

## ***Final-Reporting-2***

### **Beyond Stop Disasters 2.0: Video Games as tools to foster participation in learning about disasters and disaster risk reduction (EQC funded project 15/U706)**

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#### ***Key words***

Disaster risk reduction, video games, education, constructivism, participation, pedagogy

#### ***Summary***

*With the increasing popularity of video games over the last few decades, a significant research area for disaster studies has presented itself. Preliminary disaster video game research explored a multitude of disaster video games from various international organisations (e.g. UNESCO, UNISDR), governments (e.g. Canada), non-government organisations (e.g. Save the Children, Christian Aid), researchers and mainstream disaster video games. This preliminary research demonstrated that video games have an ability to convey messages regarding disaster and disaster risk reduction (DRR), including portrayals of hazards, vulnerabilities, capacities and numerous disaster discourses. Yet, there is a paucity of studies on these games in the disaster research literature. Hence, a necessity exists for innovative research to explore how disaster video games could contribute to DRR learning strategies of the future. This project worked to link video games to disaster studies through the sphere of disaster risk education, participation and the learning theory of constructivism. Unlike traditional video game research approaches, this project conceptualised an innovative participatory methodological framework for video game research. This framework is based upon constructivist learning theory and active learner participation, to better foster the learning process and explore learning from the inside. Utilising this framework, this research considered how various 'serious' disaster video games, in educational environments like museums and schools, could foster player participation in learning about disaster and DRR. The perspectives of museum visitors (Te Papa in Wellington and Quake City in Christchurch), students (four Hawke's Bay school) and teachers, indicate the strengths and challenges of such video games in regards to game content, game mechanics, skill-building, player motivations and social interactions. These findings indicate video games cannot be stand-alone tools for the purpose of building disaster awareness in players. Video games require greater integration into the teaching and learning processes to minimise the potential risk of such video games becoming tokenistic learning tools. These outcomes were tested with academics, teachers, students and emergency management personnel in co-designing a teaching pedagogy, involving several group-based learning activities and a geo-referenced Minecraft world, to engage students in learning about disaster and disaster risk reduction within their local area. Ultimately, the needs of the players and educators need to be factored in both the video game design and development process, and associated teaching and learning pedagogy, in order to foster meaningful player's participation in learning about disaster and DRR.*

## **Introduction**

International organisations, governments, non-government organisations, academics and practitioners have developed several 'serious' disaster video games to raise disaster and disaster risk reduction (DRR) awareness in players. However, such 'serious' disaster video games are often one-off deliverables, receiving no follow-up research to investigate the effectiveness of these games on building disaster and DRR awareness. In contrast, while mainstream video games do not intend to impart disaster awareness in players, the portrayal of disaster concepts and discourses could foster player engagement in learning about disasters. Gampell and Gaillard (2016) set an agenda for disaster video game research, connecting a broad range of disaster video games, both 'serious' and mainstream, to a DRR framework. This project builds upon the preliminary research of Gampell & Gaillard (2016), exploring how disaster video games both 'serious' and mainstream can foster participation in learning about disaster and DRR. This project aimed to address emerging themes and bridge several understudied gaps in knowledge surrounding video games as disaster learning tools with empirical evidence. Ultimately, the argument is put forward that video games need to be repositioned from being perceived by scholars, educators and DRR practitioners as simply tokenistic learning activities to fully integrating video games within teaching pedagogy and the broader the learning process. In turn, the empirical evidence collected from three case studies, forming the basis of this research project, highlights how disaster video games can facilitate deeper engagement and understanding of disasters and DRR when social interactions, metagaming and gameplay, are taken into more serious consideration.

## **Objectives**

The following objectives were proposed in order to address the primary research question: whether disaster video games, both 'serious' and mainstream, have the potential to foster participation in learning about disaster and DRR.

1. *To build a typology of disaster video games and conduct a desk analysis of discourses on disasters vehicled by these games.*
2. *To test and assess the impact of existing disaster-based video games with a targeted audience. The purpose of testing these video games is to determine whether insightful knowledge is gained, with the potential to improve disaster awareness.*
3. *To carry out an analysis of disaster video games in collaboration with a targeted audience to understand how each game scores in terms of game content, player motivation, skill building and social interaction.*
4. *To understand how video games may be used as tools for disaster risk reduction.*

## **Conclusions and key findings**

Initially, this project set out to demonstrate the ability of video games to be utilised as learning tools. With constructivist learning theory underpinning the methodological framework, it was evident that video games could be powerful learning tools. Therefore, the project aimed to move beyond merely demonstrating the connections of video games to support learning about disaster and DRR, but directed attention toward how the integration of a disaster video game into broader teaching and learning pedagogy could enhance the learning experience. Significantly, this project argues greater attention toward the 'video game pedagogy' (social interactions, metagaming and gameplay) is required to further foster people's participation in learning about disaster and DRR.

A disaster video game typology was created, categorising various video games to the aspects of prevention, mitigation and preparedness conveyed within these games. This typology is based upon the researcher's gameplay experiences to collect the data. This list is predominantly based upon 'serious' disaster video games due to having clear connections to disaster and DRR. In addition, 'serious' games generally have short gameplay durations. Therefore, such games are completed within a matter of minutes to an hour. In contrast, mainstream video games, often have around 30+ hours of gameplay to just complete the main game objective, not taking into account side content – including but not limited to side quests, general game world exploration and downloadable content. Therefore, the time required to try collect data is immense. However, the ability of mainstream games to retain a player's attention and motivation to return repeatedly to play is an area for future research attention. In addition, one player's experience will not always match another's, as different choices can affect the gameplay. Therefore, the player's actions may not trigger particular content and the content may be missed. However, several mainstream disaster video games have been included into the typology to acknowledge their potential to convey disaster and DRR content. This is nonetheless a significant research area for the future.

The four existing 'serious' disaster video games were tested in different locations with their targeted audiences. This includes Quake Safe House at two museums (Te Papa and Quake City) and Earth Girl 2, Sai Fah – The Flood Fighter and Stop Disasters! tested within four Hawke's Bay schools involving nine classrooms of students in total. Participants indicated that the particular video game played could improve aspects of their disaster awareness. However, their level of disaster awareness improved once the participants engaged with a subsequent student-centred social group based activity like a carousel. Evidently, social interaction, as a constructivist principle, suggested players could further enhance their understanding of disaster and DRR awareness by sharing their experiences with others, debriefing these experiences and ideas and connecting their gameplay back to their local context, hence, returning to the concept of the 'video game pedagogy'.

The four 'serious' disaster video games were also used to gather data around game contents, mechanics, skills, motivation and social interactions directly from the participants, including museum visitors, students and teachers. As these stakeholders are not generally part of DRR discussions, it was deemed important that their voices were heard as part of the assessment conducted. To further explore how disaster video games could be used as learning tools in connection to the curriculum, teachers attending the New Zealand Social Sciences Conference also played Earth Girl 2 and gave their perspectives upon each of these components. In addition, teachers supervising the video game trials gave insight into how the video games could be integrated into the classroom environment.

This collection of information was subsequently utilised in informing the collaboration with another project involving Minecraft for participatory mapping and funded by the National Science Challenge on Resilience to Nature's Challenges. As such, academics, teachers, students and emergency management personnel co-designed a teaching pedagogy, involving several social group-based activities and a geo-referenced Minecraft world, to engage students in learning about disaster and DRR within their local area. By addressing the needs and expectations of the students and teachers who are generally the intended users of such games there is more likelihood of the game being able to successfully foster greater disaster and DRR awareness as well as usage in the classroom environment.

The disaster video games used within this study all demonstrate connections to principles of constructivist learning theory. As the results come directly from the perspectives of the research participants, there is a strong indication that disaster video games can be used to foster participation in learning. The research results ultimately indicate greater consideration is needed toward the 'video game pedagogy'. This pedagogy must integrate social interactions – both within the game and outside; metagaming – the connection of players to information, groups, curriculum, outside of the game environment to encourage actions within the game and foster discussions outside; gameplay – ensuring each of the components (content, mechanics, skills, motivations, social interaction) are relevant to the context and target audience to encourage repeat engagement. Therefore, developers and the organisations commissioning video games must collaborate with teachers, students, parents, academics and other relevant people. This collaboration will ensure future disaster video games can better met the expectations and intended disaster and DRR learning objectives based upon the needs of the target audience.

### ***Impact***

A significant challenge for the project was the lack of prior disaster video game research to build upon. Therefore, the data collected during this project presented an opportunity to devise a methodological approach for disaster video game research. This framework built upon constructivist learning theory and participation can also double as a teaching and learning pedagogy. Significantly, this framework has already been utilised and can provide a springboard for future disaster video game research.

Overall, this project has made a significant contribution toward understanding how video games can be used as disaster and DRR learning tools. The collected data has demonstrated future pathways toward how disaster video games can facilitate deeper engagement and understanding of disasters and DRR when social interactions, metagaming and gameplay are taken into account.

### ***Future work***

Future work may involve further developing the geo-referenced Minecraft game world to allow players to not only plot hazards, vulnerability, capacities and DRR for their local area pre-hazard, but to also visualise the impacts of a hazard upon the game world. Such an initiative may involve bringing together stakeholders from different areas, like education, Civil Defence and Emergency Management, insurance and practitioners, to collaborate and co-design an accompanying teaching and learning pedagogy. In addition, this would also involve a co-designed assessment to ensure the intended learning objectives of the video game are being met.

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## References

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**Gampell, A.V.** (2019) *Video games, Lego and 2D participatory mapping*. Auckland University of Technology Guest Lecture, 19 August 2020, Auckland, New Zealand.

### **Links to publications/theses**

Article	Title	Authors	Journal	Status
Article 1	Beyond Stop Disasters 2.0: an agenda for exploring the contribution of video games to learning about disasters	Anthony Gampell JC Gaillard Meg Parsons Karen Fisher	Environmental Hazards	Published
Article 2	On the use of participatory methodologies for video game research: exploring disaster risk reduction in video games	Anthony Gampell JC Gaillard Meg Parsons	Methodological Innovations	Published
Article 3	Exploring the use of the Quake Safe House video game to foster disaster and disaster risk reduction awareness in museum visitors	Anthony Gampell JC Gaillard Meg Parsons Loïc Le Dé	International Journal of Disaster Risk Reduction	Published

Article 4	Disaster video games: an innovative approach to teaching and learning about disasters and disaster risk reduction	Anthony Gampell JC Gaillard Meg Parsons Loïc Le Dé	Journal of Geography	Published
Article 5	Participatory Minecraft mapping: Fostering students participation in disaster awareness	Anthony Gampell JC Gaillard Meg Parsons Loïc Le Dé Graham Hinchliffe	Entertainment Computing	In Review
Article 6	Fostering student participation in disaster risk reduction through disaster video games	Anthony Gampell JC Gaillard Meg Parsons Loïc Le Dé	Australian Journal of Emergency Management	Published

#### **Related publications outside of the PhD**

**Gampell, A.V., & Gaillard, J.C. (2016).** *Stop disasters 2.0: Video games as tools for disaster risk reduction. International Journal of Mass Emergencies and Disaster, 34(2), 283–316.*

Le Dé, L., Loodin, N., **Gampell, A.**, Hinchliffe, G. & Gaillard J.C. (2018). *Using Minecraft and LEGO for disaster risk reduction. Crisis Response Journal, 14(1), 74-75.*

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#### **Website**

Information regarding the geo-referenced participatory Minecraft mapping process:  
<https://childrenindrr.co.nz/>

#### **List of key end users**

Key end users may include: museum curators, principals, teachers and teacher aides, students, academics, practitioners, policy-makers, video game developers, international organisations, non-governmental organisations, governments and governmental departments, Civil Defence Emergency Management, planners, parents and care-givers