

Gaming Simulation for Individual, Collective, and Organizational Learning

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***Abstract** The lecture part of the session will refer to the discussion started by Jan Klabbers. It will build upon the concepts of analytical and design science approaches of gaming simulation. As Jan Klabbers (2008) has pointed out, design aims at transformation of existing (dysfunctional) situations into preferred ones. He distinguishes two levels of design: design-in-the-small” and “design-in-the-large.” Design-in-the-small produces simulation games (gaming artifacts) as intervention method and/or interactive learning environment to enhance education and training. Used with this aim games contribute at the same time to the “design-in-the-large” (change) process of social systems in order to create a “learning organization”.*

Keywords: *Gaming Simulation, Game Design, Learning Organization*

Introduction: Working definitions of Gaming Simulation

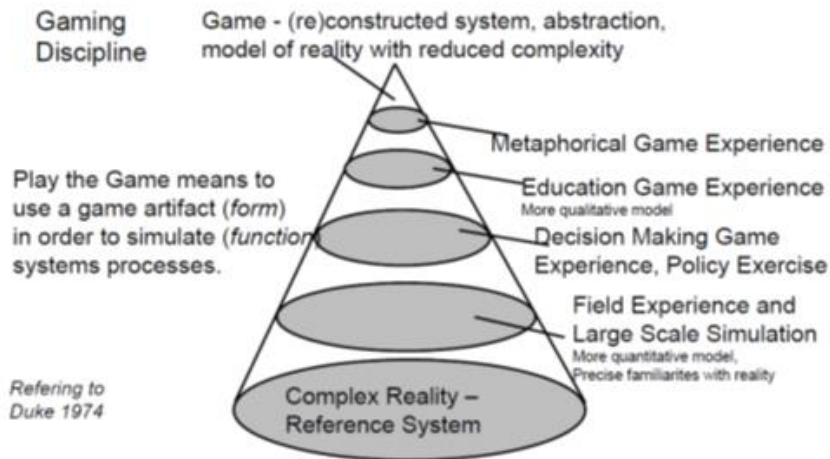
A game is a form of play. It is an activity involving one or more players who assume roles while trying to achieve a goal. Rules determine what the players are permitted to do, or define constraints on allowable actions, which impact on the available resources. Games deal with well-defined subject matter (context and content). A model is a description and representation of a (real) system and/or systems processes that can help to understand how the system and/or processes work or how it might work (Klabbers, 2008, p. 24).

Simulation games are experiential (“safe” and error tolerant) and problem based learning environments based on qualitative and quantitative models of the (dysfunctional) reality and/or models of alternative hypothetical futures. They engage learners and/or decision makers in playing different roles and acting within a set of rules, making decisions in order to explore and to predict effects of those decisions (including long term and side effects) on the simulated system and its resources.

Gaming Simulation methods are used as experiential learning environments in order to educate and train the players. They are used for creating knowledge and enhancing competencies in an authentic way and they are used for facilitating real problem solving and decision making by working out the consequences of different strategies. Through Gaming Simulation interventions in real systems are developed and alternative futures are explored by the users. Through implementing and transferring results of the game play and debriefing gaming contributes to the transformation of organizations and other real life systems.

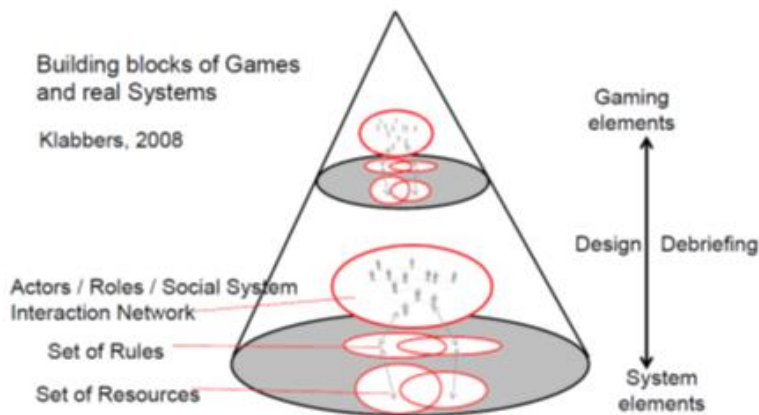
Referring to Duke (1974) and Klabbers (2008) playing a game means to use a game artifact (form) in order to simulate (function) systems processes of a complex and dynamic reference (real) system. Simulation games represent dynamic models of real situations. A game reconstructs important aspects of the reference system, it is an abstract model of the reality with reduced complexity. Several different levels of abstraction are possible - from very abstract metaphorical games and educational games with mainly underlying qualitative models to large scale simulations with quantitative models and precise familiarities with the reality for decision making purposes.

Figure 1: Gaming Simulation referring to Duke (1974)



Simulation games help to mimic processes, networks, and structures of specific existing systems. In addition to mirroring real-life systems, simulation games incorporate players who assume specific roles. The prototype gaming simulation combines role-play and simulation. Like real socio-technical systems also simulation games include actors, rules, and resources as building blocks (Klabbers, 1999).

Figure 2: Gaming Simulation referring to Klabbers (2008)



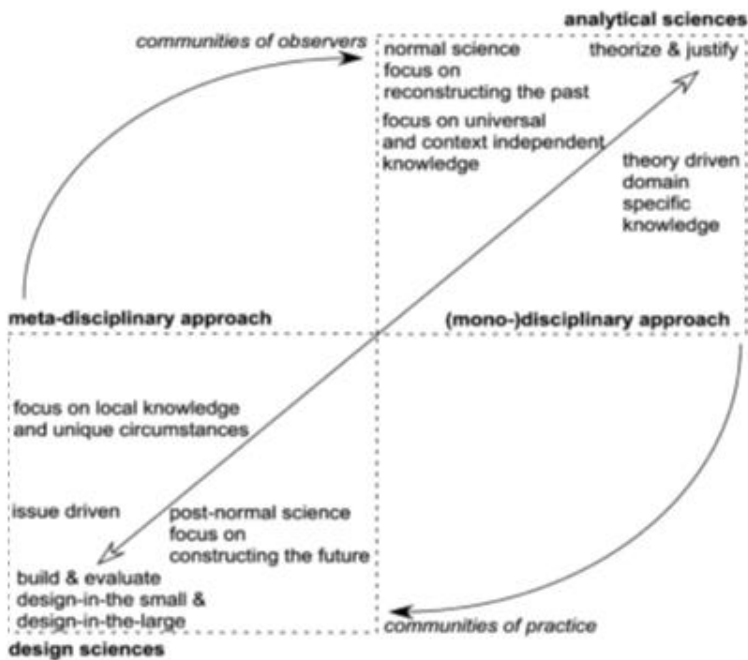
Games simulate social dynamics (e.g., communication processes through the actors using rules) as well as the dynamics of the resources depicted in the reference system. In simulation games, the scope of communications and actions between the actors is broadened by linking them to technical and material processes that mirror the social system's resources. The main goal of simulation games is to simulate the actors' decision-making process and to demonstrate the consequences within social systems (e.g., within a company). Simulation games can be defined as the simulation of the effects of decisions made by actors assuming roles that are interrelated with a system of rules and with explicit references to resources that realistically symbolize the existing infrastructure and available resources.

Gaming Simulation as science of analysis and science of design

There has been much criticism in the area of gaming and simulation research due to the disparity between conventional academic research and research based on practical experience. The conventional academic research carried out in this field has focused on developing and improving domain-specific knowledge by using simulation games in experimental environments (gaming and

simulation laboratories). In contrast, the practical experience in this field has involved the transfer and dissemination of knowledge using specific simulation games with clearly defined designated audiences in a defined context of use. Klabbers (2006) uses the terms science of analysis and science of design to describe these two different approaches.

Figure 3: Analytical Science and Design Science, Klabbers (2009, p. 191)



The theory-driven science of analysis approach has used games and simulations as scenarios to test theories in various domains such as education, social psychology, politics, and economics. The main aim of the conventional science of analysis has been to develop generalized scientific concepts and context-independent knowledge. Accordingly, the external validity of findings is of primary importance to this approach. Research in the issue-driven science of design approach, on the other hand, puts the emphasis on the usability of the simulation game. In this case, games and simulations are studied with the aim of supporting and

evaluating their development and use in practical contexts. Here, it is necessary to focus on local knowledge and individual, unique circumstances to find customized solutions to practical problems. The science of design has two branches (Klabbers, 2006): design-in-the-small, which uses simulation games as artifacts to model processes of reality, and design-in-the-large, which uses the effects of simulation games to change existing dysfunctional situations, patterns of behavior, or systems structures into preferential ones. Therefore, it is essential that the artifact assessment takes the evaluation of a simulation game as a product into account, as well as its effect on the process of change. In the design science, the interplay of design-in-the-small and design-in-the-large is of primary importance. Design-in-the-small produces simulation games (gaming artifacts) as intervention method and/or interactive learning environment to enhance education and training on the individual and collective level. Used with this aim games contribute at the same time to the “design-in-the-large” (change) process of social systems in order to create a “learning organization”.

Organizational learning

Today, people, groups, and organizations are increasingly confronted with problems and situations that show a high level of complexity. However, human abilities to deal with complex dynamic systems and processes while behaving in a sustainable way have not improved to the required extent. An essential advantage of the gaming simulation approach lies in the integration of knowledge of various scientific disciplines and the attempt to make complex-living contexts understandable. To survive, people, groups, and organizations need to adapt continuously to the change of inner and outer conditions. Therefore, human beings and organizations as social systems must be able to learn. Learning on the individual level implies acquiring knowledge, skills, and competencies to cope successfully with different circumstances. Learners need to change their inner conditions. Through cognitive (re)construction of mental models, learners change their perception and interpretation patterns of reality. Simultaneously, individuals must deal with the environment in which they live and learn to

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understand the influence of transformed behavior and communication patterns on that environment. Learning at the level of organizations signifies the change of organizational cultures and structures, strategies, and work processes. Organizational learning affects the (re)construction of social representations of groups and the development of social systems' processes.

Simon (1969) pointed out that design means to conceive and to implement courses of action aimed at changing existing dysfunctional situations into preferred ones. This approach of design-in-the-large (DIL) is the foundation of all forms of consulting work, training, and education in the attempt to foster new ways of thinking and acting and to develop organizations.

To produce a more holistic understanding of systems and to generate ideas for change, simulation games and related design methodologies offer an effective approach (Kriz, 2003) Gaming simulation design as a design-in-the-small (DIS) approach enhances a shift of existing organizational cultures and structures and in this way contributes to the DIL process of social systems. This leads to a (more or less) preferred (re)construction of real situations through the constitution of new action patterns, norms, and roles and the change of the physical and social environment itself. This form of DIL can be described as self-organizing development of social systems via DIS through designing and using simulation games.

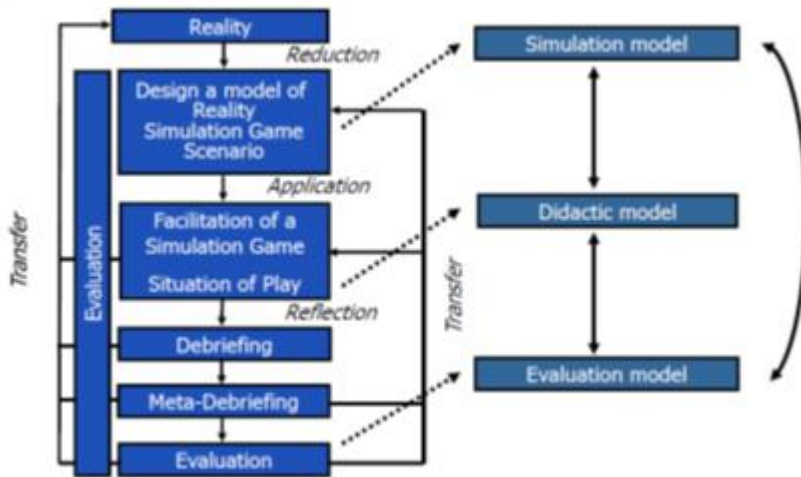
Linking design-in-the-large with design-in-the-small through gaming simulation

The gaming simulation approach and how it is integrated with DIL and DIS is illustrated in Figure 4. A part of the existing situation of reality is selected as reference system for the design of the simulation game. The final aim is to change organizational structures and processes. To carry out DIL, a game (DIS) as a dynamic model of reality is created. In order to design the game a simulation model is created, for example using the 21-step design method of Duke (Duke & Geurts, 2004). In the design of the simulation game reality is represented and a concrete model and game scenario is developed. The reality is distorted due to a reduction of complexity, influenced by individual mental models of

the designers and because of didactical reasons. This is a design-in-the-small process. By inviting stakeholders and opinion leaders to participate in the DIS process, it becomes natural to have them contribute both as agents and actors. Participating in design, play, and debriefing allows the players to take part in the DIS process while ultimately contributing to the next phase of the social system processes' DIL. Applying the game and debriefing the game is facilitated to enhance the learning process and to apply newly gained insights, knowledge, and skills within the DIS aimed at changing reality (DIL). In order to create optimal learning environments a didactic model has to be defined. In the play of the game a specific game reality emerges, created by the actors/players. The players pay attention to the game-scenario and are influenced by their mental models of the simulated reference system. During debriefing game and reality (game elements and systems elements) are compared to each other in order to transfer acquired knowledge and skills. In the debriefing also concrete plans for organizational change and interventions to change the existing dysfunctional situations are made (aid of design-in-the-large).

The secondary phase of debriefing, referred to as meta-debriefing and evaluation, is required to further the reflection. During the meta-debriefing a debriefing of the debriefing is made in order to reflect on the facilitation and debriefing of the game, the design process and the model of the game. This phase focuses on the train-the-trainer and/or train-the-designer perspective. During the evaluation the effects of the design and play of the game for the design-in-the large are analyzed. This phase requires the definition of an evaluation model that support to explain how the interaction of a simulation, its participants, and its environment create learning. It should be developed cooperatively by evaluators and simulation developers and/or facilitators. This model provides a frame of reference for interpreting the simulation's workings as a learning environment and enables to identify areas for improvement in the simulation's design or implementation.

Figure 3: Process of gaming simulation (Kriz, 2011, p.17)

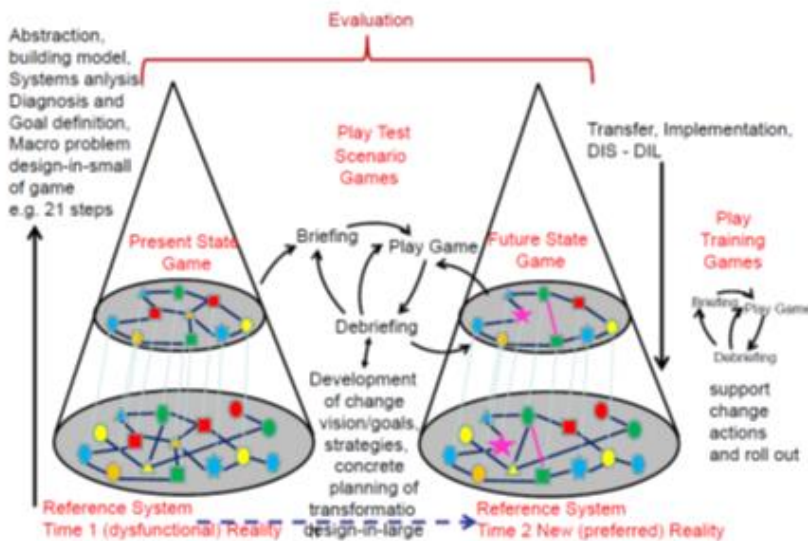


Gaming for organizational learning

Gaming simulation methods support the phase of organizational diagnosis to determine the actual condition, for example, as part of assessment centers and potential analysis. Gaming simulation helps in the understanding of existing organizational structures and work processes. For example, members and stakeholders of the organization can design simulation games together with gaming simulation experts to illustrate the processes and structures of the real organization in a present state simulation game. When playing and debriefing such a simulation game, existing advantages and disadvantages of these structures can be illustrated, thereby fostering discourse on ideas for potential change strategies. The knowledge acquired and the conclusions drawn can be used to define goals and concrete planning of change measures. With gaming simulation, consequences of alternative scenarios in a changed organizational structure can be tested, scored, and discussed. Here several test

scenario games can be carried out to find the optimal future structures and processes of an organization. In an organization, desired changes can be illustrated in a final vision/future state simulation game. Gaming simulation can then be used as an intervention tool for human resource development in training games and support organizational development through the training of specific change related knowledge and required skills. Finally, intended learning experiences and consequences of organizational changes can be evaluated with the help of simulation games.

Figure 5: Gaming Simulation as approach to organizational learning and change



The use of gaming simulation in a company, for example, can serve as a tool to create a better understanding of the prevailing organizational culture, structure, and processes to assess the risks, chances, and necessities of organizational change. Gaming simulation is a method used to support people and organizations in dealing with the sustainable (re)construction of their reality. Gaming simulation imitates organizational processes and changes them in an experiential and playful way. This aids organizations in their search for creative problem solution in real-life situations. Through gaming simulation, a number of different scenarios can be

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designed and played. The participants can experience the influence of playing different roles. Through a series of experiences in dealing with various social situations, roles, perceptions, and characteristics of the reference system, alternative modes of (re)acting can be developed. During debriefing, alternative behavior patterns are shared among the participants, followed by discourse on ideas for implementing change. The construction of organizational models and the design of corresponding simulation games by members of the organization themselves (with coaching assistance by experts) tend to be more effective than simply participating in rigid rule–simulation games (even if they are properly designed by simulation and gaming experts). The translation of experiences gained from the design of a simulation game (DIS) and from the playing of the self-designed games to the real-life system will lead to a deeper understanding of that system's structure. This understanding may lead to intervening in the system to improve its functioning (DIL). The design of simulations and games by stakeholders can be defined as a type of free-form game. Participants have the opportunity to settle their own learning goals, construct models of reality, and define game rules. The design process as a self-organizing learning environment helps reveal the communication modes of the group as well as the individual mental models and systems representations of the participating designers. Common values, goals, rules, social representations of reality, and strategies for complex systems management can be mutually shaped. Another advantage in using employees as co-designers of simulation games, with their own organization as a reference system, is that participating employees will be more motivated to transfer their experience from this DIS activity into changing the real situation. In this way, people will be more committed to their own ideas and visions of change. Therefore, the probability of an effective DIL process increases.

Summarizing remarks

The design of adequate learning environments plays an important role in supporting organizational learning, changing mental models, fostering alternative interpretation patterns of reality, developing new communication and action patterns, and

reconstructing the sociotechnical aspects of organizations. The approach of gaming simulation and the design of simulation games have always been effective methods for modeling and changing existing situations into preferred ones. The design of simulations and games as a DIS approach can be linked with the DIL process to promote organizational change. Gaming simulation as an interactive-learning environment propels the principles of problem-oriented learning into action (set up by research in educational psychology). Thus, knowledge and skills do not remain inactive; instead, they become transferable and applicable. Simulation games can be used for supporting the acquisition of knowledge and competencies in a domain-specific context for the training of specific skills needed to manage specific systems. Gaming simulation and especially the design of simulation with debriefing and meta-debriefing can be used as methods of training to foster individual learning processes. Simultaneously, the design of simulation games affects learning at the organizational level. New sensibilities and awareness; new team skills, competencies, and cognitive capacities; and new action rules, attitudes, and values that are formed in the design process of simulation games (DIS) give direction and are implemented to produce new organizational approaches, structures, and corporate cultures (DIL).

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About the author

Willy Christian Kriz earned his PhD 1999 in Psychology from University of Vienna. He is full professor for Organizational Behaviour, Leadership and Change Management at the FHV University, Austria. He is working as a researcher, lecturer, trainer, consultant and designer with different forms of simulations and games for a whole range of purposes, including education in systems-management, personnel and team development and senior management training, facilitation of organizational change processes and support of managerial decision-making. He is author of 15 books and about 150 articles and received 4 best paper awards. He has presented more than 100 papers and keynotes at conferences worldwide. He was founder and 15 years chairman of SAGSAGA (Swiss Austrian German Simulation and Gaming Association), was for 12 years executive board member, actually advisory board member and 2004/2005 and 2014/2015 president of ISAGA (International Simulation and Gaming Association), he organized two ISAGA conferences, he is founder and was 10 years co-director of the annual ISAGA Summer School on game design. He is from 2016 co-editor in chief of the Journal Simulation & Gaming (Sage Publishers).