasise value-sensitive design (Friedman & Henry, 2019), relational participation and youth empowerment (Holflod et al., 2024), aiming to create and enable inclusive and caring (game) design environments for cultural-creative innovation (Eriksson et al., 2025; Holflod & Nørgård, 2025; Nørgård & Holflod, 2024; Luz et al., 2024).

3. Conceptual Framework: Inclusive, Pluriversal, and Transversal Design

Inclusive, pluriversal, and transversal design perspectives inform this paper's approach to understanding how design can operate as a practice of relational care, empowerment, and socio-material transformation. These different–but–also–interwoven perspectives provide critical lenses on participation and agency in design, especially in contexts shaped by diversity, asymmetry, and structural marginalisation.

Inclusive design focuses on accessibility and the lived experiences of those often marginalised in design processes, commonly referred to as edge users. It challenges one-size-fits-all models by promoting flexible, adaptive, and user-centred approaches that respond to diverse capabilities, aspirations, and constraints (Collier, 2020). Rather than treating differences as a problem to be solved, inclusive design views them as a generative force for innovation and equity, acknowledging that there are no universal approaches that include everyone (Kille-Speckter & Nickpour, 2022). By designing for those who are most frequently excluded, inclusive design expands participation spaces, creating communicative and participatory infrastructures to foster agency, shared decision-making, and collective benefit. Game jams are often fast-paced, high-pressure events that celebrate speed, novelty, and technical skill. While this can be energising for some, it may also reproduce exclusionary dynamics that marginalise participants who are less familiar with dominant tools, norms, or languages. Examining game jams through an inclusive design approach encourages designers to challenge these tendencies by emphasising accessibility, equity, and the experiences of

marginalised users, while acknowledging, supporting, and empowering both people's voices and bodily experiences (Luck, 2018).

Pluriversal design acknowledges the knowledges, histories, cosmologies, and futures of actors, including human and more-than-human entities, whose lifeworlds are often excluded or subordinated. Pluriversal design resists extractive solutionism and instead encourages participatory world-building grounded in culture-sensitivity and radical co-creation (Karadechev et al., 2024). In this perspective, (pluriversal) empowerment is not an externally imposed goal, but an emergent process of reclaiming voice and shaping futures on one's own terms. These viewpoints position empowerment as a deeply participatory and relational dynamic that disrupts and reconfigures existing power relations, implying social change at individual, group, institutional, and societal levels (Hardina, 2008). Empowerment involves more than amplifying voices; it requires enabling individuals and communities to act on and reshape the conditions that affect their lives (Pettit, 2012; Kesby, 2005; Kamruzzaman, 2020). This necessitates participatory design practices that do not merely include marginalised groups within pre-existing structures, but instead transform those structures by fostering shared ownership, critical consciousness, and relational accountability (DiSalvo, 2022; Morgan, 2016; Sol, 2019). Game jams are frequently framed as universal and open-ended; however, they often operate within culturally dominant paradigms that are technocentric, solution-focused, and prioritise commercial or entertainment value. Pluriversal design offers an alternative by emphasising situated knowledges, desires, and cosmologies, especially those historically excluded from global design discourses.

Transversal design complements these approaches by engaging with difference as a resource for transformation. Drawing on transversal theory, it resists homogenising universalism and the disconnection of pure pluralism. Instead, it creates conditions for "radical creativity" through fleeting but meaningful "glimpses of wholeness": moments in which diverse actors co-create a provisional and evolving "we" (Hsu, 2021). Transversality foregrounds the ethical and ontological stakes of designing across difference, highlighting the fragile solidarities that emerge through situated encounters, hesitation, and mutual recognition (Scheel et al., 2019). In this context, empowerment becomes entangled with care: a performative, ongoing practice of negotiating responsibility, inclusion, and transformation. As matters of resisting fixity and working towards interbeing (Beighton, 2018) and interconnected communities (Braidotti, 2019; 2021). Transversal design is particularly relevant in understanding how participatory contexts, such as game jams, can function as spaces of encounter, experimentation, and co-creation that transcend and bridge categories (e.g., disciplines, sectors), facilitating movement through differences. These spaces often hold tension, contradiction, and asymmetry; yet it is precisely through navigating such conditions that transformative moments of play, relation, and empowerment might emerge. As Scheel et al. (2019) suggest, transversality is not simply about assembling different voices, but rather about engaging in practices that are already shaped by, and actively shape, onto-political relations. Design is never neutral; it enacts worlds and worldviews and thus requires continuous attuning to the relations it produces and sustains. Game jams bring together people from diverse backgrounds (Eriksson et al., 2025; Kerr et al., 2020), often spanning multiple disciplines, sectors, cultures,

and experiences. While these encounters can lead to creative synergy, they can also generate friction, misunderstanding, or asymmetry. Transversal design does not seek to erase these tensions but values them as openings for collective becoming and radical creativity. It views empowerment as a relational and emergent process that unfolds through mutual hesitation, encounter, and the forging of relationality in-between worlds.

Inclusive, pluriversal, and transversal perspectives advance different and complementary views of participation and empowerment that are not additive or tokenistic but rather generative and transformative. They position inclusion not as integration into predefined frames, but as the collaborative creation of new ones; frames through which diverse actors can meaningfully articulate and enact their agency. By centring relationality, plurality, empowerment, and care, these approaches offer vital orientations for reimagining game jam design as a site of democratic and structural engagement, flourishing, and transformation. Inclusive, pluriversal, and transversal design all share a concern with broadening what design can do and who it is for, yet they approach this from different perspectives. Inclusive design focuses on equity and accessibility, aiming to include marginalised groups in design processes and outcomes, so that systems, technologies, and environments work for as many people as possible (Kille-Speckter & Nickpour, 2022; Luck, 2018). Pluriversal design, on the other hand, challenges the very idea of universal design norms: rather than merely expanding access to dominant frameworks, it advocates for designs that respect multiple ontologies and epistemologies, enabling "a world where many worlds fit" (Escobar, 2017; Karadechev et al., 2024). Transversal design shifts the emphasis to processes of crossing and weaving across disciplines, practices, and sectors to create new forms of interbeing that do not erase differences (Beighton, 2018; Hsu, 2021; Nørgård et al., 2025). One way to describe their differences is that while inclusive design emphasises accessibility from within, pluriversal design questions the system from outside, and transversal design works between to foster dynamic, situated connections across boundaries.

4. Methodology: Design-Based Research and Participatory Ecosystems

This paper is based on a research and innovation project grounded in a Design-Based Research (DBR) approach (Barab & Squire, 2004; McKenney & Reeves, 2019) embedded within a large-scale EU project, which operates in an adapted quadruple helix innovation ecosystem (Carayannis & Campbell, 2012; Carayannis et al., 2022). This ecosystem fosters collaboration among cultural heritage institutions (CHIs), creative industries (CIs), higher education institutions (HEIs), and youth (YCs) as civic partners, enabling iterative, co-creative, and real-world experimentation in *cultural hubs* in three different countries. Cultural Game Jams (CGJs) serve as participatory design interventions that emphasise youth empowerment, value-sensitive design, and continuous adaptation within this context (Eriksson et al., 2025; Holflod et al., 2024). The project further draws inspiration from the principles of design experiments as complex interventions (Brown, 1992), short-term ethnography (Pink & Morgan, 2013), and experimental collaborations (Criado & Estalella, 2018), producing rich qualitative data such as field notes, participatory

observations, interviews, video and audio recordings, and design documentations. These methods enable intensive, situated inquiries into CGJ processes – before, during, and after – as collaborative, experimental, and context-sensitive events. The data produced through these methods provide the empirical context for the paper's analyses. The visualisation in Figure 1 depicts the adapted (cultural) quadruple helix model and how it activates connections across sectors. The *glocal* hub is encircled (right), symbolising the embeddedness of cultural hubs within a broader glocal context (Holflod & Nørgård, 2025). The sector model (left) illustrates vertical and horizontal collaborations between sectors that are connected, although not yet fully interconnected, as shown in the diagonal models (middle and right), where lines intersect to enable new connections in the middle (Nørgård & Holflod, 2024). In this paper's analysis, the first three CGJs (the pilot and the two initial full interventions) are framed by the *local* hub model, while the *glocal* model frames the last two.

Ethical considerations are central to any interventionist approach, particularly when researching with youth as both end-users and co-creative partners. We address formal procedural ethics (e.g., informed consent) alongside participation ethics, ensuring meaningful engagement, representation, and mutual benefit for all stakeholders (Antle et al., 2020; Kawas et al., 2020; Van Mechelen et al., 2020). For procedural ethics, the project received ethical approval from the university's Research Ethics Committee, and all participants provided informed consent. Situational ethics, or responsive ethical practice during emergent interactions, such as attending to the well-being of youth participants, is fundamental. It requires reflexive attention to how researchers respond to

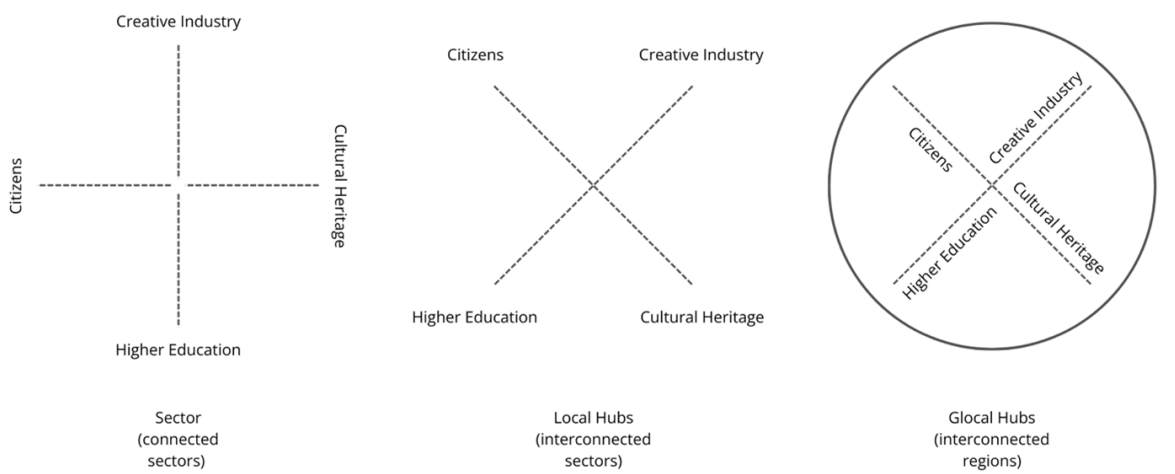

Figure 1 The Collaborative Connections between Sectors. Authors own illustration.

Table 1 Data from the five cultural game jams. The data were collected through questionnaires before and after the event, as well as through interviews with participants during the events.

Event	CGJ0	CGJ1	CGJ2	CGJ3	CGJ4
Organisers Cultural heritage	ARoS – Aarhus Art Museum (CHI)	ARoS – Aarhus Art Museum (CHI)	ARoS – Aarhus Art Museum (CHI)	ARoS – Aarhus Art Museum (CHI)	ARoS – Aarhus Art Museum (CHI)
Games	Filmby Aarhus (CI)	Filmby Aarhus (CI)	Filmby Aarhus (CI)	Filmby Aarhus (CI)	Filmby Aarhus (CI)
Research	Aarhus University (HEI)	Aarhus University (HEI)	Aarhus University (HEI)	Aarhus University (HEI)	Aarhus University (HEI)
Civic	X	X	Aarhus Youth Advisory Board (YC)	Aarhus Youth Advisory Board (YC)	Aarhus Youth Advisory Board (YC)
Venue	Filmby Aarhus	ARoS – Aarhus Art Museum	ARoS – Aarhus Art Museum	ARoS – Aarhus Art Museum / Filmby Aarhus	ARoS – Aarhus Art Museum / Filmby Aarhus
Duration/Time of CGJ	1 day (2023)	2 days (2024)	2 days (2024)	5 days (2025)	7 days (2025)
Facilitators	2 technical facilitators for game-making	2 art guides for culture-making (curators); 4 technical facilitators for game-making	2 art guides for culture-making (curators); 4 technical facilitators for game-making	2 art guides for culture-making (curators); 3 technical facilitators for game-making	2 art guides for culture-making (curators); 2 technical facilitators for game-making
Number of youth participants	40 (from upper secondary high school)	23 (mixing upper secondary high school, vocational education, higher education)	39 (mixing upper secondary high school, vocational education, higher education)	45 (from Digital Design, BA, higher education)	61 (24 from Digital Design, MA; 37 from Computer Science, MA, higher education)
Age Distribution	17-18	15-27	14-25	20-32	22-28
Gender distribution	N/A	F: 7 M: 10 Other: 6	M: 18 F: 16 Other: 5	F: 27 M: 18 Other: 0	F: 27 M: 32 Other: 2
Number of game prototypes/ concepts	7	5	9	11	18
Game Engine	Godot	Unity/Godot	Unity/Godot	P5 Play	Unity
Recruitment	Closed	Open	Open	Closed	Closed
Jam Characteristics	Rapid 6-hour pilot game jam format. Cultural emphasis on historic artworks.	48-hour game jam format. Cultural emphasis on historic artworks.	24-hour daytime game jam format. Cultural emphasis on modern artworks.	Five-day continuous daytime game jam format for DD students. Cultural emphasis on modern, installation artworks.	A seven-day daytime slow jam spread out over two months for DD and CS students. Cultural emphasis on historic artworks.

real-time ethical tensions in participatory encounters (Frauenberger et al., 2017), highlighting care, responsiveness, and trust as guiding principles for their actions. Recognising youth as epistemic partners, the project emphasises shared ownership and the co-creation of both design processes and outcomes.

Integrating civic society and youth as the fourth helix in both processes and outcomes addresses ongoing debates regarding the definition, agency, and empowerment of this dimension, aligning with approaches that emphasise youth becoming more than end-users (Hasche et al., 2020) towards wider, integrated, agentic, and communal involvement. By embedding youth voices and values into the design process of CGJs, participatory ecosystems aim to evolve into dynamic, ethical, and generative environments that foster inclusive cultural innovation. The table below displays the thematic, organising, and participant characteristics of the pilot jam and the four game jams analysed:

4.1. Retrospective Analysis: Evaluating & Iterating Game Jam Interventions

Drawing on Edelson (2002), Cobb et al. (2003) argue that a key aspect of researching design experiments is conducting a retrospective analysis of iterative processes to develop a deep understanding of the phenomenon under investigation. Edelson (2002) emphasises that, as in sound design, a tightly integrated process of design, evaluation, and revision enables designer–researchers to identify gaps in their understanding of the design context and to refine their analyses accordingly. This highlights the value of a process-based approach that traces the development of understanding through iterative cycles of learning and reflection. Addressing the methodological and reporting challenges of DBR, Collins et al. (2004) provide retrospective, descriptive analyses of two cases to illustrate how iterative design experiments evolve over time and how changes across iterations can be meaningfully interpreted. Building on these methodological insights, this paper adopts a similar processual, descriptive, and retrospective approach to analyse the iterative evolution of design interventions, tracing how problems, practices, and solutions shifted across successive cycles in the iterative interventions of five CGJs from 2023 to 2025. In DBR, retrospective analysis is framed as the process after a design experiment, an evaluative and reflective process that may lead to prospective design choices and refinements (Bakker & van Erde, 2015; Gravemeiier & Cobb, 2006), which here translates to the iterative retrospective analyses conducted after each intervention as abductive thematic analyses to refine the subsequent intervention (Komatsu et al., 2025), and for this cross-cutting retrospective analysis in the present paper. Consequently, the initial retrospective analyses provided actionable insights for refining the interventions, while the last emphasised theory development, with both outcomes integral to DBR (Barab & Squire, 2004; Cobb et al., 2003; McKenney & Reeves, 2019).

The analysis examines the evolution of CGJs – from an initial pilot to four design interventions – exploring how they were repeatedly evaluated and redesigned to enhance inclusion and well-being, and how stakeholder collaboration informed each iteration. A key part of this was the process of forming Youth Advisory Boards (YABs) as an extension of the CGJ initiative, which took place across three European

countries participating in the project. In the quadruple helix innovation ecosystem (Carayannis et al., 2022), civic society is approached as an equal stakeholder. In this case, the project invites youth into epistemic and practical partnerships (Criado & Estalella, 2018) to jointly problematise, critique, and co-create the direction and ethos of the interventions.

The theoretical perspectives and questions – inclusive, pluriversal, and transversal – are not used herein to prescribe the design of interventions, but rather to interpret their evolution toward more participatory, inclusive, and empowering practices. Throughout iterative analysis and feedback, questions of participant equity, agency, diversity, inclusivity, and differences were prominent, prompting us to explore the three design lenses as approaches to understanding and qualifying game jam interventions. In this sense, the lenses are motivated by abductive analytical processes, stemming from inductive analysis and feedback throughout the iterations. An abductive approach involves a dynamic interplay between theory and empiricism, enabling the researcher to pursue unexpected and surprising findings. This mode of knowledge production, grounded in both personal and collective experience and systematic inquiry, foregrounds researcher reflexivity in navigating research complexity and articulating the design processes (Ejsing-Duun & Skovbjerg, 2019).

5. From Crunch to Care in Cultural Game Jams

We begin the analysis by examining the gradual and deliberate shift from accelerated "crunch-style" game jams to slower, more accommodating formats. Motivated by the need to support diverse youth participation and well-being, this transformation illustrates how design choices informed by inclusive and caring principles can foster broader engagement and reduce exclusionary barriers. Rather than arriving fully formed, the CGJs took shape through iterative experimentation, reflection, and reorientation – both locally and through international influences from other cultural hubs that were testing the same interventions and methodologies. Across the first four iterations – and an initial pilot intervention – the format moved from highly time-constrained, pre-structured events towards more open, situated, and co-created spaces for youth participation. This processual shift reflects not only logistical and pedagogical adaptations, but also a more profound ethical rethinking of design as something done with participants, not for them.

CGJ#0: The Compressed Pilot

The initial CGJ was a trial run: a six-hour event involving 40 upper secondary students from a design and innovation course hosted in a mixed reality lab at a creative industries venue with artwork representations brought by the museum partner. While it generated energy and creativity, the pilot testing also revealed apparent limitations (Eriksson et al., 2024a). The compressed timeframe and dense instructions led to cognitive overload for many participants, as they expressed during brief on-the-spot interviews and as observed throughout the day, particularly those unfamiliar with game design or digital tools. Although the format encouraged group work and playful engagement with cultural heritage materials, e.g., through a developed toolkit of methods and approaches for creating cultural games, it tended to favour already confident participants and fast-paced production over reflection,

dialogue, and inclusion. Nevertheless, this pilot intervention also highlighted the format's potential to engage youth creatively and deeply with local cultural heritage, utilising game design as a collaborative medium and fostering interaction among them. Notably, the organisers – comprising cultural heritage institutions, the creative industry, and higher education – discussed and recognised the inclusive design gaps it exposed, particularly regarding accessibility, pacing, meaningful communication, and onboarding. These insights formed the foundation for the subsequent rethinking of the format, leading to the first larger-scale cultural game jams.

CGJ#1: A Shift Towards Dialogue and Youth Involvement

The format of CGJ#1 was substantially different, though it emphasised the "traditional" game jam format of accelerated, 48-hour, intensive collaborative game ideation and development, both during the day and at night, culminating in a final EXPO (exhibition) of the created game prototypes and concepts (see Figure 2). Held at a local art museum, the CGJ engaged 23 youth participants in five working groups from different educational and cultural backgrounds in examining cultural heritage while innovating games based on it.

The overarching cultural theme centred on older, golden age national artworks. Art facilitators guided participants in actively exploring and interpreting diverse cultural heritage artworks within the permanent exhibition 'Human Nature' (Holflod & Nørgård, 2024a). Moreover, the theme of "Human Nature" was examined through four distinct thematic rooms in the exhibition, titled "Philosophy", "Religion", "Exploration", and "Landscape", with a shared focus on a collection of artworks that explore how humans become and belong across different times and places. Participants were recruited through broad, open channels, i.e., free-for-all within the target age group (15-27; with one participant aged 27), resulting in substantial diversity in participants' age and gender identities (Eriksson et al., 2024b; Holflod et al., 2024). At the final EXPO, five cultural game prototypes were presented that, in various ways, addressed and reinterpreted cultural heritage through value-sensitive design, emphasising EU values and incorporating their own civic, youth voices, and concerns. As such, the CGJs adopt a unique approach to game jams, blending art, games, and values while emphasising the exploration of cultural differences. One youth participant noted:

> "One of the things that comes to my mind first is the cultural differences. I could clearly feel who came for the traditional game jam experience and who came with curiosity about what this might be. I might also be influenced by the fact that I've never been to a game jam before. I know many people who have – and have described the process. So, I could sense: Okay, this is something else."

A "kit," including ideation cards, role descriptions, and value-based prompts, supported the jam activities throughout the event. This kit (Nørgård & Holflod, 2024) was designed to lower the barrier to entry and offer multiple pathways into the design process through various methods connected to design, cultural heritage, and games, enabling multiple interests and abilities to be recognised and supported. Although the kit supported and scaffolded collaborative processes,

Figure 2 CGJ1 - Left: Early version of the design kit. Middle: Youth jamming with cultural heritage in the museum. Right: preparing for exhibition of the game.

frequent feedback gathered through on-the-spot interviews, participatory observations, and post-event questionnaires revealed that it was too comprehensive and that the youth would benefit more from a simpler, more transparent kit (Eriksson et al., 2024b). Additionally, the feedback specifically highlighted the "crunch" mode of the jam, particularly the emphasis on speed, the condensed 48-hour process, the final output, and the intense collaboration under time constraints. This "crunch" mode, as highlighted by youth feedback, underscored the ongoing tension between productivity and inclusion, revealing how some participants struggled with the accelerated pace. Importantly, CGJ#1 began to open up the *pluriversal* design question, and thus how game jams might become co-creative and *diverse* design spaces, where youth are empowered to preserve and innovate cultural heritage, designing games through and within diverse personal and cultural worlds, and engage the jam as an exploration of their youth voices, values, and agency (Karadechev et al., 2024). However, despite engaging with diverse participants and their interactions with both human and non-human aspects of tangible cultural heritage, relational design ontologies, which encompass how participants relate to one another, the space, and the design process, were only partially developed. Moreover, during this jam, the organisers informed the participants that they were eager to explore how to develop a youth advisory board – and that this would be an opportunity for direct influence and epistemic partnerships on a large-scale research and innovation project.

CGJ#2: Facilitating Difference, Supporting Care

CGJ#2 marked a distinct shift in the design and ethos of the CGJs. While still recognisably a game jam, the format was slowed down, softened, and made more open-ended. Including a former CGJ participant as a co-organiser and co-facilitator, and establishing a formal *youth advisory board*, introduced pluriversal and transversal mechanisms. Young people were not only participants but also co-designers of the jam itself, supporting creative and collective emergence across generational, cultural, and sectoral differences.

The second CGJ followed the broader experiences and formats of CGJ#1 (Holflod & Nørgård, 2024b), featuring a short and compressed timeframe, albeit with no nighttime coding

and a more relaxed pace for the event and its processes, learning from the feedback and recognising the many people, experiences, and worlds present in such events (see for example, Kerr et al., 2020). Specifically, CGJ#2 occurred during the daytime on a weekend several months after CGJ#1. Based on feedback from CGJ#1 and internal evaluations with the newly established YAB, several key changes were implemented that significantly altered the event setup and processes: the addition of a youth participant from CGJ#1 as a co-organiser, who became part of and assisted the hub leader in establishing and nurturing a youth advisory board that would contribute to the design of future CGJs, including CGJ#2. Initial observations from the project's early stages revealed significant imbalances in participation. While young people attended CGJs as cultural interventions, their involvement in shaping the direction, methods, and outcomes of these events was limited. This marked the onset of a more sustained effort to engage youth as both participants and co-creators of the jam designs and experiences, aiming to strengthen both agency and belonging and explore shared and different identities. As noted through the observations, the CGJ became:

> "… a platform for the youth to explore and express their cultural, collective, and personal identities. As they interact with the art and one another, they share stories about their backgrounds, fostering a sense of belonging and becoming someone or something. Participants talk about themselves and their motivations during the art walks, which indicates an emerging sense of community. This interaction enabled them to connect with their peers and the cultural heritage represented through the artwork."

The concept of participation expanded beyond "doing the jam" to include shaping its terms, tools, and tone. Drawing on earlier insights, the team this time focused more intently on the diverse needs of participants, including neurodivergent youth, those in vulnerable positions or bodies (Luck, 2018), individuals who were hesitant to speak in groups, and others who might not perceive themselves as "creative" or "game-literate." Now better prepared through prior experience and shared planning tools, facilitators were encouraged to cultivate a safe, responsive, and gently structured atmosphere.

At this time, the emerging formation of YABs across three countries disrupted conventional hierarchies in quadruple helix exploration and innovation. Mainly composed of former CGJ participants, the boards provided infrastructure for youth-led co-creation. For instance, one YAB took the lead in revising the original CGJ Playbook (kit) between CGJ#1 and #2. What was once a facilitator-led instructional document was transformed into a modular, flexible tool that encouraged participants to adapt methods and practices to their group's specific dynamics and needs. The revised Playbook shifted the facilitator's role from a directive teacher or consultant to a responsive guide, promoting a more distributed and caring mode of engagement. This reframing of tools and roles exemplified the project's relational and co-creative ethos, enabling a slower and more inclusive rhythm of participation. As one youth participant reflected, this shift also called for a reconsideration of what cultural game design could be:

> "And so, there is something about it that there are some differences in the jam. That is, to develop or think about games in a new way – not just because

> they are fun or entertaining, but because they do something to the culture, for better or worse, or transform it, or whatever it does. Then perhaps we need to think of some other processes. But with that said, it is also a somewhat exploratory process for us to find out what approaches and methods make sense of this so that we can bring our backgrounds and curiosity into play in different ways and for it to be a good process."

The YAB played a vital role in critiquing and revising the existing "kit" of design, cultural, and value-sensitive methods. Their contributions aimed to promote more transparent, accessible, and inclusive communication. As a result, CGJ#2 strengthened the project's inclusive focus during both the preparatory stages and the event itself. This entailed a deliberate effort to recognise and accommodate the diverse lived experiences, bodies, and worlds that participants bring to such events. The design approach supported broader participation by enabling multiple forms of engagement and offering participants different paths and orientations to choose from freely. This flexibility contributed to youths' experiences of agency. As one youth participant described:

> "[I had] Expectations of a social and collaborative experience – of something fun and joyful. The idea of creating something new, a game idea or concept that brings together something exciting and inclusive, with a large emphasis on inclusive processes and dimensions."

Quiet spaces, modular kits, inclusive design methods, and one-on-one facilitation all supported various ways of being and contributing together. Here, *inclusion* was not merely about adding accessibility features, but about a fundamental reconfiguration of the jam environment and process, enabling diverse modes of participation and engagement. The setting, within the local art museum and utilising multiple rooms and spaces, was intentionally designed based on feedback from youth participants and their involvement in iterating the CGJ. This included quiet zones for reflection and discussion, name badges and a clear pronoun policy, spacious rooms for active collaboration, flexible zones for testing and presentation, a respectful photography policy requiring explicit consent, inclusive food and drink options, and the preparation of both analogue (e.g., handouts) and digital versions of all key information, processes, and materials. Teams were encouraged to define and negotiate their own roles and set their own pace. At the same time, facilitators adapted their involvement by stepping back or offering individualised, one-on-one support rather than defaulting to group instruction. A small, redesigned booklet, developed in collaboration with the local YAB, introduced the jam, its purpose, and values in a transparent, respectful, and welcoming tone, particularly for newcomers. This booklet served as a revised version of the design kit, emphasising accessibility and relevance.

In this way, *inclusion* was reconceptualised not as "adding diversity" to a predefined structure, but as the ongoing cultivation of an environment in which multiple, legitimate ways of participating were actively supported and made visible. Additionally, CGJ#2 introduced a dedicated digital communication space via the platform Discord to support onboarding,

coordination, and dialogue throughout the jam. This new pacing and infrastructure fostered a shift in atmosphere: the jam was no longer perceived as a race towards a polished product, but as an open invitation to explore shared concerns, local stories, and plural values through playful media and creative reinterpretation.

CGJ 3-4: Jamming Slow and Opening Futures

With CGJ#3 and CGJ#4, the format evolved into a more relational, open-ended, and glocal (both local and trans-local) design ecosystem, see Figure 3. These later jams unfolded across different times and spaces, taking place within educational settings, cultural heritage institutions, and creative industry environments locally in three European countries, both with shared themes, approaches, digital environments, and transnational YAB feedback. This expanded setup allowed for extended temporalities and diverse spaces for reflection, experimentation, and iterative development.

Unlike earlier iterations, these jams were deliberately stretched over extended periods and dispersed across multiple locations, providing participants with greater room to explore and refine their ideas and contributing to the creation of a more inclusive jam process (Abbott et al., 2023). CGJ#3 spanned five days across various venues (Holflod & Hansen, 2025). In contrast, CGJ #4 adopted a "slow jam" model, unfolding over two months with weekly design workshops, presentations, designCRITs, and check-ins (Holflod et al., 2025). By this stage, the CGJ format had matured into a versatile, structured yet improvisational framework. *YAB members took on expanded roles*, co-developing the design briefs and facilitating and communicating tools, co-leading the jams, and mentoring peers throughout the process. This marked a critical shift: young people were no longer just included in the process; they were helping to shape and co-own it. In doing so, they became more than end-users; they emerged as active contributors within the quadruple helix innovation ecosystem, addressing the key challenge, identified by Hasche et al. (2020), of enabling meaningful public sector participation in such collaborations.

This iteration also saw a more developed approach to *onboarding,* following up on the iterative design of materials, kits, and communication environments. The third CGJ was facilitated by visits and processes at the cultural heritage site, the creative industries, and the university, which were also part of CGJ#4, just spread out over a longer period. These encounters enabled more grounded, personally relevant engagement, particularly for participants less familiar with game design or gaming. The design kits were now richer, but also more legible: simplified guides, translated prompts, and thematic cards that helped participants connect game-making to issues they cared about, ranging from climate justice to social inclusion. Significantly, the jam's facilitation culture had shifted. Instead of relying on predefined roles or tasks, facilitators responded flexibly, fostering an environment where young people felt recognised, supported, and taken seriously in their creative pursuits. Finally, the third and fourth CGJs were not only local but also shared themes, communication environments, and youth advisory board integration across three countries, thus marking a *glocal* approach that expanded the international and cultural diversity of the CGJs.

In CGJ#3-4, the youth's role transformed once more, *from participants and advisors to mentors and co-facilitators*. A new question emerged: *how can game jams nurture moments of relational friction, mutual hesitation, and collective emergence, allowing diverse participants to co-create across differences and imagine otherwise together*? This development aligned with the transversal ideal of flattening hierarchies and reconfiguring expertise, enabling youth to operate within a distributed ecology of roles and responsibilities. The onboarding tools and kits became more modular, clearer, and responsive, informed by prior feedback and co-developed with youth. Significantly, the jam's culture changed from achievement to care, co-presence, and meaning-making. Furthermore, YAB members increasingly assumed facilitation and leadership roles during the CGJs themselves. At the latter events, youth representatives played a pivotal role in shaping the jam experience and setting the tone for engagement, supported by research, cultural, and creative industry partners working in solidarity.

The events featured intentional *infrastructural changes*, such as enabling and communicating retreat spaces, involving youth as co-facilitators, emphasising care and well-being, simplifying jam briefs and processes, and articulating goals more precisely, all of which emerged directly from youth feedback. These changes reflected user-centred design practices and demonstrated a structural rebalancing of authority and care in facilitating cultural co-creation. Such rebalancing can be related to inclusive design, posing a question of *how we might design structures, tools, and rhythms of game jams to support meaningful participation and agency for those who are often marginalised in fast-paced design cultures*. The answer was not merely representational inclusion but infrastructural empowerment, shifting who participates, how, and under what conditions. This reconfiguration extended to the project's overall governance structure. Representatives from each cultural hub's YAB were invited to oserve in the project's transnational advisory board, where they contributed as equal partners alongside senior experts in innovation, participatory design, and cultural heritage. In this space, youth brought situated insights informed by youth culture and social engagement practices, contributing not only to CGJ development but also to broader questions of cultural strategy, dissemination, and innovation policy. This approach exemplifies what Morgan (2016) has identified as a key imperative for empowering initiatives: the need to include youth voices and structurally amplify and empower them through meaningful participation in governance and strategic decision-making. The developments through this project embody this imperative, seeking to advance a participatory logic that resists tokenism in favour of participatory agency and shared ownership (Nørgård & Holflod, 2024).

Across the pilot and the four iterations, the CGJ format thus gradually shifted *from a focus on pressure and performance towards one on care and co-creation*, particularly when considering the temporal and spatial elements of the format. Related to pluriversal design perspectives, this raises the question of how *game jams can be reimagined as spaces of situated co-creation, where diverse cultural imaginaries and relational worldviews inform not only what is designed but also how and why.* This progression was not linear, nor devoid of tensions, but rather a cumulative process of learning to design with difference in mind and a growing commitment to enabling diverse

forms of agency, expression, and belonging, and acknowledging the multiple worlds present in such events that are part of world-making (Escobar, 2017). However, with the initial two CGJs emphasising open recruitment and the latter two testing the approaches in educational recruitment environments, age and gender diversity decreased, while international diversity increased.

However, new limitations emerged: the shift to educational settings and structures reduced some demographic diversity. While international diversity increased both locally, with the presence of international students, and globally, through shared jam collaborations across cultural hubs, the breadth of local participation may have narrowed. Moreover, while the initial two CGJs had the benefits of open recruitment and thus stronger intrinsic motivation to explore culture, game design, new relations, and new communities, the latter two within educational structures had a significant external motivation as part of the higher education programs, thus representing tensions between the autotelic and telic nature of such events. Accordingly, the CGJ serves as a participatory intervention and a living example of how inclusive, pluriversal, and relational design practices can evolve through reflection, experimentation, and the willingness to be transformed by those we seek to engage.

Youth as epistemic and practical civic partners played multiple, intersecting roles in the design of processes, collaborations, and events: as co-designers of methods and materials, as facilitators and cultural brokers during CGJs, as contributors to ethical, aesthetic, and infrastructural changes, and as co-governors of the overall participatory strategies. Their role was not additive but transformative, shifting the logic of the CGJs from adult-driven intervention to youth-enabled co-design and ownership. By empowering youth to design the systems and structures through which cultural participation is organised, this paper frames a mode of participatory world-making: one that affirms youth not as the future of culture, but as active agents of its present transformation.

Consequently, these examples illustrate that recognising youth as co-creative, equal partners is not merely a progressive rhetorical gesture but a necessary reorientation of participatory and cultural design. The YABs function as governance

Figure 3 CGJ3 – Left: parts of the design kit in action. Middle: Youth pitching game idea and getting feedback in expert council. Right: Youth exhibiting games at the museum.

tools and pedagogical infrastructures, enabling young people to articulate their desires, address inequities, and shape futures through collaborative and situated, practice-based design and participation ethics (Antle et al., 2020; Frauenberger et al., 2017). By embedding youth in every phase of cultural production – from ideation to evaluation, from the local to the transnational – these models open new possibilities for inclusive innovation.

6. Discussion: Designing with Ambiguity through Inclusive, Pluriversal, and Transversal Questions

This section discusses and synthesises how the three design lenses foreground different yet complementary values, processes, and questions. We propose a set of guiding design questions derived from the retrospective analysis, providing a framework for game jam practitioners and researchers seeking to support equity, care, and empowerment. Finally, we reflect on the value of embracing ambiguity and tension in participatory design processes, arguing that doing so can open up possibilities for more just and creative futures in game jam design.

Inclusive Design

Design question: *How might we design structures, tools, and rhythms of game jams to support meaningful participation and agency for those who are often marginalised in fast-paced design cultures?*

Initially, the CGJs focused on inclusion by recruiting a diverse group of youth and ensuring their access to opportunities. Over time, this shift occurred as inclusion and participatory agency were embedded in the iterative design of processes, environments, events, and roles. Youth moved from passive users to active co-creators. Jam formats adapted to support varied participation rhythms, and facilitation practices emphasised pacing and responsiveness. This iterative process revealed inclusion as a dynamic, context-dependent practice shaped by time, space, and conditions rather than a fixed goal.

The development of YABs marked a key *shift from representational inclusion to infrastructural transformation*. YABs positioned youth as co-creators, facilitators, and contributors to governance, thereby distributing agency in meaningful ways. For example, one YAB transformed facilitator-centric toolkits into modular, flexible resources that invite contextual adaptation and shared ownership. Jam formats became more open-ended and responsive, introducing retreat spaces, transparent communication, and co-facilitation roles informed by youth feedback. This ongoing, reflexive, and abductive redesign demonstrates that meaningful, agentic participation necessitates time, care, and a willingness to share control. Inclusion remains contingent on institutional support, facilitator attitudes, and temporal constraints, highlighting that inclusion is best understood as an ongoing design ethic grounded in agency, responsiveness, and infrastructural care.

Pluriversal Design

Design question: *How might game jams be reimagined as spaces of situated co-creation, where diverse cultural imaginaries and relational worldviews inform not just what is designed, but how and why?*

Through successive iterations, *CGJs increasingly operated as pluriversal spaces*, as sites where youth engaged with cultural heritage not as static content, but as something to interpret, question, and transform. The jams became venues for reimagining heritage through personal narratives, collective memory, and locally embedded perspectives. Youth drew on their lived experiences, social practices, and cultural references to explore how games might reimagine, preserve, and innovate cultural heritage. The YABs further amplified this by bringing relational worldviews into the heart of the design process. Their facilitation practices foregrounded collective care, their reflections challenged normative framings of game design, and their participation in governance brought youth culture into strategic deliberations. In short, they co-created *how* and *why* games were made, not just *what* was made.

Yet, pluriversal practices also revealed their limits. Deep cultural frictions, epistemic asymmetries, and tensions between institutional logics and alternative ways of knowing were present, though not always resolved. CGJs began to address these tensions, inviting more plural design ontologies, but full engagement with, for example, decolonial, feminist, and non-Eurocentric frameworks remains emergent. Thus, pluriversal design in CGJs asks us to see design not as the implementation of known methods, but as the co-creation of meaning and method, informed by the plural, situated knowledges of participants themselves.

Transversal Design

Design question: *How might game jams nurture moments of relational friction, mutual hesitation, and collective emergence, allowing diverse participants to co-create across difference and imagine otherwise together?*

The CGJs became spaces where *transversal encounters could emerge across generations, sectors, and epistemologies*, meaning creating conditions for co-becoming and resisting stereotypical (sectoral and hierarchical) categories. Perhaps most transformative was the CGJs' capacity to facilitate encounters across difference, not by smoothing over conflict, but by creating conditions for mutual hesitation, vulnerability, and co-becoming. Through iterative co-design, distributed agency, and reflective formats, the CGJs created threshold spaces where participants could collectively envision alternative possibilities. These transversal qualities, however, depend on the careful curation of time, facilitation, and institutional support, which are often fragile or under-resourced in practice.

YAB members played a key role in fostering these transversal dynamics. As cultural brokers, facilitators, and vital contributors, they enabled conversations that might not have otherwise occurred between youth and adult partners, local and transnational actors, and informal and institutional worlds. The transnational YAB and its role in the project's advisory board further enabled transversal design at scale, creating

cross-border dialogues that enriched the preparation and evaluation of CGJs' cultural, pedagogical, and political ambitions.

Such transversal processes are inherently fragile: they depend on creating opportunities for moments of sharedness across worlds, supportive processes and institutions, and working across and beyond disciplinary and professional languages and knowledges. However, they also open spaces of shared imagination, where game jam design becomes a medium for thinking, feeling, and becoming otherwise together. Transversal design thus reframes game jams as practices of designing *with* friction rather than against it, inviting moments of rupture, mutual learning, and imaginative possibility.

6.1 Designing with Ambiguity in Relational Design Ecologies

Rather than resolving the three guiding design questions, the processes surrounding CGJs, the emerging partnerships, and the youth's civic role deepened and entangled them, transforming them from problems to be solved into orientations to be lived with. Inclusive, pluriversal, and transversal design did not emerge as fixed endpoints but as evolving design orientations and questions that require constant negotiation and reflexivity: ways of staying with complexity, cultivating care, and enabling situated co-creation (Escobar, 2017; Holflod et al., 2024; Hsu, 2021). This entails the mindful and reflexive design of time and space, the pacing and planning of events, and the inclusivity and accessibility of places and spaces, as also argued by Kerr and colleagues (Kerr et al., 2020).

Through iterative interventions, including the establishment of Youth Advisory Boards (YABs), the redesign of materials, processes, and tools, and infrastructural adaptations, the CGJs explored and enacted these orientations in tangible and pedagogically meaningful ways (Eriksson et al., 2024b; Eriksson et al., 2025; Nørgård & Holflod, 2024). These interventions were not merely additive; they were transformative, shifting the logic of participation from inclusion as access to inclusion as agency (Collier, 2020; Luck, 2018). Such reconfigurations align with critical calls to design with, rather than for, marginalised participants (Pettit, 2012; Morgan, 2016; Sol, 2019). In embracing ambiguity, the CGJs resist closure, becoming environments and spaces where design remains open-ended, shaped by the relational dynamics of each context and the lived experiences of youth participants. This openness and ambiguity were not a lack of direction but a deliberate stance: a refusal to instrumentalise inclusion, a commitment to epistemic plurality, and a recognition that collective creativity often emerges through friction, hesitation, and mutual transformation (Beighton, 2018; Scheel et al., 2019).

What remains unanswered are questions about long-term impact and sustainability: Can CGJs continue to act as generative infrastructures for co-creation and inclusion beyond the initial project funding? What forms of institutional anchoring and pedagogical translation are required to scale such plural and relational formats within broader education, heritage, industry, and civic innovation ecosystems? And how can these models retain their ambiguity and responsiveness without being diluted, co-opted, or reduced to replicable templates? Finally, in game jam research and theory, more fine-grained insights into the design and development processes

of such jams are crucial for illustrating connections between design and outcome, as well as for disseminating the collaborative processes involved in planning and evaluation, which are equally vital parts of the process.

6.2 Limitations and Future Plans

As Barab & Squire (2004) argue, DBR aims to openly disseminate and problematise the tested designs, experiments, and implementations to offer insights into local dynamics and contexts, with this paper providing a retrospective analysis of the iterations and design refinements of a specific intervention. However, it also involves several limitations, both general and specific to this paper. While this paper does not provide a formal evaluation of outcomes (e.g., youth empowerment measures, diversity metrics, and participant satisfaction), which could have strengthened it, another limitation concerns the breadth of diversity among the young participants, affecting the pluriversal perspectives. All five CGJs demonstrate gender equality compared to more traditional game jams. While the second CGJ incorporated a broader range in identifying gender diversity and, to some extent, marginalised groups, and the fourth CGJ included nationalities, we are still missing many parameters, such as marginalised and Indigenous participants. Acknowledging these limitations, we propose that future work further investigate factors such as longitudinal youth engagement, competence development, and cross-cultural comparisons.

7. Conclusion

Based on a retrospective analysis of the design of a series of five cultural game jams, the present paper suggests that designing with and through inclusive, pluriversal, and transversal questions is not about reaching a final, optimal format, but rather about cultivating ongoing responsiveness, reflexivity, and relationality. In this sense, game jams become less about designing games and more about designing processes and conditions for collective and cultural imagination, care, community, and world-making through game-making. They reposition inclusive innovation not as a deliverable, but as a relational practice: one that affirms ambiguity, centres civic agency and youth as co-designers of cultural and creative futures, and opens shared, indeterminate spaces for imagining more just, joyful, and jamming participatory futures *for all*. It is our hope that the inclusive, pluriversal, and transversal questions posed in this paper can inspire others who intend to design game jams with broader perspectives on equality and equity.

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K.H., E.E., and E.A.H. contributed to the design and implementation of the research, as well as to the analysis of the results and the writing of the manuscript. K.H. took the lead in drafting the manuscript. All authors provided critical feedback, revisions and helped shape the research, analysis and manuscript.

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