

Participatory Methods for Science–Society Dialogue: Insights from Personal Meaning Mapping and Serious Games

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As Earth and ocean sciences increasingly operate at the interface of scientific inquiry and societal decision-making, there is a growing need for methods that support dialogue and knowledge co-creation across diverse knowledge systems. This poster examines how Personal Meaning Mapping (PMM) and the serious game Watershed Game function as complementary, dialectical tools that mediate learning and communication among scientists, the public, stakeholders, and policy actors in free-choice learning contexts.

To understand how dialogue unfolds at the level of individual meaning-making, PMM is employed not only as an analytic method for examining participants' interpretations, but also as a reflective practice that enables participants to recall and reorganize prior knowledge, worldviews, values, and lived experiences related to human–nature relationships. Implemented before and after participatory engagement (e.g., museum visits, serious games, workshops), PMM allows systematic comparison of conceptual structures and meaning change across diverse groups, including scientists, regulators, adolescents, Indigenous communities, and farmers. In-depth interviews further contextualize these evolving meaning-making processes.

While PMM captures shifts in individual understanding, a serious game such as the Watershed Game provides a collective, experiential platform through which these meanings are negotiated in practice. Operating as a serious game that simulates socio-environmental trade-offs, it creates a shared space where scientific knowledge, traditional ecological knowledge (TEK), and local experiential knowledge are brought into dialogue and co-created through interaction and negotiation. Together, PMM and the Watershed Game demonstrate how sustainability knowledge emerges through participatory engagement rather than unidirectional transmission.

By examining both individual reflection and collective negotiation, the poster highlights how power dynamics shape whose knowledge is legitimized in sustainability science and governance. It further illustrates how participatory, game-based approaches can foster trust while maintaining scientific rigor, offering practical pathways toward inclusive knowledge co-production and a renewed social contract between science and society.

Keywords: Knowledge co-creation, Personal Meaning Mapping (PMM), Serious games, Social-ecological system thinking, Science–society interface, Free-choice learning