Digital Participatory Toolkit for Conflict-Sensitive Planning in Mining Regions

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Abstract

This workshop explores participatory methods for spatial planning in mining regions, combining role-play and analog GeoDesign experiences with a Digital Participatory Toolkit developed within the MINIPART project, aimed at improving public participation. Participants, representing diverse stakeholder roles, will collaboratively test tools including SWOT analysis, ranking, polling, and mapping exercises. Through structured negotiation and evaluation of trade-offs, they will gain insight into context-sensitive planning. The toolkit will be encouraged for ongoing use, equipping participants with skills to implement in participatory approaches in the future.

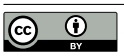
CCS Concepts

• **Human-centered computing**; • **Participatory design**; • **Information systems**; • **Decision support systems**; • **Applied computing**; • **Environmental sciences**;

Keywords

Role-play simulation, Geo-design, Digital participation tools, Conflict mitigation

ACM Reference Format:
Marijana Pantić, Tamara Maričić, Ana Perić, Dušanka Milosavljević, and Milovan Vuković. 2026. Digital Participatory Toolkit for Conflict-Sensitive Planning in Mining Regions. In *Participatory Design Conference 2026, Vol. 3: Workshops, Situated Actions, and PDC Places (PDC 2026 Vol. 3), June 15–19, 2026, Milan, Italy*. ACM, New York, NY, USA, 3 pages. https://doi.org/10.1145/3789493.3797294



PDC 2026 Vol. 3, Milan, Italy

ACM ISBN 979-8-4007-2470-1/2026/06
https://doi.org/10.1145/3789493.3797294

1 Introduction

Mining regions are complex socio-spatial environments where economic imperatives, environmental impacts, and community well-being often collide [1]. Effective governance and stakeholder engagement are crucial for navigating these challenges [2]. Large-scale extraction projects often trigger tensions between authorities, companies, and local populations when decisions lack inclusive dialogue, resulting in disputes over land use, environmental degradation, and perceived inequities [3]. Addressing such conflicts requires planning approaches that recognize diverse perspectives and build trust among stakeholders.

Spatial planning thus becomes both an arena of contestation and a platform for negotiation [4]. Traditional top-down approaches often fail to capture local realities, generating mistrust and resistance [5]. Conflict-sensitive planning seeks to acknowledge power asymmetries and promote equitable participation [6].

Building on this framework and participatory planning methods [7], the workshop introduces the **Digital Participatory Toolkit (DPT)**, developed within the MINIPART project (Improving Participation in Spatial Planning of Mining Areas), to support conflict-sensitive spatial planning. The DPT will be integrated with established participatory techniques (e.g., newsletters, polls, SWOT analysis, scoring) and interactive co-creation formats such as analog **GeoDesign** and **role-play**. Participants will combine digital tools with direct, face-to-face interaction, enhancing skills and reflections on participation in fragile trust contexts [8]. Aligned with participatory design principles [9], the goals of the workshop are: (1) To **explore and adapt participatory methods**; (2) to **experiment with digital and analog tools**; and (3) to **create a collaborative learning environment**.

The workshop aligns with the PDC conference theme by showing how participatory design can address environmental justice and resource governance in mining regions—critical sites for testing the "political dimension, investigating how participatory processes can foster peacebuilding, social justice and transformative change" and

"how design can support sustainable transitions through collaborative decision-making, inclusive policy frameworks and prototyping systemic interventions."

2 Format, Methods, and Participant Involvement

The workshop is designed as a highly interactive, practice-oriented session structured in four blocks. It combines role-play, analog GeoDesign, and the DPT developed within the MINIPART project, ensuring a mix of hands-on and digital methods. The workshop is intended for **12–20 participants** (3-5 per stakeholder group), a size that allows for active engagement and meaningful interaction. All participants will be involved through **role-play, small-group tasks, presentations, and structured debates**, ensuring that each voice contributes to the collective learning experience and final decision. The workshop is designed to last **3 hours**, divided into four interactive blocks that combine analog role-play and geodesign with digital participatory tools. The modality is offline (in person), with digital support elements.

Block 1: GeoDesign exercise (≈ 50 minutes). Following a short introduction to the MINIPART project and the workshop aims and structure, participants will be divided into four stakeholder groups – citizens, NGOs, the mining company, and local authority – while convenors act as spatial planners. Each group receives a role-specific mandate (e.g., safeguarding community well-being, protecting the environment, maximizing profit, addressing corruption). Using maps and post-it notes, groups will design spatial interventions aligned with their interests. Groups will present their proposed solutions, anticipated costs, and action impacts.

Block 2: Digital testing (≈ 50 minutes). Each group will use the DPT (e.g., SWOT analysis, ranking, polls, matrix building) to submit entries that represent their collective interests and spatial proposals developed on the maps. Since planners (in this case, convenors) determine the entries to be ranked, matrix categories to be evaluated and questions in polls, the application will broaden participants' perspectives by drawing attention to potential impacts of their decisions that may not have been anticipated in the initial analog exercise.

Block 3: Systematization (≈ 20 minutes). The convenors, acting in the role of planners, will systematize the collected submissions in order to identify potential areas of conflict or misalignment between stakeholder groups ("hotspots"). To enable this review, a short break will be introduced for participants.

Block 4: Negotiating (≈ 60 minutes). The closing session will focus on unresolved conflicts ("hotspots"), reflection on negotiation challenges, and the added value of digital tools for visualizing trade-offs. Participants will also discuss how such participatory methods could be adapted to real-world contexts.

3 EQUIPMENT AND TECHNICAL Requirements

Participants will need **personal internet-enabled devices** (smartphones or tablets) to access the DPT. To ensure inclusiveness and technical accessibility, the convenors will provide three tablets, available to participants who may prefer to work on a larger screen but do not have their own device at hand. The workshop will also require **maps for the analog Geo-Design exercise (provided by the convenors), post-it notes, and four flip charts** to support group work and reporting. If flipcharts are unavailable, large sheets of paper will be sufficient, enabling group work and the visual display of results for subsequent discussion and exchange. In line with the map and the subject of the spatial plan, the convenors will also provide stickers to represent spatial objects within the analog GeoDesign exercise, as well as "banknotes" to be allocated among the groups in order to emphasize real-case experience. **A standard seminar room with movable furniture** and stable **Wi-Fi** is sufficient, provided it has enough tables to accommodate four groups of approximately five participants each. **Markers in multiple colors** would be beneficial.

4 Relevance and Positioning

This workshop is relevant to the **PDC2026**, as it situates participatory spatial planning within contexts of social, environmental, and economic complexity. Mining regions often present conflicts arising from competing interests, making them ideal settings to explore participatory design as a tool for fostering dialogue, negotiation, and coexistence. By engaging participants in collaborative exercises, the workshop contributes to theoretical insights, provides practical experience, and offers participants actionable lessons in trust-building.

The workshop aligns with key conference themes by addressing the interplay between **global systems and local experiences**. Through the use of a **DPT**, the session enables stakeholders to simulate decision-making processes, negotiate trade-offs, and collectively co-design interventions that balance environmental, social, and economic priorities. This approach resonates with discussions on democracy and participation by exploring how digital tools can enhance inclusion, transparency, and deliberation across governance scales.

Positioned within the **MINIPART project (2024–2027)**, which focuses on improving participation in spatial planning of mining areas in Serbia, the workshop translates research outputs into actionable tools and experiential learning. It serves as a platform for knowledge co-production, capacity-building, and the dissemination of participatory strategies that can inform future policy, planning, and civic engagement. In doing so, the session contributes directly to the conference's mission of designing for coexistence and socially responsible decision-making in complex, multi-stakeholder contexts.

5 Organizers and Expertise

This workshop is convened by a multidisciplinary team with extensive expertise in spatial planning, sociology, environmental governance, and participatory design. The team combines project members and an external collaborator to provide both methodological rigor and comparative perspectives. Together, the convenors ensure a rich interdisciplinary foundation, enabling participants to engage in meaningful, co-creative exercises that combine academic insight with practical experience in participatory spatial planning.

Dr. Tamara Maričić, Spatial Planner, Senior Research Associate, PhD in Spatial Planning, with 19 years of experience in researching mining regions, including environmental protection, social impacts,

and public participation. Her expertise is applying participatory methods in real-world planning contexts.

Dr. Marijana Pantić, Spatial Planner, Senior Research Associate, PhD in Spatial Planning. She specializes in integrating qualitative and quantitative approaches, including interviews and focus groups. Experienced in facilitating participatory processes, enabling her to lead interactive stakeholder engagement exercises.

MA Dušanka Milosavljević, Sociologist, Research Assistant, MA in Integral Urbanism, PhD student in Sociology. She has field research experience with diverse communities across multiple social research projects. Her expertise in qualitative methods and group facilitation ensures effective participant engagement and data collection.

Prof. Dr. Milovan Vuković, Technological and Physical Chemist, Metallurgical and Mining Engineer, Environmental and Political Scientist, Full Professor. His interdisciplinary background bridges technical and social perspectives, enabling him to guide discussions on complex trade-offs in mining and spatial planning.

Prof. Dr. Ana Perić, Urban Planner, Assistant Professor, is an external collaborator on MINIPART. Her research focuses on stakeholder collaboration, participatory procedures, and comparative planning cultures. She brings expertise in designing co-creative, conflict-sensitive participatory workshops that foster social learning and democratic governance.

6 Expected Outcomes and Takeaways

Participants will gain practical knowledge and skills in participatory design and conflict-sensitive planning through collaborative exercises using the DPT, role-play, and analogue GeoDesign. They will learn to co-develop spatial solutions, negotiate diverse interests, assess trade-offs, and prioritize interventions within limited budgets. The activities will strengthen their ability to identify consensus and divergence, enhancing informed decision-making in professional and community contexts.

Beyond individual learning, the workshop - embedded in the MINIPART project on public participation in mining area planning - will contribute to academic outputs, policy insights, and methodological refinement. Participants will gain access to the freely available DPT for future use and may form collaborations that inspire follow-up projects.

Acknowledgments

This work was funded by the Science Fund of the Republic of Serbia (Grant No. #7598).

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