

Students playing Ratio Rancher can experience statistically significant learning gains in understanding ratios and proportional reasoning.

Game: Ratio Rancher

Research Date: 2015
 Grade Levels 6-12
 Sample Size: 400+
 Study Type: Program Effectiveness

Overview

Ratio Rancher - a game based assessment developed by GlassLab Games - meets Common Core Math standards related ratios and proportions in the middle school grades. Through use of dynamic difficulty that adjusts the challenge level to student needs, immediate feedback and hints, as well as real time unobtrusive assessment and reporting (Mislevy, Corrigan, et al., 2014) built into the game experience, players gain facility scaling variables and calculating complex ratios and proportions. Ratio Rancher accomplishes all of this while motivating students to engage with challenging content over extended periods of time.

The Innovation

Ratio Rancher is a browser-based caretaking game designed by GlassLab. In the context of the game, players take on the role of ranch managers in charge of feeding a cast of wacky, fictional creatures with surprising eating habits. The ranch's feeding pen provides an instructive tool that helps students visualize and gain insights into ratios and proportions. Advanced challenges support students in successfully working through game-based tasks that require fluency in working with base rates and scaling. The game's dynamic difficulty system, real-time feedback and formative assessment system operate in the background to support student learning throughout their gameplay.

Pilot Participants and Implementation

Students from across the country participated in the Ratio Rancher field study, drawn from classes taught by sixteen elementary, middle and teachers in four states. Over 400 students, representing a range of socioeconomic backgrounds, and in grades 4 through 9, participated, with a large number (n=344) completing the pre-test, game and post-test activities.

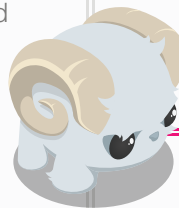
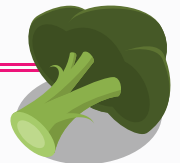
The pre-test and post-test were designed using model assessment items from the National Assessment of Educational Progress (NAEP) test, the Partnership for Assessment of Readiness for College and Careers (PARCC), and the Smarter Balanced Assessment Consortium (SBAC).

Beyond the tests, students were engaged for three periods of gameplay for a maximum exposure of two hours. Participating students generated over 1 million learning events in the course of the study, and the game was their sole source of instruction during the field test.

Analyses & Results

Field study results show that on average, students who played Ratio Rancher experienced statistically significant learning gains across the short gameplay period. While the game was designed and tested for use in the middle school grades, analysis of the field study results reveal that younger students tend to experience more growth on average than their older peers.

Students can experience statistically significant learning gains in understanding ratios and proportions after just three 45-minute sessions of gameplay.


Conclusion

Ratio Rancher presents students with challenging math content requested by the Common Core standards for ratios and proportional reasoning, and the supports required to excel. Through the use of its core mechanics and dynamic difficulty system, real-time, personalized feedback, unobtrusive formative assessment and actionable reports, Ratio Rancher is able to drive statistically significant learning gains in students in only three class periods of gameplay.