

Using games for social learning to promote self-governance

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Abstract

Governance of shared resources needs to overcome collective action problems. Relational values and decision-making play a critical role in this process. Approaches are needed to stimulate self-governance, taking relational values into account. We review the literature on the use of collective action games as a tool to stimulate social learning and self-governance. We emphasize the importance of legitimacy in decision-making and the risk of crowding out internalized motivations – for instance, based on relational values – with instrumental incentive mechanisms. We further highlight the need to include ecological outcome indicators in the game design to allow the activation of relational values. Our review concludes that games used as part of a set of participatory activities enable communities to come together to identify relevant problems and craft potential solutions.

Introduction

Governance of commons -- shared resources such as water, forest, fish stock and grazing land -- is a challenge because one needs to overcome collective action problems. In collective action problems people need to overcome individuals' conflicting interests versus the group's interests. The impact of dwindling resources on sustainability, inequality, poverty or conflicts remains a key challenge of the twenty-first century. The tragedy of the commons narrative suggests that communities are not able to manage their own shared resources and intervention is required to nationalize or privatize the shared resource¹. However, there is substantial evidence that communities are able to govern their resources sustainably². People enjoy nature not only by extracting resources but also because it contributes to their individual and collective identity and connects them to each other and the place they live. They feel responsible and carry moral values to protect nature^{3,4}. Communities can create their own rules, define boundaries of the resource and resource users, and have active monitoring to enforce the rules⁵. However, communities do not always manage to create their own institutional arrangements that ensure sustained enjoyment of instrumental and relational values.

How does one stimulate self-governance of shared resources while tapping on the diverse ways of living, knowing and doing of communities around the world? In this paper, we review the recent literature on different types of games to uncover the role of relational values in a) the use of experimental games as a tool to understand self-governance and b) how experimental learning games can stimulate communities to work together to self-govern their shared resources. We thereby consider the range from abstract laboratory experiments with student subjects to games co-created with stakeholders.

In abstract lab experiments the task is usually defined as decisions that impact one's monetary earnings. Participants do not know with whom they are matched in the experiment and typically no framing is provided. In fact, the design aims to remove any relational values from the experiment to uncover and test predefined causal hypotheses of generalizable behavioral mechanisms based on individual instrumental motivations.

When those abstract experiments were brought to the field, relations between community members, which have been shaped by the natural environment, started playing a role. For example, from a trust game combined with ethnographic material, Vollen⁶ found that among the Nama in Namibia the dominant form of exchange is more akin to generalized reciprocity than direct reciprocity and geared toward long-term relation building for risk reduction in semi-arid environments. When games are framed as a specific resource game, relational values with the resource come into play. For example, games framed as forestry, fishery and irrigation games done with foresters, fishers and irrigators did not show different results if participants played a game of a resource they were less familiar with⁷. Students and actual resource users chose similarly, except that student subjects never left any resources "wasted", while actual resource users left resources unexploited to let the system recover, giving back to nature⁸. Increasing complexity of games via debriefings, role designation, simulating biophysical system dynamics, reporting economic and ecological outcome indicators, and co-design start to bring in more relational values between players and the resource, and among players.

Including relational values in the game allow them to be potential learning tools. Figure 1 visualizes the spectrum of games, from abstract experiments to complex contextual exercises. Researchers have observed that many experiments carried out in the field facilitated learning⁹. Once learning becomes the main objective of the process, we refer to “games” in this paper rather than “experiments”. Games that include a community debriefing and reflection meeting can have great potential for learning¹⁰. More abstract games intend to distill a specific management or cooperation challenge which is often relevant across a wide range of cases (e.g. ^{9–12}). Role playing games are often based on complex system dynamic models that allow us to learn about relations in a specific social-ecological-technical system (e.g. ^{15–19}). This limits their scalability. Similarly, games co-created with stakeholders can be a valuable capacity building activity (e.g. ^{20–22}), but are often very time and knowledge intensive and not scalable as an intervention tool. As such, games that could stimulate collective action and self-governance at scale are based on fundamental principles of collective action problems, but are embedded in participatory processes to build on instrumental, relational and social values within the community. Activating specifically relational values to nature in a game requires that the game framing includes a natural resource and that players’ decisions affect the state of this resource. Activating relational values to other people requires that the game shows how players’ decisions affect others.

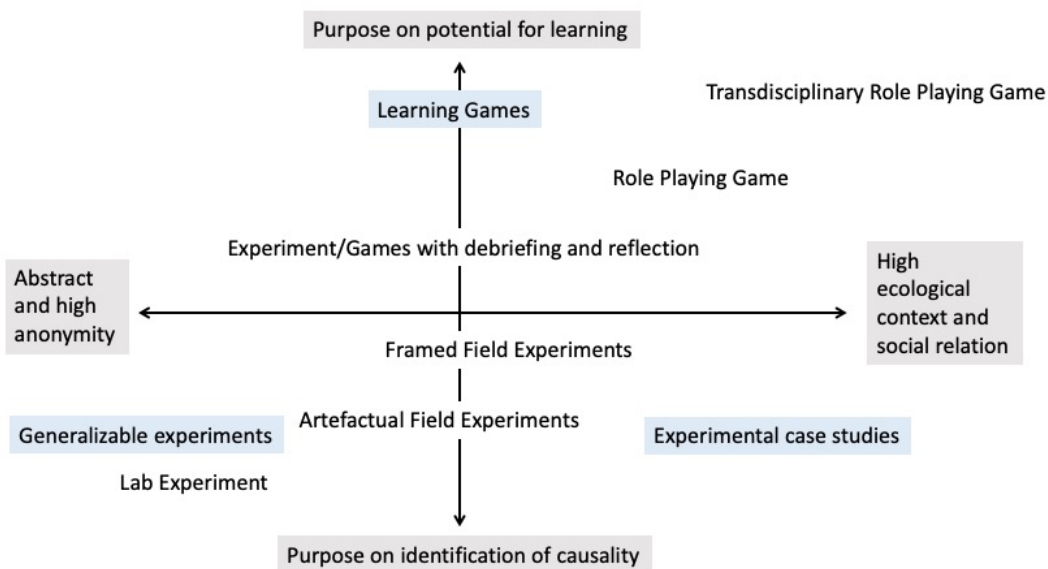


Figure 1: Different types of experiments (focusing on causality) and games (focus on learning).

What experiments tell about behavioral mechanisms

Experiments in the lab and the field have greatly contributed to our understanding of how relations among people interact with expected instrumental and relational outcomes. Imposing rules, even if they are socially optimal rules, is often found not to be effective²³ as it can

negatively affect reciprocal relations. For example, Falk and Kosfeld²⁴ show that the reciprocal relationships are weakened if one party assigns a minimum contribution to the other party. Such a control measure is perceived to be a signal of distrust. Imposing solutions – even if following them lead to socially optimal outcomes – can lead to crowding out of intrinsically motivated behaviors and have limited effects in the long term as social relations are replaced by market logic. Riener and Wiederhold²⁵ show that a common experience induced via team-building processes leads to an even stronger crowding-out effect as compared to treatments without such a common experience.

There is evidence that crowding-out effects can be mediated if institutional arrangements are perceived to be legitimate, for instance because they express moral and relational values. DeCaro et al.^{26,27} highlight that poorly managed resource dilemmas undermine people's fundamental needs for justice, belonging and equity connected to the dilemma and the resource which shows the importance of procedural justice for common-pool resource management. In their experiments, enforcement of rules improved voluntary cooperation only when individuals had the possibility to vote, leading to highest perceptions of procedural justice, self-determination, and security among participants. Kessler and Leider²⁸ find hidden costs of control only in cases where procedural fairness concerns in implementing rules are ignored. Similarly, Schnedler and Vadovic²⁹ vary the legitimacy of rules and find that where control is perceived legitimate, hidden costs of control are negligible. Thus, participatory processes to create policies can even increase intrinsic motivation as could be shown in community driven development projects^{30,31} or payment for ecosystem service programs³². The legitimacy enhancing effect of elections seems independent of whether participants voted for a leader or directly for the rule and whether resources were abundant or scarce³³.

Effective institutional performance might be connected to the specific ecological and social context. Ghate et al.³⁴, for example, found that the shared norms in indigenous communities in India were so deeply embedded that communication was not needed to adopt cooperative decisions in the games they carried out.

The research on self-governance has so far shown its great potential to solve collective action problems when rules are adapted to local circumstances, taking into account local norms, trust levels with in- and outsiders, knowledge about system dynamics and time to experiment with rules. While communication always favors self-governance the case for sanctions (i.e. control) is more nuanced. It seems that sanctions work best when legitimately implemented which may in some contexts involve traditional leadership rather than democratic leaders³⁵ and when monitoring and enforcement is localized rather than centralized³⁶.

Games as learning tools

The challenge remains how to develop affordable approaches which stimulate diverse communities in many localities to locally adapt legitimate rules. It has been argued that experiential learning games can contribute to addressing this challenge³⁷. A growing number of scholars explores the use of games as tool to facilitate sustainable commons management through social learning^{13–15,20,38–42}. Activities that engage people improve learning and serious games are role models of active learning⁴³.

In a review of more than 50 studies, Edwards et al.⁴¹ highlight that one can improve the social capital among stakeholders by playing a role game on resource governance together. They also observe that past studies with role games and serious games improve learning and empower communities. Systematic reviews on serious games^{18,44} find that most game interventions focus on cognitive learning. Most of them pay less attention to normative and relational learning⁴⁵. In contrast, Jean et al.⁴⁶ used a serious game with watershed governance framing and found that participants showed stronger trust and empathy after the game. There are similar studies around a multi-player, role-play simulation game concerning river management in the context of climate change^{19,47}. They observed changes in players' beliefs with regard to ecological (functions of river and flood safety) and social (modes of decision making) but not in terms of economic goals. Mayer et al.⁴⁸ reports on binational, multisector, serious games workshops, where participants learned about negotiations and group decision-making while building mutual respect and trust. Participants agreed that (1) action is called for and that completely depleting the freshwater in the shared aquifer could be catastrophic to the region; (2) addressing depletion and prolonging the life of the aquifer will require binational action, because actions on only one side of the border is not enough; and (3) informal binational cooperation will be required to be successful.

Muhamad and Kim⁴⁹ argue that games which have a learning and behavioral change intention need to create a structured experience around specific goals with players receiving immediate feedback on the effect of their decisions on the goals. Whether this learning experience activates relational values connected to natural resources depends on the game's structure, framing and goal definition^{50,51}. Czap et al.⁵² assessed the effect of a self-interest vs. an empathy framing emphasizing the effect of a game decision on the water quality and downstream users. They find that the empathy framing increased pro-environmental decisions and that players balanced self-interest and environmental and other-regarding outcomes. It is noteworthy that multiple studies have shown that other-regarding preferences are positively associated with pro-environmental behavior⁵³.

Many games included in addition to economic also ecological goals allowing players to take interactions between instrumental and relational value outcomes into account^{15–19,47}. In den Haan et al.¹⁸ RPG players' land use decisions created trade-offs between hydrological, biodiversity and financial outcomes related to river management. Players were given role-specific goals to balance economic outcomes, flood safety and ecological value of a river landscape. They gave flood safety as a more instrumental outcome priority over biodiversity which would be more strongly linked to relational values. Participants reported positive cognitive and relational learning outcomes. In the RPG of Hertzog et al.¹⁶, participants took on the role of different types of water users in an irrigation scheme. Players were given the task to receive income and to limit land conversion to irrigated land. Also in this game, players

prioritized instrumental values over relational ones as most of them expanded their land to the limit of their financial capacity. The participatory formulation of rules did not prevent this result.

Could a participatory approach be created using games as (relational) learning tools, but without the significant costs of co-designing very contextual games with stakeholders? Few recent studies^{12-14, 39} demonstrate that standard experiment designs can be used as a basis for developing games applicable in many communities. The co-design process is limited to contextualizing game rules and framing in a way that make them applicable to a large geographical area. A groundwater game was used in Anantapur district, India, where five players made decisions about which crop to use^{12,13}. The game players had the goal to create income but the game reports the change in groundwater level depending on players' decisions. This could have potentially activated relational values. Based on the game experience in 17 pilot villages, the partnering NGO rolled out the games in more than 2750 communities³⁷. In a similar study, Bartels et al.¹⁴ used an irrigation game to support improved local water governance and management. The game had a clear emphasis on receiving income from water and as players optimized their strategies, they avoided harvesting more water than they needed. This game became part of the intervention toolbox of different implementing organizations and has been played in more than 1700 communities by December 2022.

But does a large-scale application of games also lead to measurable learning? A systematical review⁵⁴ of 42 publications on serious games revealed that mostly changes in mental models directly after the game are studied. Measuring impacts on real-life behavioral or institutional change is very rare. In the aforementioned study, Meinzen-Dick et al.¹³ found that the use of the groundwater game, and the structured debriefing exercise stimulated more engagement in finding solutions for the groundwater depletion. They also found that a year after the game play, residents from those communities had a better understanding of groundwater governance compared to control communities where the game was not played. Similarly, Bartels et al.¹⁴ showed that two years after the game was played, treated communities reported more dam maintenance activities than control communities. Meyer et al.³⁹ report evidence that playing a coordination game increased cooperation of farmers in pest control. Better evidence on the impact of games helps to understand when and how games can contribute to improved self-governance. Falk et al. (2023)³⁷ conceptualize related behavioral change mechanisms and highlight the need to match the intended learning outcomes with the specificity of the game rules and framing, the importance of communication during and after the game in debriefing as well as the conscious choice of participants in the process. All these aspects affect how players can activate relational values in games.

One possible reason for the success of games is the safe space the game provides. Games can create a forum for experiencing possible scenarios and discussing the complexities of collective action where the consequences of participants' decisions in the game have little or no effect on them in reality. Players can safely explore behavior and institutional change that is very risky in real life^{49, 50}. Social learning which strongly integrates the relational values with their resources and the community can best happen if there is space for different viewpoints, and facilitators avoid to impose their ideas³⁷.

Conclusions

Experiments on collective action and the commons showed that imposing solutions does not lead to sustainable outcomes. It is critical to build on the relational values of the participants. If participants can determine their own destiny, sustainable outcomes are more likely. But self-governance is not always successful and communities may need facilitation to build capacity. Games built on framed experiments that provide resource context and build on existing relations, are suitable tools to learn about better solutions. Games used as part of a set of participatory activities enables communities to come together to identify relevant problems and craft potential solutions. Although more impact analysis needs to be done, initial results demonstrate measurable improvement of resource governance years after the intervention.

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Bartels et al. 2022. The study evaluates the influence of performance-based payments in learning games on promoting real-life collective action. The authors find little evidence for different behavior in the game. However, performance-based payments supported a slightly more likely intended behavioral change almost two years after the intervention.

Creutzig, F., F. Kapmeier (2020) Communication of insights is not just a matter of providing information as assumed in the traditional information deficit theory. Evidence from communication studies demonstrate that active learning, such as using games, is more effective to communicate scientific understandings of sustainability challenges. The paper reviews examples of games for active learning, especially in the context of climate change.

DeCaro et al. 2021. Communication increases cooperation in controlled behavioral experiments on social dilemmas, but why this is the case is not well understood. In this paper, lab experiments are discussed where participants answered survey questions during the experimental procedure. This leads to the finding that the positive effect of communication is less about the context of the information exchange, but more about how one communicated (such as positive tone of voice) leading to trust in each other and the process.

Falk et al. (2023) This paper conceptualizes how experiential learning games can influence behavior related to commons management and identifies critical design elements. The authors present a conceptual framework describing the most important processes involved in experiential learning games and apply the framework to intervention cases in India. The paper highlights the importance of communication and debriefing for achieving learning and behavioral change. The authors emphasize the need to build games around theories of change with transparent assumptions.

Heinz and Koessler 2021 systematically identified 33 studies and reviewed them with regard to their contribution to understanding connections between other-regarding preferences and pro-environmental behavior. They conclude that interventions addressing other-regarding preferences can be effective in promoting pro-environmental behavior in some instances. Effective interventions included the provision of information on behavioral consequences, perspective-taking, direct appeals, framing and re-categorization.

Meyer et al. 2021. This study demonstrates that the use of a framed public good game in villages in Laos led to significant improvement in pest control. The game and subsequent debriefing improved understanding of each other's willingness to participate in rodent-control training and rodent-control activities leading to a 20% lower loss of harvest than in control villages.

Muhamad and Kim. 2020 reflect on how serious games can trigger attitudinal and behavioral change. Based on conceptual thinking, they highlight game features which are most important for achieving learning outcomes. The authors call for theory-driven game design which defines intermediary outcomes that lead to desired behavioral change. They emphasize the value of transdisciplinary collaboration in game development processes.

Venot et al. (2022) use the case of a participatory game design process to discuss technical and social constraints embedded in games. They reflect on how power imbalances in the design team can affect the choice of game constraints which again affect how power will be represented in the game. The authors are driven by the question whether participatory processes undermine how objectively a game represents the complexity of social-ecological systems. They conclude that the game design process allowed to integrate different bodies of knowledge and broadened the view of participants from mere technical solutions to more aspirational future thinking.

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