Minecraft As a Platform For Co-Creation Of Urban Space: A Case-Study With Teenagers

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Abstract

Digital tools, such as games, are one way of encouraging citizen participation in municipal redevelopment and co-creation of new ideas. In this study we have used Minecraft as a design tool to encourage participation by teenagers in urban planning. We developed a model for participation that follows roughly the ideas of the Block by Block foundation for public participation. We created a digital twin in Minecraft of an old school site that is to be redeveloped soon. We then recruited former students at the school to be participants in a planning workshop to identify possibilities for redevelopment. Our overall design goal was to lay foundation for a process of developing participative workshops employing Minecraft.

Keywords: Smart city, Urban design, Minecraft

1 Introduction

The development of digital tools for participation in urban planning has been widely discussed in planning literature over the last decade (Batty & Yang, 2022), and the COVID-19 pandemic compelled planning organizations to temporarily rely solely on digital participation methods, which cities intend to continue using alongside traditional participation methods (Boland et al 2022; Milz et al 2023).

In planning literature (e.g., Healey, 2020; Innes & Booher, 2004) and in the legislation of most European and North American countries (Batty & Yang, 2022; Lovrić & Lovrić, 2018) the right to participate in planning is given to all those who will be affected. As planning typically impacts environments over the course of decades rather than months or years, younger generations will be affected long-term by planning decisions made today, and yet young people are least likely to participate in planning or through traditional political decision-making (Best & Krueger, 2005). A key reason for this is that despite varied local and legislative efforts to increase children's access to participation (Derr & Tarantini, 2016), in practice failure to sustainably link participatory processes with local communities and children's everyday environments are common (Derr & Tarantini, 2016).

While the adoption of digital participation tools has the potential to enable the participation of wider audiences compared to traditional participation methods, the knowledge, effort, and resources required to participate form barriers for people who are not already engaged in planning, and young people are often particularly disenfranchised from contributing to the development of their living environment despite (Mansfield et al., 2021). Reaching new, more diverse participant groups is far more likely if people can participate within their everyday environments – physical or digital – without required prior knowledge. The planners must go to the people.

Research on children's participation exists, but there is still limited understanding of how to make it a standard practice in planning (Stenberg & Fryk, 2021). Online surveys and participatory mapping tools such as Maptionnaire have been successfully used to engage children in varied planning processes, however, to reach wide engagement, these methods typically require resource-intensive processes with cross-sectoral collaboration, such as with schools or libraries (for example (Egli et al., 2020). Alternatively, youth outreach can be done via the platforms they already frequent, such as suitable online games. One example is Minecraft, a block-building computer game with 180,439,605 average monthly active players in May 2023. A framework for using it for public participation

cases has been developed and popularized by the Block by Block foundation (McDaniel, 2018).

In Finland, the city of Vantaa has developed a Minecraft "digital twin" already in 2015 (*City of Vantaa Minecraft model*), aimed particularly at engaging children, however there is limited information and research on the outcomes or impact of the project – it is likely that the planners' lacked access to the results or the motivation to utilize them as background material in actual planning processes.

An implementation gap (Geertman, 2017) remains between the availability of planning support systems, for example participatory tools and platforms, and their actual influence on planning – without dedicated development or research projects, planners and planning organizations are reluctant to invest resources into or systematically utilize novel tools despite their recognized potential benefits. To reduce the implementation gap, Nummi et al (2022) suggest user-centered approaches and an iterative, incremental, development process for new tools, while ensuring that planners have access to training and support for implementing new participation methods.

In this paper we use the multiuser open world game Minecraft to gather user opinions and ideas about the redevelopment of an urban space. Minecraft has been used to model spaces especially with kids and young adults (see (Delaney, 2022) and (Olesen & Stenudd Ermeklint, 2015)) and we build on these former studies and the use of UN Block by Block participation tool (McDaniel, 2018).

To test our ideas the first author built 1:1 model of a school and its surrounding areas at Kirkkonummi, a medium sized municipality in Southern Finland[1]. We developed a workshop and engaged former students at the school, who live in the same municipality, to participate in a pilot workshop.

Our goal is to gain understanding of how Minecraft can be used for participatory urban planning for gathering ideas and wishes of the people that are affected by city planning. Our main research questions were:

RQ1: How can actors in the planning sector empower children and teenagers to participate in green urban planning using Minecraft?

And the design question was:

RQ2: How can reusable concepts for urban planners to use in workshops be developed to *attract more diverse groups to participate in planning?*

The rest of the paper is organized as follows. First, we review relevant literature, which provides the background and motivation for the study and summarizes the findings of similar earlier studies. Then, we describe our research design in detail and provide information on the pilot workshop and Minecraft environment used in this study. Next, we describe the main findings of our study and discuss the theoretical and practical implications as well as suggestions for future research before concluding the paper.

2   Background

Minecraft has been used for urban planning with children before, also regarding a school environment, see (Magnussen & Elming, 2015). The idea is to develop a model of the environment that allows for easy and natural interaction for kids who are accustomed to playing digital games in general and Minecraft in particular. Bashandy (Bashandy, 2020) offers a critical view of how much true participation there is in this kind of approach by looking at the power differences.

UN Habitat Block by Block handbook (McDaniel, 2018) describes the process of using Minecraft in the following way: "The participatory workshops, using Minecraft, bring people together to visualize their urban design ideas and needs in Minecraft, and present these to city authorities and local government officials." These designs should then affect the real design projects and the city officials should follow through on some of the ideas. "Building in Minecraft allows people to explore the merits of various alternatives and visualize their ideas, providing a way to explore and question new perspectives. The process also encourages people to develop a broader understanding of the urban environment, speak in public with greater confidence and improve social relations." (McDaniel, 2018) The Block by Block project was initiated by the United Nations and the game developer Mojang, and it used Minecraft to involve communities in the design of public spaces. The project has been used in over 30 countries to engage local communities in urban planning and design, and has resulted in the creation of more than 100 public spaces (McDaniel, 2018).

An interesting approach that is close to our goals is the Quick Urban Analysis Kit (qua-kit) software that was developed by Artem Chirkin at ETH Zurich to engage young people in urban planning and design (Mueller et al., 2018). The tool allows for rapid

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[1]https://www.kirkkonummi.fi/library/files/5b9a5bbbc9105834f1005147/15_Hankekortti_Keskusta_Kirkkoniitty.pdf

development of urban environment designs, and it is used through an online interface (Chirkin & König, 2016). The toolkit does not allow for direct manipulation of the designs, which is a major drawback for our purposes, but it provides a low barrier of entry to participation.

These are just a few examples of how Minecraft has been used for participation in urban planning. By using Minecraft as a tool for engagement and learning, communities and organizations can involve people in the design of their cities and create more sustainable and livable communities.

3   Research design

In this paper we employ a design research approach for developing an environment that supports the development of Minecraft based workshops for urban planning. We use Action Design Research (ADR) (Sein et al., 2011) as the research method. The ADR approach is described as: "a research method for generating prescriptive design knowledge through building and evaluating ensemble IT artifacts in an organizational setting" (Sein et al., 2011). It suggests that a research team should shape the design of an IT-artifact via build-intervene-evaluate (BIE) cycles that include concurrent and authentic evaluation instead of the 'build and then evaluate' mode. ADR projects follow an iterative approach that encourages participation from practitioners and seeks actively their feedback. Figure 1 below shows the essential activities of an ADR project. The first task is to define the problem to be solved by all parties together. An overarching objective of ADR is that there always needs to be a balance between different type of outcomes. This includes results that help practitioners to solve their immediate challenges and problems; documentation of produced knowledge outcomes that are disseminated among practitioners and a community of researchers; and reflection and learning. Subsequently, these outcomes need to be balanced so that all parties (e.g., stakeholders, scholars) benefit from them.

ADR strongly emphasizes activities that advance building and evaluation that help resolving complex problems within organizations. The solutions are incrementally shaped and re-shaped through prototypes. This is carried out iteratively through collaboration between researchers, practitioners, and stakeholders in an organizational setting.
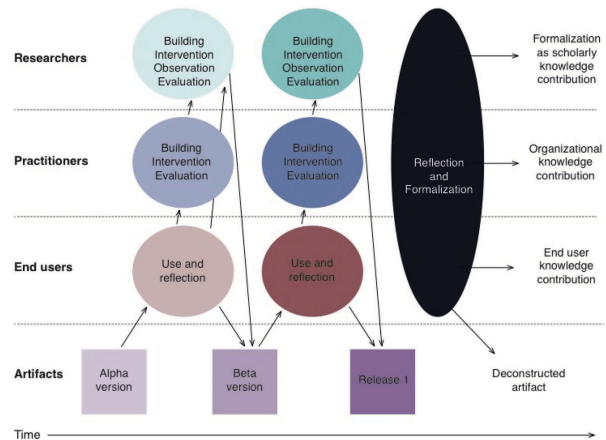

Figure 1. Action Design Research: Key Activities and Outputs (adapted from Sein & Rossi, 2019)

The process of building and evaluating artifacts is intertwined with efforts to generate knowledge where the primary source of innovation is organizational. In our case the artifact is the specific urban setting modelled in Minecraft and the generalized outcome is the process of generating new environments with tools available for Minecraft developers.

The generic workshop design process was roughly as follows:

1. Define the objectives: Start by defining the objectives of the workshop. What sustainable urban planning concepts do we want to cover? What are the key properties and features of the model within Minecraft?
2. Plan the activities: Plan the activities for the workshop, including building the surrounding areas in Minecraft, simulating the impact of design choices on the environment, and leaving room for the participants to freely pursue their ideas.
3. Identify the participants: Identify the target audience for the workshop. Determine the number of participants and any prerequisites for participation.
4. Develop the model within Minecraft. In section 4.2 we explain this process in detail.
5. Prepare the resources: Prepare the necessary resources for the workshop, such as Minecraft tutorials, sustainable urban planning resources, and design tasks.
6. Plan the individual workshop: Plan the format of the workshop, such as the date, time, and location. Ensure that all the necessary equipment, such as computers or consoles, are available.

7. Facilitate the workshop: Facilitate the workshop, providing guidance and support to participants as they work on urban planning challenges in Minecraft. Encourage participation and discussion and provide opportunities for feedback and reflection.
8. Follow-up: Follow up after the workshop, providing feedback, resources and support for continued learning and engagement in sustainable urban planning.

In the following we explain how we followed this process. First, we describe the objectives and the participation process and then we outline the design of the environment and the data collection.

3.1 Participation process

For this case-study, the participation was organized as a loosely structured, two-day workshop where participants had a high degree of freedom to choose when and how they would like to contribute their ideas. The goal was to test the usefulness of Minecraft for engaging teenagers to in a collaborative to gather ideas for the redevelopment of a local urban area. The area to be collaboratively redesigned was chosen considering the following conditions:

1) A land-use plan is currently being prepared for the redevelopment of the area
2) The area is large and central enough to contain a variety of urban functions, and will not be developed solely as a residential area
3) The area is likely to be familiar to the participants

The participants to the workshop were recruited by the first author among a peer-group focused on playing computer games and using the communication tool Discord. The participants were instructed that the participation is voluntary and that all answers will remain anonymous. They were also instructed that they can end their participation if they felt any kind of discomfort.

First, the participants were asked to fill in a preliminary survey regarding their background, previous experiences related to computer games and participation, and their expectations for the workshop. They were also given an overview of the area in question and instructed to design a suggestion for its development in small groups. While no specific guidelines or conditions were given for the design task, the participants were asked to consider realistic development ideas.

Over the course of two days, the participants conceived and built their suggestions on the Minecraft server in two groups. The lead author was present to facilitate the workshop and provide instructions and guidance to participants on Discord and Minecraft servers, alternating between the separate discussion channels of the two groups.

After the workshop, the participants were asked to fill in a survey describing their experiences in the workshop, and the usability of the method and specifically of Minecraft as a planning participation tool. A pizza coupon to a pizzeria near the planning site was promised as a gift for the participants who were in the workshop and responded to the questionnaire.

3.2 Design of the environment

A 1:1 scale model of the study area was constructed using Minecraft Java Edition version 1.19.4 and certain third-party tools. The environment used was a Minecraft world run on a private server.

The most important Minecraft add-in software used were Worldpainter (version 2.17.2) and Worldedit (version 7.2.14). Worldpainter allows the user to create a Minecraft world using a top-down view and height map. This map was used to plot the basic shape and direction of the roads and buildings with help from a satellite image overlay from Google Maps. Worldedit is a modification for Minecraft that helps with building the environment, including tools such as copying and pasting, filling geometric shapes and selection. A server plugin of Worldedit was also available for use to all participants to speed up the building process. These tools significantly sped up the modeling and building of the environment, when compared with standard Minecraft. The tools also helped the participants design their proposals quicker. When designing and constructing a model of realistic proportions, the use of third-party software and tools is of utmost importance, as Minecraft does not offer enough utility on its own.

As the source of the design, we used the area development plan from the municipality of Kirkkonummi[2]. Google Maps and Google Street View were used for reference on details when creating the environment. The process of constructing the model took roughly 18 hours for one person, with the area being slightly larger than the design area to give a realistic view of the environment.

In addition to the building tools, Optifine (version HD U I4) with BSL shaders (version 8.2) was used to enhance performance and graphics. Figures 2-5 show Minecraft as enhanced by these modifications.

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[2]https://www.kirkkonummi.fi/library/files/5b9a5bbbc9105834f1005 147/15_Hankekortti_Keskusta_Kirkkoniitty.pdf

Figure 2 A and 2 B. The old school area in Google maps terrain view and a model constructed for the workshop

4 Results

4.1 Participants' background and expectations for the workshop

The workshop participants were asked to fill a short questionnaire developed based on the outline provided by Block by Block, describing their experience of the workshop.

The group of participants consisted of 7 people aged 16-17. Most were familiar with the target area, with their views of the area ranging between neutral and negative. They reported using a computer in their free time 3-4 hours per day and being very familiar with Minecraft prior to the workshop. One participant had prior experience of participating in planning. The participants described their ideal urban environments as green, walkable, clean, open, safe, beautiful, and calm. They also mentioned services, attractive buildings, and social cohesion in the area.

When asked about the expectations for the workshop, most participants showed enthusiasm, some for having fun while playing the game and seeing others' creations, others specifically for learning how this sandbox game can be used to inform planning and how ideas can be shared to develop a better living environment.

For the future development of Kirkkonummi, the participants suggested that the municipality should reduce the emphasis on car traffic, renovate and upgrade existing buildings and public spaces and improve walking and cycling conditions, and reduce the urbanity and highlight the historical countryside village qualities of the central area.

4.2 Participants' satisfaction with the workshop

The participants were generally satisfied with how the workshop was organized. Four of the participants found the instructions completely clear (5), while the rest found them unclear (2-3). They found Minecraft a suitable platform for the task (4,14/5) and reported a similar experience of ease of producing a suggestion for the planning task (3,86/5). All of them said they would likely participate in a similar workshop again if given the opportunity (4,43/5). The most enjoyable part of the experience was conceiving and building the model together – collaboration and creativity were mentioned in most of the responses. The least enjoyable aspects were issues with timing and the scale of the model, and the "chaotic nature of the used methods".

The participants were uncertain whether the results would influence planning (3,14/5). They felt that the method and platform could be used to gather ideas on a large scale, but that it was not very practical for more detailed suggestions.
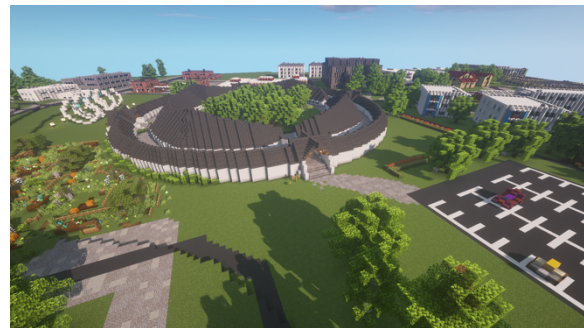

Figure 3. Proposal 1: A circular market hall and patio garden

Figure 4. Proposal 2: A hotel, spa and a small parking lot
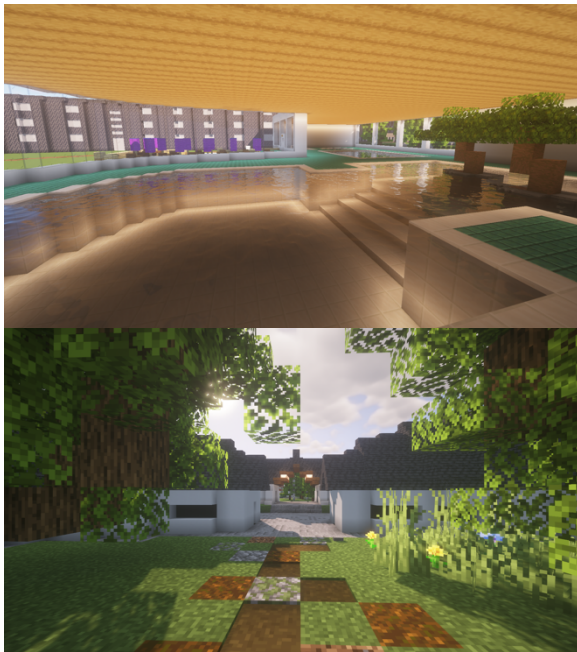
Figure 5 A and B. Proposal 2 details: spa area of the hotel and a garden

Figure 6. Detail, the parking lot of the current school building, source: Google Street View

4.3   Results of the workshop

The proposals created by the participants were highly detailed and contained suggestions for a variety of functions including housing, a hotel, public art, and recreational facilities.

Working in groups of three and four, the participants brainstormed, planned, and produced the proposals. Over the course of two days the participants freely worked on their projects and talked about their proposals. The participants clearly preferred working in groups and sharing ideas, with all of them freely choosing their groups. Building as a team encouraged sharing creativity and ideas and helped motivate the group members to continue the projects.

Proposal 1 included a circular market hall, patio garden, small parking lot, a contemporary sculpture, and an allotment. The group emphasized having walking areas, greenery and a communal place.

Proposal 2 included a spa, hotel, yard, and small parking lot. This group put an emphasis on the efficient use of space, recreation and bringing in tourists and visitors.

4.4   Minecraft in urban planning

Minecraft can be used to facilitate a user-friendly participation process which requires relatively little prior experience of the tool itself compared to most 3D visualization and planning tools available. The third-party tools used (mainly Worldedit) were relatively easy to learn and use efficiently, speeding up the building of the proposals.

The efficiency of designing and producing the environment in Minecraft depends heavily on the tools used and the number of builders. The amount of detail is also important to consider, as higher levels of detail quickly turn unfeasible. Constructing an environment with 1:1 scale and sufficient detail is relatively simple for an experienced builder or team. For the first author with prior experience of building in Minecraft and using the third-party tools, designing the environment was efficient and straightforward. Apart from minor technical difficulties the construction of the environment faced no obstacles.

5   Discussion

In this study, we focused on how to involve young people in the development of urban space. We used a workshop in Minecraft to present a space and to gather opinions and concrete development ideas.

Our case study highlights the effectiveness of using a peer agent to recruit participants and engage them to commit to providing detailed contributions to a planning process. Furthermore, we demonstrate how productivity tools can be used to enhance the development with Minecraft. These third-party tools allow, for example, the creation of series of blocks and copying of buildings and thus shorten the implementation time considerably.

5.1   Theoretical contribution

To design inclusive and accessible online participation processes, different types of barriers for participating must be recognized and overcome. In this

case study, we developed some effective strategies to engage young people in the planning of urban environments.

1) Engaging young people in familiar digital environments

Using a tool that participants are accustomed to allowed them to focus on the creative process, and likely lowered the threshold for them to sign up for the workshop. As Derr and Tarantini (2016) discussed, a key factor in the success of participation aimed at children is whether the process is clearly connected to the local community and environment; we add to this notion by suggesting that the participants should not be expected to venture out of their everyday environments in order to participate but rather should be met and engaged within familiar (digital) environments that require minimal additional effort to access. A popular game such as Minecraft provides an avenue to reach vast groups of users who have previously been excluded from participating in planning.

2) Motivation for co-creation among peers

Prior studies have found a fun process to be a key enabler in youth participation (Mansfield et al., 2021), and our case demonstrates that designing an enjoyable, collaborative activity motivates participants to dedicate time and effort to a participatory task. Most participants stated that their favorite part of the workshop was working together with friends on a creative design task.

5.2 Practical implications

Our case reinforces the notion that children and young people can come up with diverse ideas for the planning of their local environment when engaged through an accessible and fun platform that facilitates creative expression of their wishes for the development of their local environment. While it is unlikely that this type of co-creation process with a high level of creative freedom would yield ideas that could be implemented directly in strategic or detailed planning, the contributions can help planners form a deeper understanding of the environmental qualities the participants value and wish to see developed in their hometowns. The ideas do however have potential to be directly utilized as a basis for community-based urban development initiatives such as participatory budgeting suggestions.

The implementation gap, or the resistance to the introduction of new digital tools and planning support systems to planning practice as described by Geertman (2017) should be considered when planning for wider use of Minecraft in participatory planning processes. Specialized skills are required to create a suitable Minecraft model for participation, to analyze the results and their implications for planning, and for reporting them in a format which is usable for planners. If the participation is organized without introducing strategic planning goals and economic, physical, social, or political boundary conditions to the planning outcomes, the results of co-creation are likely to be unfeasible, meaning that an open-minded approach is required to extract and utilize the information they contain about the participants values, wishes, and needs for development.

As a participant recruitment strategy, key actors who work as agents in their peer groups can help reach and motivate participants, however, this will naturally limit the potential participants to their social networks. For engaging previously underrepresented groups such as youths, a limited target group can be justified for the development of suitable participatory methods. For this purpose, existing networks such as youth councils can be used to identify potential peer agents.

In future research a similar workshop could be designed and carried out in collaboration with planning practitioners to test and develop the applicability of the results in real-life planning cases.

5.3 Limitations and future research

This study was a pilot, where we tested the applicability of the environment for this kind of research, and we had a limited number of participants. In the future the goal is to develop the reusable design aspects of the environment through the ADR process.

6 Concluding remarks

In this paper we demonstrated how one can efficiently design a digital environment for fostering participation in urban planning. The goal was to demonstrate the use of Minecraft for creating a model of a municipal area under redevelopment. The model was used to foster the participation of teenagers in the planning process through tools that they know how to use and are interested in using for the common good. We demonstrated the applicability of the idea through a prototype workshop.

Acknowledgments

References

Bashandy, H. (2020). Playing, Mapping, and Power: A Critical Analysis of Using" Minecraft" in Spatial Design. *American Journal of Play*, *12*(3), 363-389.

Batty, M., & Yang, W. (2022). A Digital Future for Planning: Spatial Planning Reimagined. *Digital for Planning Task Force: London, UK*.

Best, S. J., & Krueger, B. S. (2005). Analyzing the representativeness of Internet political participation. *Political Behavior*, *27*, 183-216.

Boland, P., Durrant, A., McHenry, J., McKay, S., & Wilson, A. (2022). A 'planning revolution' or an 'attack on planning' in England: digitization, digitalization, and democratization. *International planning studies*, 27(2), 155-172.

Chirkin, A. M., & König, R. (2016). Concept of interactive machine learning in urban design problems. In *Proceedings of the SEACHI 2016 on Smart Cities for Better Living with HCI and UX* (pp. 10-13).

City of Vantaa Minecraft model. Helsinki Region Infoshare. https://hri.fi/data/en/dataset/vantaan-minecraft-kaupunkimalli

Delaney, J. (2022). Minecraft and Playful Public Participation in Urban Design. *Urban Planning*, *7*(2), 330-342.

Derr, V., & Tarantini, E. (2016). "Because we are all people": outcomes and reflections from young people's participation in the planning and design of child-friendly public spaces. *Local Environment*, *21*(12), 1534-1556.

Egli, V., Villanueva, K., Donnellan, N., Mackay, L., Forsyth, E., Zinn, C., Kytta, M., & Smith, M. (2020). Understanding children's neighbourhood destinations: presenting the Kids-PoND framework. *Children's Geographies*, *18*(4), 420-434. https://doi.org/10.1080/14733285.2019.1646889

Geertman, S. (2017). PSS: Beyond the implementation gap. *Transportation Research Part A: Policy and Practice*, *104*, 70-76. https://doi.org/https://doi.org/10.1016/j.tra.2016.10.016

Healey, P. (2020). *Collaborative planning: Shaping places in fragmented societies*. Bloomsbury Publishing.

Innes, J. E., & Booher, D. E. (2004). Reframing public participation: strategies for the 21st century. *Planning theory & practice*, *5*(4), 419-436.

Lovrić, N., & Lovrić, M. (2018). Network approach to constructing theory of participation in spatial planning. *Land Use Policy*, *79*, 30-47.

Magnussen, R., & Elming, A. L. (2015). Cities at play: Children's redesign of deprived neighbourhoods in Minecraft. European conference on games based learning,

Mansfield, R. G., Batagol, B., & Raven, R. (2021). "Critical Agents of Change?": Opportunities and Limits to Children's Participation in Urban Planning. *Journal of Planning Literature*, *36*(2), 170-186. https://doi.org/10.1177/0885412220988645

McDaniel, T. (2018). Block by Block: The Use of the Video Game "Minecraft" as a Tool to Increase Public Participation.

Milz, D., Pokharel, A., & Gervich, C. D. (2023). Facilitating online participatory planning during the COVID-19 pandemic. *Journal of the American Planning Association*, 1-14.

Mueller, J., Lu, H., Chirkin, A., Klein, B., & Schmitt, G. (2018). Citizen Design Science: A strategy for crowd-creative urban design. *Cities*, *72*, 181-188.

Nummi, P., Prilenska, V., Grisakov, K., Fabritius, H., Ilves, L., Kangassalo, P., Staffans, A., & Tan, X. (2022). Narrowing the Implementation Gap: User-Centered Design of New E-Planning Tools. *International Journal of E-Planning Research (IJEPR)*, *11*(1), 1-22.

Olesen, I., & Stenudd Ermeklint, A. (2015). Citizen participation in development of public spaces-A case study in Nepal looking at Minecraft as a tool in urban planning.

Sein, M., Henfridsson, O., Purao, S., Rossi, M., & Lindgren, R. (2011). Action Design Research [Research Essay]. *Mis Quarterly*, *35*(1), 37-56. http://aisel.aisnet.org/misq/vol35/iss1/5/

Sein, M. K., & Rossi, M. (2019). Elaborating ADR while drifting away from its essence [Article]. *A commentary on Mullarkey and Hevner*, *28*(1), 21-25. https://doi.org/10.1080/0960085X.2018.1527189

Stenberg, J., & Fryk, L. (2021). Making School Children's Participation in Planning Processes a Routine Practice. *Societies*, *11*(1), 3.