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## **Serious games, gaming, learning and crisis communication – insights from the literature**

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### **Introduction**

Serious games and crisis simulations could be generally seen as important examples of media. They use the impact of entertainment to communicate a serious message, as Gee (2003) and Prensky (2005) have earlier argued. Serious games and crisis simulations can be applied to a wide variety of situations and conflicts such as natural disasters, prison riots, kidnappings, and international conflicts as Boin, Kofman-Bos and Overdijk (2004) have proposed. Still the simulations and games typically serve a limited number of purposes. Simulations and games are often used to illustrate the patterns and pathologies of crisis decision making. They have also proven to be a powerful tool to generate awareness among participants. Boin et al. (2004) underline that crisis simulation and serious games can be very helpful in bridging the proverbial gap between theory and practice. Simulations present participants with a setting that generates real-life experiences and enables them to directly apply theoretical insights to crisis problem solving (Kleiboer, 1997).

Communication skills and the management of information chains need to be trained to crisis managers and response teams, as Reuter, Mueller and Pipek (2009) emphasize. They argue that this is needed particularly for crises of a size that requires inter-organisational coordination. In many cases, the training could be supported by simulation and games. Reuter et al. (2009) highlight the strategic preparedness of actors in crisis management. Although process modelling and improvement techniques can be used, there will always be situational aspects that the actors need to respond to. Smith (2004, 349) also remarks that simulations or serious games serve “as a useful audit mechanism for organizations as well as a validation tool for contingency plans and organizational crisis teams.” Simulations provide a safe environment to organizations to engage in trial-and-error learning and the opportunity to learn within a safe environment the limits and capabilities of their organizations.

## **Purpose of the study**

The purpose of this study is to study how serious games, gaming and virtual simulations can be used to enhance crisis preparedness and communication in multi-actor networks. Games and gaming as a platform to further develop crisis preparedness education can be a useful tool as games can be seen as a form of narrative that can be to a greater or lesser extent fictitious. A game can be a simulation of real life events or create totally new fictitious scenarios. Games and virtual simulations can give freedom to experiment with forms of behaviour and they often include problem-solving which is motivating too. Crises are extreme situations, but the skills learned are useful also in less hectic times. Serious games, gaming, and virtual simulations can teach and enhance these skills, but how and to what extent?

## **Methodology**

One objective of the literature review was to go beyond merely summarizing previous research. For this study, a computerized search of relevant scientific articles was carried out in November 2015, followed by a thematic analysis of the data. The method used in this paper for conducting the review can be described as a mix of metasynthesis and a systematic literature review. The former is a non-statistical technique with the aim of integrating, evaluating, and interpreting the findings of multiple qualitative research studies, whereas the latter is a more rigorous and well-defined approach with the aim of clarifying the frame within which the literature was selected.

Literature was gathered through database searches employing primarily the EBSCO and ProQuest. Databases used for EBSCO were the Academic Search Elite, Business Source Elite, and Communication and Mass Media Complete, and E-journals. The first search, for the EBSCO databases, yielded 65 results. The second search in the ProQuest database yielded 43 results. Overall the numbers of found articles were 108. To narrow down and distil the material, a number of inclusion criteria were used. For this research, the literature must have (a) covered research on crisis communication or crisis management, (b) covered research on gaming, serious gaming or virtual simulations, and (c) the paper offered at least 6 references. These criteria also served the purpose of excluding literature not related to the topic. Excluded literature pertained various topics (e.g., gaming in general, gambling, marketing, branding). The articles in the

final sample, 29 articles overall, were then read through and a thematic analysis was conducted. The main findings and conclusions of each article were transferred to a data-extraction table and additional notes made.

RQ1: How is serious gaming used to enhance competence of citizens and, in particular, related to crisis preparedness?	RQ2: How is serious gaming used to enhance competence of experts and, in particular, related to crisis management and communication?
RQ3: How is serious gaming used to investigate behaviour by citizens and experts, in particular, related to crises?	RQ4: What are the trends visible in the scholarly literature on this topic?

## Findings

In this section, the main results derived from the sample of articles are presented by research questions. The RQ1 explored gaming from the civic educational perspective.

<p>RQ1: Serious gaming used to enhance learning and education of citizens</p> <ul style="list-style-type: none"> <li>- The combination of narratives and rule-based procedures make the virtual world a unique rhetorical tool for imagining participants as citizens and acting out that imagination. Playing games with different rules facilitates taking on roles in those worlds, making decisions within the constraints they impose, and then reflecting about living in them. (Davidsson and Gehm, 2014)</li> <li>- Games can teach a community's core values and the process to participate. The player is able to see the broader arguments of civic education and the nature of good citizens and good societies. (Davidsson and Gehm, 2014)</li> <li>- Gives the player tools and techniques for thinking about, approaching, categorizing, and analysing that society. Gaming could be a tool for the production of systems of thought about cause and effect. (Greenberg, 2012)</li> <li>- Games are learning tools, which could help increase collaboration of young people, and enable them to work in a team and develop a sense of community. Hilton (2006)</li> <li>- Games use the impact of entertainment and could communicate serious messages. They invite players to explore and interact (Neys and Jansz, 2010)</li> </ul>
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RQ2 addressed the crisis expert perspective.

<p>RQ2: Serious gaming used to enhance expert competence</p> <ul style="list-style-type: none"><li>- Enhances the communication, situational awareness and personal skills of participants and confronts scenarios that range from usual to extreme (Ferracani et al., 2015).</li><li>- Enable collaborative learning, which leads to a deeper level of understanding and long-term retention of the learned materials. Also are emphasizes the social and communicative skills (Wouters, van der Spek and van Oostendorp (2009).</li><li>- Interaction in serious games emphasizes communication skills and outlines the information chains by crisis managers (Reuter et al., 2009).</li><li>- Serious games could benefit finding new capabilities, new ways of operating, and the potential for real-time decision support tools which could enable a range of possible timelines for developing crisis (Walker et al., 2011).</li><li>- Supports the training of crisis units, including the crisis phases of preparation, execution and evaluation (Stolk et al., 2001).</li></ul>
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RQ3 investigated the decision making and behavior in crises.

<p>RQ3: Serious gaming used to investigate decision making and behaviour</p> <ul style="list-style-type: none"><li>- Through gaming, the investigations of human phenomena, e.g. cooperation and ethical behaviour in conflict situations, can be carried out (Szell and Thurner, 2012).</li><li>- Permits insight into the cognitive processes that inform judgment and possesses a potential as a method to evaluate decision making (Mohan et al., 2004).</li><li>- Virtual worlds can be a safe environment to test hypotheses as to how to react to real world emergencies without putting humans at risk (Wyld, 2010).</li><li>- Serious games might be used to study decision making of crisis managers under stressful and overloaded conditions (Walker et al., 2011).</li></ul>
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RQ4 clarified the trends in the current literature.

The findings indicate that the volume of gaming and crisis have increased in recent years. For the first search, 9 papers out of 11 were published during the last 5 years. For the second search 6 papers out of 9 were published during the last 5 years. The findings also indicate that most of studies in the field are case based. The papers that discussed serious gaming and simulation from the crisis management perspective were either focused on case-studies of medical care, literature reviews or crisis simulation case-studies. The papers that focused on crisis management discussed how gaming and simulation work as training tools.

## **Conclusions**

The main purpose of this paper was to draw attention to serious gaming and virtual environments in crisis communication. Our results describe that digital games and environments are an expressive medium which invites players to explore and interact. The combination of narratives and rule-based procedures make the virtual world a unique rhetorical tool for imagining and acting. This paper presents that participating digital games and virtual worlds with different rules facilitate making decisions, taking new roles in those worlds and reflecting about living in them. Learning and participating via digital games and virtual worlds gives new tools and techniques for thinking about, approaching, categorizing and analysing the complexity of world. Our observations are that eventually this will help citizens to educate themselves and be more prepared with crisis situations. Digital games and virtual worlds are cost effective and readily available environments that provide alternatives to expensive high-fidelity simulators. These both can be used to train the skills and decision making ability of crisis response units, as well the non-technical soft skills of participants. We propose that games and virtual environments play important role enhancing crisis management planning and training, which leads to the deeper level of understanding. For the crisis experts, digital games and virtual environments could be used to emphasize the communication skills and information chains needed in crisis. They could also reveal weaknesses in existing plans and resource planning. This way the coordination of different operational elements can be increased and recognition of public faith for emergency capability gained. Well before a crisis happens the resources, decision making ability, response planning, and training for crisis management can be enhanced. After actual crises

digital tools as games and virtual environments could help to learn from experiences and modify the crisis management system for the future. Overall crisis experts and citizens together, via digital games and virtual environments, could facilitate the learning for crises in safe environments. Serious games technology could be used to study human phenomena. For crises and disasters this involves the cooperation and ethical behaviour of participants. Virtual tools like games and simulations are safe environment to test hypotheses how citizens and crisis response experts react without putting anyone in real risk. These kinds of environments also provide the possibility to manipulate the task conditions and permit insight into the cognitive processes. This creates the possibility to test and evaluate decision making under stressful and overloaded conditions.

This review into the literature of serious games, virtual environments and gaming simulations can be used as a basis to study a wide range of communicative aspects related to crisis, crisis management and human behaviour. The overall findings indicate that the interest in the topic is recent, as with the exception of some articles dated earlier, most papers found were published in the last five years. Although the focus on crisis management yielded many articles, there was little attention for communication with publics. The use of serious gaming for preparedness of citizens and for investigating citizen behaviours can be seen as a significant gap in the research so far. This gap should be addressed in future.

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