Project Name

Enviropedia: A Serious Game about Beverage Container Choices

Principal Investigator Lori Scarlatos

Campus Stony Brook University

Year of Project 2012

Tier Tier Three

Project Team

- Alexander M. Orlov, Stony Brook University
- Arnout van de Rijt, Stony Brook University
- David J. Tonjes, Stony Brook University

Overview Summary

Development of an innovative web-based game situated within an online science learning community. Enviropedia, will emphasize the connections between science and society by focusing on beverage container choice.

Outcomes Summary

The game is available for play here to demonstrate that by concentrating on containers with the larger carbon footprint points are accumulated more rapidly. Additional teaching materials are available.

Project Abstract

The trouble with introductory science and engineering courses is that students often don't see how what they are learning is relevant to their lives. We propose to address this by leveraging our team's past efforts to develop an innovative web-based game situated within an online science learning community. This system, which we call Enviropedia, will emphasize the connections between science and society by focusing on a

simple decision that people make every day: what beverage containers to use.

For this phase 1 effort, we will develop and pilot test our intervention in two freshman seminar courses at Stony Brook. In phase 2, we will extend the system and work with other SUNY campuses to incorporate it into general science courses as well as introductory courses in materials science.

Background: Understanding the environmental impacts of materials we use in our daily lives is crucial to making sustainable and environmentally friendly choices. Impact can be quantified as a "footprint" based on emissions from materials extraction, manufacturing, use and disposal. Understanding impact could give engineers real incentives to come up with innovative materials solutions. Educated consumers may also drive product innovations in directions we might not even envision today.

Innovation: The core of Enviropedia will be a learning community focused on the environmental impact of beverage container choices. Enviropedia will include 1) a fast-paced casual game where instant recognition of pro-environmental choices leads to higher scores; 2) a wiki that explains the environmental impact of beverage containers in the game; 3) a carbon-footprint calculator for estimating environmental impact of new container choices; 4) an inventors and innovators forum, where materials science students can present and discuss novel solutions to reducing footprint; and 5) a community page that presents top scores, highlights best suggestions/inventions, and provides a discussion forum for members of the learning community. Engagement with the system will have three levels, each with distinct goals.

The goal of the first level is to increase people's awareness of the impact that their simple choices have on the environment, and reinforce their recognition of what good choices are. This will be achieved with a Tetrislike
casual game where falling beverage containers – representative of what can be found on campus – ultimately pile up to create a wall. Before the wall is complete, players can click/tap on containers to remove them; more points are earned for removing containers with larger footprints. When the wall is complete (game over), point values of the remaining containers are subtracted to reach a final score, which is shown in comparison to scores from the closest competition. Learning to quickly recognize what the better choices are will help players to improve their scores as they play the game over and over again.

The goal of the second level is to encourage people to explore ways that they can further decrease their carbon footprint. After completing the first level, players will have the option of replacing containers in the casual game with others, from the wiki, with point values corresponding to footprint. Players may also enter their own new container options in the wiki, using the carbon-footprint calculator to estimate environmental impact. Submitting pictures of people using those containers on campus will earn them merit badges and a spot on the innovators page. Once the container is approved (by faculty and/or materials science students), it too can be used in the casual game.

The goal of the third level is to provide opportunities for students to explore how materials science can be used to reduce environmental impact. Players can optimize container scores with novel combinations of sizes, materials, and processes to earn badges and a place of honor on the inventors page. Faculty guiding the
students may choose to encourage them to publish the most innovative solutions as posters or papers for a conference. We expect that materials research will benefit from the novel solutions proposed which may lead to materials innovation and patents.

Used in a general science course, Enviropedia has the potential to affect the ways consumers make choices. Used in an engineering course, it has the potential to alter the process by which materials engineers are trained, and potentially lead to innovation and novel materials development.

Team: Lori Scarlatos, professor of Technology & Society, conducts research focused on how games and gamification can enhance learning. Her current project is Energy Choices, an online multi-player game based

on a simulation using World Bank Data to illustrate the interconnections between fuel source, the economy, and global climate change. She will lead the technology development effort.

Alex Orlov, professor of Materials Science, has already grappled with the problem of teaching engineering students to appreciate the concepts of eco-informed materials choices. He developed an online calculator that determines the environmental impact of materials in terms of carbon emissions associated with their production, and piloted it in several classes. He will lead the content development and teach one 102 seminar.

Arnout van de Rijt, professor of Sociology, is an expert in social network analysis and recipient of the 2010 Distinguished Young Scholar award from the International Network for Social Network Analysis. He studies the effects of informal rewards in peer production environments such as Wikipedia, and found that awarding simple rewards for participation significantly increases participation and productivity. He will develop the survey instruments and analyze the results.

David Tonjes, professor of Technology & Society, conducts research examining and assessing the issues of solid waste management. He will do project assessment and teach a 102 seminar.

Reports and Resources

- [Project website](#)
- [Stony Brook "Sparks of Innovation" Conference Poster](#)

Discipline Specific Pedagogy

- STEM

Instructional Design

- Gamification (Design)
- Online Education