

# Mathematics and Sustainable Development Goals

## An Example of Digital Games Based Learning

### Summary

The discipline of mathematics is known to generate a sense of fear and stress among students (Lee, J. 2009). School students are often unable to visualize and experience mathematical concepts and question their application in real life (). Mathematics teaching-learning in nearly every country in the world is still rooted in rudimentary computational processes and problems that emphasize "simplistic thinking" (Sriraman, B.). Sriraman points out that the goals for educating current and future generations should have more emphasis on connections, coherence, civic consciousness and cross-curricular competencies for solving problems confronting humanity. Even in the modern classroom, emphasis is not given to these ideas and Education for Sustainable Development (ESD) and even when they ideas find space, they are discussed in isolation (UNESCO MGIEP, 2017). One of the possible approaches to bridging this gap is to use contextual examples from sustainability to teach the 'core disciplines' like mathematics, science, language and geography (UNESCO MGIEP, 2017). The benefits of using such an approach is two-fold. It brings the ideas of global importance into the classroom discussion and also provides some context to mathematics teaching. We present an example of a digital game focusing on spreading awareness about the Sustainable Development Goals (SDGs) among players while they apply concepts learnt in mathematics. Here we show that using interactive media, a video game, has a positive impact on students' application of coordinate geometry skills, knowledge of the Sustainable Development Goals, motivation and engagement. The study involved a single group (n=16) experimental design. The results and observations open discussion about effective usage games-based learning for integration and embedding of ESD into mathematics education.

## DIMENSION DESTINATION

### WILL ROHAN SURVIVE?



### About the Game

### Future Research

Dimension Destination is a third person, interactive video game set in the year 2030. It places the player in the body of Rohan, a schoolboy, who is sent on an unknown world to collect valuables, associated with different SDGs, and bring them back to help Earth achieve the SDGs. The player must use the coordinates that he is provided with, to collect the valuables in time while his oxygen tank is draining. The extra-terrestrial world is imprinted with grid-lines which resemble the Cartesian Plane and the player gets various hints as he/she explores the world. The game is targeted at school students of Grade IX and Grade X and was built using Unity Game Engine. The game can run on any Windows based machine.

Testing and some preliminary results and observations lead us to ask two research questions:

If two equivalent groups were to play a similar game, but one group plays a digital version while another plays a physical one, what differences in learning outcomes and cognitive experiences would come about?

What is the best way to use principles of game design and learning theories to develop purposeful learning games?

