

Raising Natech Risk Awareness Using a Serious Gaming Approach in Colombia

○Lina Maria PARRA-ORDUZ, Ana Maria CRUZ

Introduction

Raising risk awareness and risk communication among stakeholders is still an issue to be addressed to develop and implement effective risk reduction measures (OECD, 2015). Past studies have shown that there is little or even no information provided to the local communities regarding natural and chemical hazards and risks (Kinoshita et al., 2014) and Natechs (i.e. Natech' - Natural hazard -triggered technological accidents) (Yu et al., 2017). It has been identified that sometimes industry limits the information access to other stakeholders (Tzioutzios, 2022), such as government entities and citizens. This can result in adverse effects, such as a negative impact on risk awareness, and less disaster prevention measures and preparedness planning for these events (Mohammad, 2019).

The aim of the study is to understand how risk awareness can be raised and which factors may affect it, we studied interactions among stakeholders. The study was carried out using a serious game approach. The serious game, proposed by (Tzioutzios, 2022) promotes dialogue among stakeholders and their participation in decision-making processes concerning natural and Natech disasters under high uncertainty and often incomplete information. The serious game is

based on a collaborative and experience-based learning approach. The game was implemented during several workshops conducted in Colombia. This study is expected to later contribute to the improvement of risk reduction measures and the development of inputs for risk management policies.

Past studies

Previous work by (Tzioutzios, 2022), aimed at the design and testing of a serious game to promote information sharing and awareness raising, using a non-traditional approach. The name of the serious game is EGNARIA.

To evaluate the impact of the game, Tzioutzios developed a survey based on the Situational Theory of Problem Solving (STOPS) (Jeong-Nam Kim & James E. Grunig, 2011). STOPS attempts to model how individuals communicate during a situation that requires problem solving and the factors that drive their motivation to do so.

Methodology

The study was conducted through the implementation of 8 gaming workshops in 4 Colombian cities, involving 71 individuals from different groups of stakeholders. Representatives from national, regional and local government entities, industry and communities participated in the



Figure 1. Methodological steps for this study. Source: the authors.

workshops. The survey based on STOPS, described above, was conducted before (Step 1) and after (Step 3) the gaming sessions (Step 2) and the data collected from all the workshops were analyzed at a later stage. The followed 4 steps are described in Figure 1.

Results

After conducting the workshops and performing the analysis of the data, we were able to identify, that female participants and those with higher education levels, showed and increased risk awareness. When comparing among the different stakeholder's perspectives those related to the national government entities and industry indicated higher risk awareness.

The analysis provided insights on the impacts of the game on Natech risk awareness considering their different profiles based on their actual roles, previous experiences, age, education, and gender. Our analysis supports that the gaming experience and the direction of the discussion was highly influenced by the participant's backgrounds and past experiences.

The experience for the workshops demonstrated the suitability of the game to promote the dialogue between different actors in a territory. Furthermore, it exposed how the workshops helped each of the involved stakeholders to better understand their real-life role in Natech risk management, considering the national regulations in place in Colombia.

By studying the workshop discussion recordings, it was identified that the game is seen as a valuable tool to increase risk awareness and the participants expressed their desire for this game to be available as a tool for their communities. In addition, valuable insights were offered to improve both the game and the survey, to better serve as a useful tool.

Overall, our findings can serve as an initial input to improve the decision-making process and making the implementation of risk reduction measures more effective, leading to an improved Natech risk management process. Further analysis of the data is expected to help to better understand how the

communication channels might be established among the stakeholders.

References

- Jeong-Nam Kim & James E. Grunig. (2011). Problem Solving and Communicative Action: A Situational Theory of Problem Solving. *Journal of Communication*, 61(1), 120–149. <https://doi.org/doi.org/10.1111/j.1460-2466.2010.01529.x>
- Kinoshita, T., Professor Emeritus, Kyoto University, 31-17 Kotakeyabu-cho, Matsugasaki, Sakyo-ku, Kyoto 606-0967, Japan, & Fellow, International Institute for Advanced Studies. (2014). Short History of Risk Communication in Japan. *Journal of Disaster Research*, 9(sp), 592–597. <https://doi.org/10.20965/jdr.2014.p0592>
- Mohammad, L. R. (2019). *Risk Perception and Awareness about Earthquake among Residents in Dhaka*. Kyoto University. <https://doi.org/10.14989/doctor.k22105>
- OECD. (2015). *Addendum Number 2 to the OECD Guiding Principles for Chemical Accident Prevention for Chemical Accident Prevention, Preparedness and Response (2nd Edition) To Address Natural Hazards Triggering Technological Accidents (NaTech)*.
- Tzioutzios, D. (2022). *Exploring Natech Risk Communication for Participatory Risk Management: Understanding citizens' communicative behaviour through a comparative study and a serious game* TZIOUTZIOS Dimitrios 2022. Kyoto University.
- Yu, J., Cruz, A. M., & Hokugo, A. (2017). Households' Risk Perception and Behavioral Responses to Natech Accidents. *International Journal of Disaster Risk Science*, 8(1), 1–15. <https://doi.org/10.1007/s13753-017-0116-y>