

Project Summary

Overview.

St. Mary's College of Maryland proposes "*What's in a 'Game'? The use of evolution-based video games to enhance biology education*", an Engaged Student Learning (ESL) track Level 2 study in the Improving Undergraduate STEM Education: Undergraduate Education (IUSE:EDU) strand.

Nearly one-third of the American population holds a creationist belief system, and nearly three-quarters of the population fails evolution-based knowledge assessments. Even more than one-quarter of upper-level biology students reject the idea that all life on earth shares a common ancestry. Due to mistrust of science and cognitive obstacles commonly related to religious beliefs, teaching evolution in the classroom is a persistent challenge. As such, tools and methodologies for reducing barriers to learning about evolution are of great interest to Biology educators. Due to the fact that >80% of adolescents in the US play video games, the use of game-based education has briefly been explored as a potential means of evolution education. We propose a discipline-based education research project in which we develop a biologically accurate video game tool to enhance evolution education and acceptance in undergraduate biology. This tool will be used as a method for interactive evolution education at the undergraduate level, allowing for the evaluation of game-based learning in increased understanding and acceptance of evolution. Thus, our objectives for this study are to: (1) Systematically develop an evolution-based video game, (2) Evaluate the required dosage and lesson type for optimal student outcomes, (3) Determine the effect of player agency in gameplay on student performance and perception, and (4) Close the evolution acceptance gap observed in students with strong religious identities.

Intellectual Merit.

The proposed activities will develop a novel evolution education video game. This research will pave the way towards improving the understanding and acceptance of evolution in undergraduate education, and will allow us to address how we can more effectively teach these topics in the classroom. Project outcomes will impact the following interests of the IUSE program: (1) Development and study of the efficacy of innovative teaching and learning practices and resources, (2) Development and implementation of novel instructional methods or adaptation of existing evidence-based pedagogies in STEM disciplines or in multi-disciplinary or interdisciplinary courses or programs, (3) Co-curricular activities that increase student motivation and persistence in STEM, and (4) Local, regional, or national efforts to develop and disseminate tools, resources, or models designed to improve STEM teaching and learning.

Broader Impacts.

The proposed work develops and tests a novel tool for the delivery of evolution education. As evolution is a necessary puzzle piece in the building of a scientifically literate population, the stark resistance of evolution by the general public and STEM graduates is of great concern. In order for students to be prepared for an adulthood of voting, scientific reasoning, and policy making, students must understand evolution. As the acceptance of evolution is driven largely by religious background, methods of evolution education are also an equity concern for recruitment and retention of students in the sciences.

Additionally, we will freely disseminate our tool to participating science faculty and the broader science and education communities. Educators who have the tools necessary to reach a broad student body during the introduction of evolutionary concepts are better positioned to teach inclusively about these topics, further meeting the learning needs of their students.