Can computer models be used for social learning? A serious game in water management

Merel M. Van der Wal a, *, Joop de Krakera, b, Carolien Kroeze a, c, Paul A. Kirschnerd, e, Pieter Valkeringb, f

a Faculty of Management, Science and Technology, Open Universiteit, P.O. Box 2960, 6401 DL, Heerlen, The Netherlands
b International Centre for Integrated Assessment and Sustainable Development (ICIS), Maastricht University, Kapoenstraat 2, P.O. Box 616, 6200 MD, Maastricht, The Netherlands
c Environmental Systems Analysis Group, Wageningen University, Droevendaalsesteeg 3, P.O. Box 47, 6700 AA, Wageningen, The Netherlands
d Welten Institute, Open Universiteit, P.O. Box 2960, 6401 DL, Heerlen, The Netherlands
e Faculty of Psychology and Educational Sciences, Open Universiteit, P.O. Box 2960, 6401 DL, Heerlen, The Netherlands
f Flemish Institute for Technological Research (VITO), Boeretang 200, BE-2400, Mol, Belgium

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ABSTRACT

Computer simulation models are increasingly used to support solving complex problems in natural resource management, with social learning as subsidiary goal of the solution process. In this research, a serious game on water management is used where participants receive feedback on consequences of their choices from an Integrated Assessment Meta Model. This study aims to determine if and how social learning takes place and explores the role of the model in social learning. Group discussions were qualitatively analysed to uncover and understand the mechanisms in this process. Results show that social learning took place in 10 of the 12 game sessions. Though model feedback was an important driver for social learning, social learning was driven most by the team’s reflection on their perspective. We conclude that using a model can facilitate social learning in a serious-game setting, in particular in combination with reflection on teams’ perspectives.

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1. Introduction

To cope with complex problems in the management of natural resources such as water and arable land, participatory approaches involving stakeholders are becoming increasingly popular (Parker et al., 2002; Reed, 2008). The expected benefits of a participatory approach can be summarized as (1) improving the quality of the solutions by including relevant non-scientific sources of knowledge and experience, (2) enhancing the relevance, legitimacy and credibility of the solutions by accounting for the diversity of perspectives among the stakeholders and (3) widening the basis of support for the implementation of solutions.

In this context, stakeholders join a participatory process to come to a policy-decision. Where it concerns land use related policy decisions, the focus is specifically on finding a solution for often complex or wicked problems. Such problems are characterized by being open for various interpretations and solutions, hold a strong interconnectedness to other problems, involve various parties with differing interests, and expand over multiple time scales (Gibson et al., 2013; Hisschemoller et al., 2001; Rittel and Webber, 1973).

Computer simulation models are often used as a support tool in understanding and dealing with the complexity of these wicked problems (Inman et al., 2011; Rotmans, 2006). A computer simulation model can support the decision process by allowing joint exploration of the effects of different measures that can be taken to solve the problem. By providing a feedback link between choices, (simulated) actions and consequences in several cycles or rounds, using a model in participatory processes can lead to stakeholder learning in a similar way as Kolb’s experiential learning cycle, amplified by facilitated dialogue and communication between stakeholders (Jiggins et al., 2007). In this cycle, learners move from...