GLASSLAB
RESEARCH

Learning Impact Report

Game: Mars Generation One
Research Date: 2014
Grade Levels 6-8
Sample Size: 900
Study Type: Program Effectiveness

Three out of four students playing Mars Generation One: Argubot Academy EDU are mastering core aspects of argumentation.

Overview

GlassLab games generate learning insights for students and adults while improving student performance on complex challenges. By leveraging embedded, unobtrusive assessment, student and teacher reports and advanced psychometric models (Mislevy, Corrigan et al., 2014), our games detect improvements in student performance and deliver just-in-time feedback. They do all of this while motivating students to engage with tough concepts over extended periods, and return for more.

The Innovation

Mars Generation One is a text-based futuristic adventure game developed in collaboration with NASA and the National Writing Project. The year is 2054. The setting is the first human settlement on Mars. Citizens settle their differences and make important policy decisions by sending robot assistants—or "argubots"— into debates reminiscent of the assemblies in ancient Greece. Aligned to Common Core ELA standards for the middle school grades, the game introduces and develops players' core argumentation skills. These include: identifying evidence in text, organizing evidence to support claims, and evaluating and critiquing arguments through use of critical questions.

Pilot Participants and Implementation

A total of thirteen teachers from nine different states are currently participating in the ongoing pilot study for Mars Generation One. The study represents over nine-hundred students (n = 969) in grades five through nine. To date, it has led to over 1 million game-based learning events over a three-week period. Taking place during five class periods, the pilot includes three 45-minute periods of game play, in addition to two traditional classroom routines, each lasting approximately 20-30 minutes.

Analyses & Results

GlassLab, ETS and Pearson researchers are now carrying out preliminary analyses of log data from student game play following best-practice principles of evidence-centered design and educational data mining, including cycles of exploratory and confirmatory analysis. The group is currently working through several iterations of analysis. Initial findings have shown that as designed the game requires intense effort over demanding material. The game requires players to create up to thirty arguments, participate in eight different debates, evaluate over fifty pieces of evidence and critique between twelve and twenty-four opponent arguments. Despite the high level of game challenge, over 74% of players are able to successfully complete the rigorous game; 74% of students report they had fun playing the game, with 70% reporting wanting to play the game again. Moreover, preliminary analyses of the first set of classes to complete the pilot show statistically significant learning gains (t(302)=5.8135, p<.001) on an external pre-post measure of argumentation that was created in collaboration with ETS.

> **Students who played Mars Generation One made statistically significant improvements in argumentation as measured on external pre-post tests.**

Conclusion

Mars Generation One engages students and supports their success in spite of challenges of high-level argumentation. Through use of game-based tutorials in argumentation, personalized feedback and scaffolded-design, three out of every four students playing Mars Generation One are mastering core aspects of argumentation matching evidence to claims, identifying argument schemes, and evaluating and critiquing others' arguments. In addition, students who played Mars Generation One made statistically significant improvements in argumentation as measured on external pre-post tests.