

Playful Participatory Mapping: Co-creating Games to Foster Systems Thinking

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Abstract: This paper presents a currently evolving hybrid research, teaching and public engagement methodology that uses game design principles and elements to overcome established limitations of participatory research methodologies and pedagogies (such as lack of transferability of findings and difficulties in comparing outcomes and datasets) through the inclusion of game design elements and a focus on systems thinking. Game design is inherently rooted in systems thinking, which has been highlighted a key competence in addressing the “wicked” problems and Sustainable Development Goals, a linkage which is still weakly explored by research. The paper will discuss the methodology’s theoretical groundings and inspirations, with a particular focus on linking participatory approaches, game design and Donella Meadows’s work on “Leverage Points” for systems-oriented interventions. The paper will then discuss how the methodology builds on and moves beyond established community mapping approaches by working with participants to progressively and co-creatively add more formalised game-like elements and dynamics (simulation, goal-setting, player-mapping, turn-taking, role-playing) that organically scaffold participants in moving towards more abstract systems modelling. Following an articulation of the process and its underlying theoretical framework, the paper will also present brief, reflective accounts of a number of experiments in playful participatory community mapping facilitated over a 18-month period, with diverse groups of participants across different countries engaging with the methodology and informing its evolution. These accounts will showcase how the game design lens has allowed participant communities to develop systems thinking and engage in systems mapping, moving from materially grounded and culturally relevant categories towards more systematised models, which include possible, practical “leverage points” for intervention. The paper will reflect on the process and the outcomes of these engagements, and on their influence in further developing the methodology itself, showcasing the potential of playfulness and gamefulness as powerful bridges between thinking locally and acting globally.

Keywords: systems thinking, co-creation, game-based learning, workshop.

1. Context & Inspiration

In the last decade, the debate about the societal role of universities in globalized societies has itself taken a very gamelike form, emphasising mainly competitive “games”. League tables, marketisation and human capital theory have framed higher education (HE) as a positional good for both nations and individuals, assumed to enable them to acquire a competitive advantage on the global market, individual “players” trying to win competitive games (Marginson, 2004; Morini, 2020; Morini, 2021). This framing forecloses the autonomy of learners in these competitive games that they have not designed, and therefore the development of a pluralistic but shared sense of planetary citizenship (Fornasa & Morini, 2012; Kern & Morin, 2014; Moraes & Almeida Freire, 2016), defined as critical, active, and reflective participation in the complex entanglements of planet-wide socio-economic and ecological systems. This article argues that we need to envision and play different games to survive our current crises, and that we might as well do it literally by taking the active stance of game co-creators, both requiring and scaffolding the development of systems thinking.

Systems thinking is, within the context of this article, defined as the capability to collectively analyse complex systems across different domains (society, environment, economy, culture, health) and different scales (local to

global), considering cascading effects, feedback loops, emergence and other systemic features (Dubberly, 2014). Systems thinking's influence on learner participation in action-orientated change remains under-explored in educational research and is still broadly unaddressed in HE curricula (Benson, 2007; Feldmann-Jensen et al., 2019), despite having been increasingly highlighted as a necessary form of literacy (beside reading/writing, numeracy, digital literacy) to enable learners to meaningfully understand and respond to the interconnection of local and global crises (UNESCO, 2017).

The proposed approach, still in development and tentatively named YOUTHOPIAS (Youth Organising Through Playful and Participatory International Action Research and Systems thinking) aims at exploring how local and global systemic dynamics can be fruitfully problematised through playful approaches to teaching and learning, to promote the systems thinking required to build the sustainable and inclusive social ecosystems. YOUTHOPIAS is inspired by ambitious conceptual and practical experimentations in systems thinking from the '60s and '70s, such as Stafford Beer's CyberSyn project (a decentralised control system for the Chilean economy; see Espejo, 2014), Buckminster Fuller's World Game™ (a simulation built to anticipate and address global logistical scenarios; Fuller, 1969) and Howard Odum's Macroscopic (a set of conceptual tools, methods and techniques by which to understand very large systems – conceptually mirroring the microscope; see Odum, 1971).

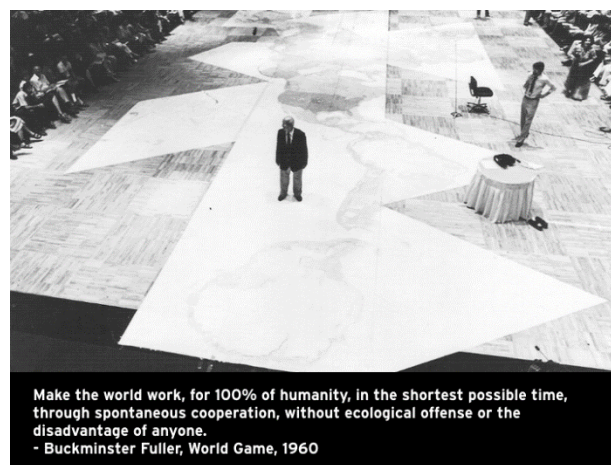


Figure1: Fullers's World Game

All of the above were attempts to make large systems readable and open to democratic organising, attempts which fell short due to both historical contingencies and methodological shortcomings, notably an assumption that the expertise to address those challenges is mainly located in (and owned by) academia and/or central governing bodies. The paper instead articulates the exploration of a more grassroots paradigm of HE research-intervention, using participatory, co-creative, culturally relevant, and playful pedagogies under the principle of systems thinking. YOUTHOPIAS moves therefore beyond those inspirations by leveraging 21st Century sensibilities and developments in intercultural education, in the methodologies of the social sciences, and in the design disciplines. On a practical level, this involved a pilot series of hybrid workshops held with local co-facilitators across Brazil, Malaysia and UK, engaging university students from plural disciplines (informing the intended transdisciplinary scope) and local youth, with the purpose to further develop the methodology through joint reflection on the co-created artefacts and on participants' engagement.

2. Systems Thinking and Games

YOUTHOPIAS explores the opportunities provided by the medium of play and games for engagement with systems thinking through design and cocreation (Gee, 2006; Zimmerman, 2008; Ito et al., 2010; Morini, 2013). In itself, the emphasis on the educational value of game co-design is part of a growing literature (e.g., Kangas, 2010; Kafai & Peppler, 2011; Arnab, Clarke & Morini, 2019), but still represents a relatively secondary perspective in the discourse of game-based learning, and one which we intend to re-centre here. YOUTHOPIAS in fact moves beyond a broad emphasis on co-design, emphasising the tension and interplay between two central aspects reflecting the useful dualism that the English language articulates between "play" and "game":

- The idea of "play" places the player's autonomy at the centre (albeit in a relational dimension with other players and the game itself), as articulated by De Koven (2013). The emphasis on "play" (often sidelined in the game-based learning literature) therefore translates into an emphasis on conceptualisation, modification ("modding"; Sotamaa, 2010) and co-construction of games as social and cultural activities.

- The idea of "game", on the other hand, emphasizes the examination of the formal elements that make up a playful artefact or activity: rules, information, objectives, mechanics, feedback. In particular, focusing on the "game" aspect allows participants to explore the conceptualisation, modification and construction of formal systems.

The first aspect, that of play / socialization / culture, is particularly important when co-design is carried out in communities marginalised on a socio-economic and cultural level, and where cultural relevance (Ladson-Billings, 1995) becomes central. Maintaining an element of freeform playfulness ensures a meaningful and rooted involvement in local needs and perceptions. The literature in this area is still limited but growing, and it is important to highlight how many contributions come from communities with a strong history of colonial subordination (LaPensée, 2019; Minoi et al , 2019; Miner, 2022), possibly as a result of having directly experienced being forced to follow rules and objectives imposed from outside (see Oliveira Andreotti et al., 2015, exemplifying different conceptualizations of coloniality in terms of rigged, harmful or meaningless games). The second aspect, explicitly linking games and systemic thinking, is still largely unexplored in current literature (some exceptions are Zimmerman, 2008; Young, 2016; Akcaoglu & Green, 2019) despite the fact that systems thinking is recognized as a fundamental requirement in the design of games of any genre (Tekinbas & Zimmerman, 2003). In order to synthetically articulate the generative connections between systemic thinking and playful/gameful thinking, a useful conceptual model is that of the "Leverage Points" for systemic change, proposed by Donella Meadows (1999), then more explicitly conceptualized in a playful way together with Sweeney and Meher (2010).

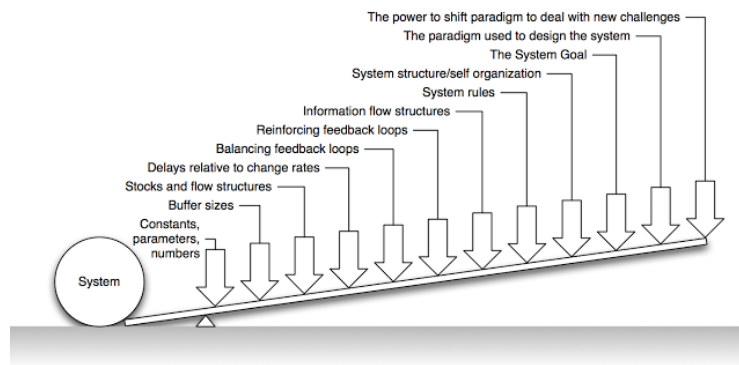


Figure 2: Meadows’s Leverage Points

In light of the previous arguments, it can be seen that most "leverage points" (feedback loops, information flows, rules, objectives, design) can be conceptualized in terms of key formal elements of a game co-design process, thus outlining a useful parallelism between the design / modification of play systems and the design / modification of ecological and social systems, while recognizing the important distinction between closed (playful) and open (socio-ecological) systems. As highlighted by other authors (Monat & Gannon, 2015), the exercises proposed by Meadows and co-authors, while representing a vivid example of the potential of this approach, remain extremely simplistic, mostly confined to a non-formalised and narrative level. This is probably due to a lack of familiarity of the authors with the modern developments of the medium, and therefore a lack of gaming literacy (Zimmerman, 2008). A deeper and more active involvement in the above-mentioned formal elements of game design allows, vice versa, to better appreciate the quantitative and counterintuitive aspects of systems behaviour.

As Pedercini (2017) argued, to co-create games is to think systematically about a problem. In urban studies, games including Monopoly and Sim City have achieved enduring popularity as entertainment and as educational tools (Schrier, 2021). Games such as Bay Area City Planner (Twu, 2015) and MultipliCity (Molleindustria, 2014) demonstrated the potential to engage communities in accessible and scalable discussions about their lived environment through tangible, simplified models of experiential scenarios, and informed YOUTHOPIAS choice to focus on engaging urban audiences. However, all the existing co-creation research and initiatives are centred around specific local communities, a missed powerful opportunity when the inherently systemic character of the game medium would be a privileged access point to initiate more abstract and comparative conversation about systemic dynamics.

These aspects, together, point at YOUTHOPIAS's core aim: to provide a blueprint for HE activities centred on planetary citizenship, community engagement and systems thinking, exemplifying an alternative way to conduct the three traditional core missions of education, research and societal engagement.

3. Developing a Methodology

Having outlined the broader theoretical background of YOUTHOPIAS, we will now outline some practical experiences informing its ongoing development. In the course of pilot hybrid workshops conducted before and after the critical phase of the pandemic, iterative versions of the YOUTHOPIAS approach have been used in collaboration with youth, students and academics in plural contexts and disciplines (newly arrived foreign youth, emergency management masters students and conflict resolution researchers in England; postgraduate students and teachers in sociology and educational sciences in Malaysia; students of a technical-tourism high school institute in Brazil).

The general methodological ethos of YOUTHOPIAS draws variously from Theatre of the Oppressed (Boal, 2013; Frasca, 2001), game design patterns and pedagogies (Bjork & Holopainen, 2002; Wanick & Bitelo, 2020), remix (Markham, 2016; Arnab et al., 2017) and speculative design (Mitrovic et al., 2021), with participants being facilitated towards creatively "playing out" local conflicts and concerns, and creating tangible models accessible to those unfamiliar with the specific context, conveying abstracted but culturally and experientially grounded models of local experiences and scenarios. Each instance of the process lasts ~2 hours and has 2 distinct phases (followed by a debriefing). The pilot workshops were facilitated over an 18-month period, with the main outputs being the co-created artefacts themselves and reflections generated by facilitators based on their experience of the workshop and interactions with participants. The article will now discuss the process in detail with examples and reflections from the workshops.

3.1 Participatory Mapping – Drawing the Board

In the first phase, participants are provided with simple "Do-It-Yourself" materials (Knobel & Lankshear, 2010) such as stationery and board game bits (e.g., playing cards, dice, meeples) when working in a physical space, or a templated online whiteboard. Participants are then supported to work in small groups (~5-6 people) and sketch playful maps of a known context (for example one's city, community or home institution), with an emphasis on what makes (or could make) it welcoming. Focus is on the context, and no personal information is collected, therefore complying with GDPR standards. This phase of the workshops is informed by literature around participatory mapping, an established approach in Participatory Action Research (Saija & Pappalardo, 2018) to generate shared community-based baseline understandings of the context, making tacit and subjective local knowledge visible and tangible – and therefore easier to discuss and reflect upon. In effect, participants are asked to draw a shared board to play upon in the following phase.

In this step the social/cultural aspect of play dominates, and the maps generated reflect a pluralism of interpretation of both urban environments and welcoming qualities, but also common, cross-cultural patterns of understanding: conviviality (e.g., areas with preferred food venues, green spaces and playgrounds), housing (articulating the plurality, and inequality, of urban housing planning) and movement (e.g., patterns of public transportation and accessibility).





Figure 3: Example boards generated by participants

While this phase has always proved fruitful in its open-endedness, participants were often reluctant to be creative using the materials at hand (often linked to claims of “not being able to draw”), and could broadly be linked to a reluctance of adults and young adults to engage in more freeform and creative forms of play (see Walsh, 2019, for a critical reading of this dynamic), and struggled to initiate the mapping. Invariably, as you can see by the examples above, this reluctance was overcome and the board colourfully populated. However, overcoming this reluctance often ate into the limited time allocated for the workshop and required strong scaffolding, which was much easier to provide in face-to-face iterations.

In future iterations we will therefore experiment with providing enhanced scaffolding for this phase, e.g., by providing pre-made common environmental “building blocks” through physical and digital post-its (drawing inspiration the widespread board game Carcassonne, or Pedercini’s MultipliCity) based on the common recurring themes mentioned above. This is not to bind participants’ contributions within pre-established boundaries, but rather to provide a starting point of reference, particularly when conducting the workshop online.

3.2 Players Analysis – Mobilising the Stakeholders

The second phase is where the formal, systemic game aspect moves to the forefront. Facilitating this transition, in the context of YOUTHOPIAS, means introducing a very basic system of simulated conflict, a key element of formal games (Tekinbas & Zimmerman, 2004 - though it’s important to highlight how conflict doesn’t need to be between the players/co-creators, but rather might be with or between elements of the designed system itself, and “victory” might mean addressing a conflict rather than winning it).

This transition is scaffolded by utilising a basic stakeholder analysis tool (Reed et al., 2009), with participants facilitated in mapping possible stakeholders for their board along two axes: influence and support. Recurring examples of stakeholders were local administrations and educational leadership (on the “influential but not necessarily interested” side) and conspiracy theorists and NGOs (often mapped as “opponents” in terms of conflicting interests but both lacking real influence). Having established the key “players” of the scenario (with the instruction of trying to have at least an example for each of the quadrants, and one for each of the participants in the group), participants are then facilitated in considering how their interaction might play out.

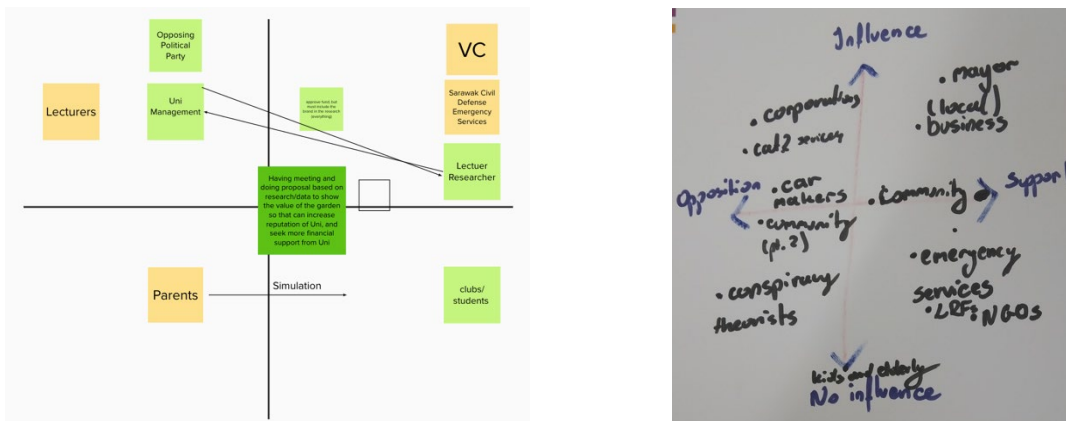


Figure 4: Examples of Players Analysis

To do this in a structured way, participants are asked to collaboratively establish an overarching, desired systemic goal for each of those “players” (e.g., being re-elected, improving business revenue, raising the quality of local schools, or preserving green spaces). In the latest iterations of the workshop, further emphasis was brought on formalising other systemic aspects, by facilitating discussion of other key systemic leverage points, in particular rules (e.g., regulations or institutional missions), and relevant feedback loops (e.g., votes and power; funding and organising capacity). Participants then are asked to take turns (an extremely common and cross-cultural game mechanic; see Elias, Garfield & Gutschera, 2012), choosing any one of the stakeholders, and considering and role-playing one of the following moves:

1. how a specific stakeholder might decide to make changes on the map, within the scope of their influence and interests (e.g., a public administration imposing regulations; businesses finding new markets).
2. how a stakeholder might decide to influence and shift the interests and influence of another stakeholder, particularly by acting on their desired systemic goals and feedback loops (e.g., students running an event to convince parents of the need for a change; citizens putting pressure on elected officials to support or oppose a certain outcome; NGOs fundraising to acquire more influence).

It’s important to highlight the instruction for participants not to take a specific, chosen once-for-all role. This allowed them to play their evolving game-like model not as competitors, but rather maintaining a stance of co-designers of the system, and therefore in touch with the 2nd to highest leverage point proposed by Meadows: directly engaging with designing the system.

These constrained narrative interactions between “players” with different desired systemic goals, grounded in the shared narrative landscape of the board created in the first phase, and structured by the back-and-forth of stakeholders and turns, allowed participants to experience first-hand the dynamics of feedback loops, and through them the inherent systemic complexity of social interactions. Of particular relevance was how some of the narrated emerging interactions (e.g., the consequences of perverse incentives in academic careers; or cycles of gentrification generated by urban student housing) surprised even the participants themselves, who hadn’t thought about some side effects of desired systemic goals, rules or feedback loops before being able to “play them out” on the shared board. This highlights the centrality of emergence in systemic understanding, and problematises assumptions of simple and linear causality often deeply embedded in non-systems oriented approaches to both education and research (Bateson, 1979; Oliveira, 2013).

As with the first phase, the open-ended nature of the task proved to be daunting at first, particularly for participants with less established links to the broader context (e.g., the newly arrived youth in the England site), which at times led to simplistic representations of the “players”, their desired systemic goals and their roles within the broader board. Critically reflecting on this informed the progressive addition of further scaffolding based on explicitly addressing more of Meadows’s leverage points, adding at the same time complexity in the outputs and anchoring starting points for the participants.

Following this and further feedback from participants and co-facilitators, future iterations of the workshop will involve participants building a simple, narrative “character sheet” for the “players” (see Clarke et al., 2018, for a similar technique within the context of learner self-reflection), to provide additional structured scaffolding and documentation, and importantly will emphasise the need to consider possible non-human stakeholders (e.g.,

local water systems or fauna; Leino, Karrpi & Jokinen, 2017) as integral part of ecologically sound systemic mapping.

4. What's the next game? Reflections and Next Steps

Although the playful models co-designed during the workshops cannot be defined as full and finished games (also due to time factors - game design is an iterative process which cannot be solved within the ~2 hours of the workshop; Kultima, 2015), the YOUTHOPIAS workshop, and its hybridisation of participatory mapping, role-playing and game design, nevertheless offered to participants the opportunity to experience themselves as active creators – not just passive subjects of someone else's model, but co-designers and critical reviewers of a shared model, and indeed of the paradigm used to generate it. The key element is therefore autonomy (literally "to give oneself one's own rules" - making the philosophical connection with games very clear), both of learners (in a humanizing and citizenship sense) and of educational processes in the broadest sense (freeing them from the competitive logics discussed in the introduction), touching the most powerful of Meadows's leverage points: the power (and indeed the necessity) to shift paradigm to deal with new challenges.

Coherently, the pilot series of YOUTHOPIAS workshops discussed above emphasised experimentation and playfulness with regards to the methodology itself, inviting open critique and conversations, and highlighted important shortcomings and ideas for further development. Some of those more closely related to scaffolding specific activities have already been discussed, but some of them stand on a more overarching level. The two most relevant, within the scope of promoting systems thinking, are 1) the necessity of developing and integrating in the workshop an explicit linkage with global systemic dynamics, and 2) the necessity to explore more accessible ways to invite broader participation from local communities and benefit local development.

To address the above, future iterations of the methodology will involve Collaborative Online International Learning (COIL) approaches as a space/place for the shared interaction of knowledge, ideas and theories from multiple cultural contexts (Rubin & Guth, 2015; Wimpenny & Orsini-Jones, 2020). This can be done, on a practical level, by using the shared process and the models created to more easily share the respective visions of local citizenship and societal participation developed in each local community, with local participants working as "play-testers" for each other, promoting perspective-taking through games (Dishon & Kafai, 2020) and meaningful intercultural communication and conversations.

A particularly interesting suggestion was also that of flipping the approach: why start small, when we could ask different communities to use the same approach to imagine whole "preferable worlds" (Dunne & Raby, 2013), and deploy both the playful/cultural and game-like/systemic aspect of YOUTHOPIAS to transfer those larger insights to the local level? While this might prove challenging in terms of focusing engagement and maintaining cultural relevance, particularly in terms of reaching out to local communities, it's surely something that will be experimented with.

The further developments of YOUTHOPIAS following the pilot workshops promise therefore to be both complex and challenging, but also offer a glimpse of the potential for systems thinking to scaffold a deeper linkage between thinking globally and acting locally – grounded through playful co-creation and generating a reflective feedback loop between university, society, and planetary systems. The piloting purpose of the workshops, while still acknowledging the need for further development, can therefore be considered achieved, showcasing the potential to advance beyond previous discipline specific (Young, 2018), less formalised (Meadows, Sweeney & Mehers, 2016) and digitally focused (Akcaoglu & Green, 2019) approaches.

To conclude, it's important to highlight the participants' strong, positive response in terms of participation and investment in the principle of material and cultural autonomy that we intend to put again at the centre of HE, in a form of inversion of many instrumental uses of education in general and game-based learning in particular. We argue here that, as both educators and citizens, we need to avoid using games instrumentally to bring into education the competitive and disempowering, game-like ideologies of reality. Vice versa we need to work through and beyond broader education systems to frame playfulness and imagination as powerful ways to maintain an active relationship with reality (Rodari, 2001).

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