



Exploring engineering solutions to environmental hazards through Minecraft

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Since 2014, Science Hunters (1,2) has successfully used the computer game Minecraft to engage children with Science, Technology, Engineering and Maths, and particularly geoscience (3), through a defined approach which allows exploration in line with individual interest within the framework of specific topics. Minecraft offers almost limitless building possibilities within a range of virtual environments. It has huge appeal, with features and processes that can be linked to those in the real world, and is therefore an ideal tool for communication of scientific concepts.

Previous research has indicated that Minecraft successfully acts as a hook to draw children into engaging with topics (4), and that this specific approach is successful in increasing subject knowledge and understanding. For example, 492 children participating in school-based sessions on 'volcanoes' and 'habitats' showed statistically significant increases in correct answers when asked the same topic-based questions before and after participating (5).

Since April 2020, the Science Hunters project Building to Break Barriers (6), funded by an Ingenious grant from the Royal Academy of Engineering, has been developing methods for engaging children with aspects and applications of engineering that children may not typically associate with the topic through Minecraft. Drawing on the foundations of Science Hunters, this has included environmental-based topics such as how people can mitigate against earthquakes and volcanic eruptions, manage rivers and flooding, store nuclear waste, dry crops in humid environments and design food production solutions.

Sessions were delivered virtually, due to COVID-19 considerations, and mainly in schools; despite this need to adapt to a new delivery format, and lack of face-to-face interaction, feedback remains overwhelmingly positive, with less positive responses focusing on wanting extended opportunities (i.e. for longer than one lesson) on the game.

Aligning with previous observations over years of Science Hunters delivery, preliminary evaluation of natural hazard-based sessions indicate that children enjoy being able to create their own structures in the game, and devise ways to protect them from environmental hazards through engineering solutions. Through this structured, child-led approach, Minecraft offers an effective tool for engaging children with a wide range of topics, including geoscience-based exploration and solution design.

1 <https://www.uwe.ac.uk/research/centres-and-groups/scu/projects/science-hunters>

2 www.lancaster.ac.uk/sciencehunters

3 Hobbs et al., 2018. Digging Deep into Geosciences with Minecraft. *Eos*, 99(11), 24-29

4 Hobbs et al., 2019. Using Minecraft to engage children with science at public events. *Research for All*, 3(2), 142-60

5 Hobbs et al., 2019. Science Hunters: Teaching Science Concepts in Schools Using Minecraft. *Action Research and Innovation in Science Education*, 2(2), 13-21

6 <https://www.uwe.ac.uk/research/centres-and-groups/scu/projects/building-to-break-barriers>

This contribution will be presented virtually.