Games for sustainability. How serious games can be used in research and education [EN]

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Recommended by M.A. Lukasz Jarzabek

Piotr Magnuszewski, Lukasz Jarzabek (Centre for Systems Solutions)

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Policy failures of the past century often resulted from over-reliance on biophysical data and inadequate appreciation of the diversity of ways in which decisions are made at all levels of society. Policy resistance (Sterman 2000) was the frequent, tragic result, reversing initial successes with policy failure. Optimal solutions developed by scientists and policy makers more than often proved to be useless in the world of entangled interests and intensive conflicts. In parallel, other disciplines, e.g. behavioral economics (Camerer and Loewenstein 2004) started to document "predictably irrational" (Ariely 2009) human actions.

Serious gaming for sustainability (GotCredit, www.flickr.com, Creative Commons)

Consequently, understanding and analysis of complex policy issues is often hampered by the high costs of gathering data about how various members of society actually think and decide about such issues. Similarly, scientists and policy makers often must invest years to gain experience critical to managing systems that change and evolve without undertaking real risk (Sterman, 1994). This raises the question: Can we lower the

costs of learning through experience to create better policies?

For many controversial issues persuasion does not work. What is needed, is direct experience, followed by reflection, that may lead to a change of attitudes and the emergence of new perspectives. Games and simulations can achieve these outcomes through direct experience where participants face the consequences of their decisions without bearing their real-life costs.

Serious gaming has multiple roots including game theory, drama theories and systems analysis. Game theory analyses human behaviour in situations in which participants have mutual influence on each other, and where the outcome is the result of individual and/or collective actions. Different actors are involved in different parts of the system and have only partial information and resources that are required for a solution. Moreover actors may have different perspectives on the issue. The expected result of a serious game is an improved understanding of a complex issue. This understanding is based on how players deal with the rules, how they interact and how they use their power and resources (Duke, 1974).

Simulation games and serious role-playing games allow players assuming the roles critical to the success or failure of a policy (Harvey et al., 2009). In general, games (both simulation and role-playing) are used to gain better understanding of the roles and positions of the involved actors, and complexity of several types of issues. The complexity of the issues manifests in: several domains (social-cultural, economic and ecological), a number of different actors (often with diverse goals, representing different organizations), several types of solutions. Depending on their purpose, games resemble real-life situations to a certain extent. Games that are used to support policy development require detailed information about the issue(s) at stake, the system they are embedded in, and relevant feedback for evaluating the feasibility of the created policy.

Games that are focused on learning might be executed on a more abstract level and allow participants to take other roles than they have in real-life. Participants learn about the complex structure of the problem and interdependencies between actors. When people are assigned roles other than what they perform in reality they can experience the perceptions of others and develop empathy for them. This builds better understanding of the positions and values of actors in the system as the player experiences the consequences of his/her behaviour. As a result, players are better able to jointly seek solutions.

Energy Transition Game

Let us look at a few examples. The main theme of the Energy Transition Game is practicing social and technological transformations. The Energy Transition Game is a role-playing simulation that allows players to experience transition challenges from fossil fuels to renewable energy sources. In this micro-world where energy is essential to ensure the wellbeing of citizens, players can shape the future of the energy sector. They can take roles of an energy producer, energy provider, technology start-up, one of the government departments or civil society organizations. However, achieving their goals may not be easy. Energy prices, costs of change, energy demand, harsh competition and consumer satisfaction – they can all affect the outcomes of

their decisions. Each player takes different role within a complex energy system landscape. Each role is linked with different decisions and responsibilities leaving a space for players to create their own strategies. In an open game world all players can freely interact with each other, make agreements, put new policies in place, and come up with creative, out-of-the-box solutions. This way the game not only simulates the real-life complexity of the energy transition, but also creates an environment where innovations are born.

Flood Resilience Game

Another example is the Flood Resilience Game - a simulation that helps the flood professionals to identify policies and strategies that can make flood-prone communities more resilient. The game presents the challenges that flood-prone communities in developing countries face every day. This way it creates an environment for exploring the strategies to increase flood resilience. The players begin with little knowledge about the real flood vulnerability of their community and the ways of improving their safety. Throughout the game, they progress from reactive actions (levees, preparedness) towards avoiding risk creation (prospective risk reduction). At the same time, they struggle with everyday problems (making a living, being healthy, taking care of children's education). The game also recreates interdependencies between the specific members of a community. This way it highlights the need for communication, cooperation, and solidarity between them. All of this helps the players connect what happens in the game with their daily realities. Two-hour gameplay allows them to live through a couple of decades, so they can experience the long-term effects of the decisions that they can make now. This way, they can grasp the whole concept of flood resilience, and why it is so important.

Lords of the Valley

Sometimes the games that seem to be set in a very specific context can also work as a metaphor of much wider concepts. The "Lords of the Valley" uses the real-life river system model to recreate the challenges of both river valley management and cooperation in multi-party environment. The game combines solving complex problems with the dynamics of human relationships. It is a role-playing simulation game that takes place in the valley of the river exposed to unexpected droughts and floods. Participants take roles of people living in this valley making decisions on behalf of different organizations. They try to achieve their goals, facing many challenges arising from the decisions of other players and the unpredictability of the environment. The game was used to discuss the complex challenges of river valley management and necessary transformation required to attain sustainability. It has also been used to improve the quality of communication and collaboration in many organizations, public and private.

Green&Great

The games have also a unique potential to change how people perceive and understand sustainability in a business contexts. When playing a game, through intellectual and emotional engagement in an interactive environment they start to see how important sustainability becomes for their business. "Green&Great" is a simulation game in which players assume the role of managers in large consulting firms. Their companies compete for clients and seek to make a profit, while achieving social goals and reducing environmental impacts. The Green&Great game allows participants to experience the consequences of their choices — either sustainable or unsustainable. The experience feels real, engages emotions and supports true change of attitudes and actions. By facing the consequences of their own decisions, players learn and experience the importance of business sustainability as a source of competitive advantage.

Games4Sustainability

These are only examples of how games can be used in sustainability-related research and education. In order to catalogue and describe such games and simulations, the Games4Sustainability initiative was created. The platform allows its users to explore and apply the free-to-use sustainability serious games. Another part of the platform is a blog providing further inspiration for using games to promote and teach sustainable development in its different forms. Games4Sustainability users can also regularly explore the updated Sustainability Gamepedia where they can find information on different existing games (including board games, computer games, role-playing games and other types) to support their educational goals. The G4S platform aims to be a source of inspiration for academics, trainers, NGOs, teachers, students and other people interested in implementing sustainability games in their activities, and hope to gather an active community of educators sharing their experiences in applying those games and inspiring each other.

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More about

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About the authors

Piotr Magnuszewski

Co-founder and managing director of the Centre for Systems Solutions (Poland). For many years he has been working as a systems modeller, professional trainer, facilitator and researcher. He is particularly involved in linking theory and practice, science and policy, knowledge and action through diverse systems and knowledge management tools. He has been applying and teaching systems tools with diverse groups of scientists, NGOs, businesses and administration in many countries. He designed and applied many simulation and role-playing games addressing the issues of complexity and sustainability. He has been also applying them with diverse groups of scientists, businesses, NGOs and administration in many countries. He has been specializing in experimental games used for research on linking cultural values and emergence of institutions, interactions between cultural theory and common pool resource management and effectiveness of payments for ecosystem services in the context of natural resource management. Piotr is also working as a research scholar in the International Institute for Applied Systems Analysis (Austria) engaged in many international projects on adaptive management of complex socio-ecological systems. In this context, he developed and applied, in a participatory way, a range of system dynamics qualitative and quantitative models. He is an author of many research and educational publications.

Lukasz Jarzabek

MA in Information Science from the University of Wroclaw. He has wide knowledge in new media practices, also in the educational context. In CRS he is a game development specialist. He is also responsible for promotion and marketing in Polish and international projects. He was a co-designer and an administrator of social networking and knowledge brokering website created for sustainability professionals and academics. Since 2012 he has been running online webinars with sustainable business simulation game "Green&Great" for businesses and other organizations from all over the world. He also participated in design of experimental game exploring the management of common goods from the Cultural Theory perspective for IIASA. He participates in policy exercise and workshops design for EDUCEN (European Disasters in Urban Centres: a Culture Expert Network) H2020 project.

https://www.pol-int.org/en/salon/games-sustainability-how-serious-games-can-be-used-research-and?j5Q6rewycZ5HtUDXTWpx7UZE=1