

# The Role of Serious Gaming in Assisting Humanitarian Operations

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## ABSTRACT

Crisis response, including humanitarian operations, is a highly complex field and its effectiveness is challenged by the dynamic partnerships of organizations involved and critical field conditions. Serious gaming is recognized as an effective method for complex systems design and analysis. Given the criticality of complex humanitarian operations and the current challenges faced by humanitarians in crisis response, serious gaming could play an important role in this field. However, the full potential of serious gaming in humanitarian assistance has not been fully explored yet. This article examines the role of serious gaming in assisting humanitarian operations. A board game is developed and played to examine its role in facilitating requirement engineering and training for humanitarian missions. In the contribution, the authors show how they were able to address the vital challenges faced by humanitarian aid workers in crisis response. Additionally, the outcomes of game sessions and their implications for humanitarian operations of the future was discussed.

## KEYWORDS

Coordination, Humanitarian Assistance, Humanitarian Logistics, Information Management, Monitoring and Evaluation, Requirements Engineering, Serious Gaming, Technology Adoption, Training and Exercises

## 1. INTRODUCTION

Crisis response including humanitarian operations is a highly complex field (HD Network, 2017) with a large number of autonomous actors (Stephenson, 2005). It is of utmost importance that humanitarian operations are carried out in a timely effective and safe manner. In such field, it is crucial to get the information flows, e.g. the planning and distribution of aid to people in crisis situations, 'right' (Altay & Labonte, 2014). In order to better understand and develop such complex system for humanitarian operations, serious gaming can be applied.

Serious gaming is nowadays an accepted method for the analysis and design of complex systems (Duke & Geurts, 2004; Bekebrede, Lo, & Lukosch, 2015). It is also a useful tool for crisis management, as it is easier and more cost-effective than to study a certain phenomenon in reality. Furthermore, serious gaming can make a problem more visible for measurement and observation. It also allows for the design of controlled experiments and offers a safe environment when difficult or dangerous situations are to be explored.

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In domains such as security, military and surgery, serious gaming can help to increase the effectiveness of training by providing a flexible, safe but yet realistic environment (Macedonia, 2002; Bonk & Dennen, 2005; Zyda, 2005). With serious games, players and teams of players can train and probe actions and reactions in a real-like environment, without the risk of real-world consequences (Lukosch et al., 2012). Furthermore, it provides immediate feedback and helps players to reflect especially when a proper de-briefing phase is included (Kriz, 2003).

Nevertheless, how serious gaming can assist humanitarian operations has not been fully explored and there are both knowledge and practice gap in applying serious gaming in this domain. The objective of this paper is to examine the role of serious gaming in facilitating the coordination and collaboration of humanitarian organizations in missions. The authors developed the humanitarian board game Plaitra, as part of the H2020 project iTRACK, to explore and evaluate the various roles of serious gaming in humanitarian operations. This paper presents results from two game sessions organized to evaluate Plaitra's role as a research instrument and a training tool to assist aid workers and discusses its implications for humanitarian operations and future work.

## **2. BACKGROUND**

### **2.1. Challenges in Humanitarian Operations**

Humanitarian aid is 'to provide a needs-based emergency response aimed at preserving life, preventing and alleviating human suffering and maintaining human dignity wherever the need arises if governments and local actors are overwhelmed, unable or unwilling to act' (COUNCIL, 2008). Like operations in business sectors, common operational challenges are also perceived in this domain, but under unique conditions and with more critical impact on the operational success. They include but not limit to the multi-stakeholder and dynamic environment (Sampson, 2012), the communication and alignment gap (Chen, 2008), or the first-time right performance (Parasuraman et al., 1985).

#### ***2.1.1. Dynamic Environment***

Diverse factors influence the capacity to deliver humanitarian assistance ranging from external elements to the operational and situational complexity of the events. For instance, the presence and strength of humanitarian stakeholders in the affected region, donors' interests and media coverage (Olsen et al., 2003) push from the outside while the cause of the origin, the severity of the impact and the resilience of the region demand from the field. The dynamic combination of such influential factors makes every single humanitarian aid operation unique.

Humanitarian aid work comprises of a large network of stakeholders from multiple disciplines, including individuals, non-governmental organizations (NGO), military, international organizations, private sector, donors, public sector and media (HD Network, 2017). In addition to the communication and coordination complexity in such multi-actor network (Sampson, 2012), the humanitarian actor network is very dynamic at the instance level, i.e. every specific disaster response is unique from another one in terms of the impact and onsite situation, as well as the availability of onsite humanitarian organizations and teams.

#### ***2.1.2. Coordination and Alignment***

Balcik et al. (2010) provide an extensive overview of challenges in coordinating humanitarian aid efforts. A few ones are discussed in here. Firstly, the emergence of information technologies, like GPS, telecommunication networks, and tracking mechanisms, play a critical role in humanitarian operations (Vinck, 2013) and provide opportunities for improved security planning and coordination. At the same time, it also creates new safety issues in the humanitarian environment (Armstrong, 2013). Although there is a widely shared and intuitive understanding that proper communication with well working policies and technology is key to secure the safety of aid workers and to support

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