Making (fun) multi-player gaming an educational experience

November 13 2019, by Matt Shipman

This still image is from a prototype of the game "Crystal Island: EcoJourneys." The game was made using a new framework that integrates narrative-centered learning and collaborative learning techniques in order to keep multiple players engrossed in the learning experience while fostering collaboration and problem solving. The framework may serve as a blueprint for future efforts in the field of educational gaming. Credit: NC State University

A new video game framework brings together two well-studied

approaches to educational software in order to keep multiple players engrossed in the learning experience while fostering collaboration and problem solving. The framework is one of the first to integrate narrative-centered learning and collaborative learning techniques, laying the groundwork for future efforts in the field.

In proof-of-concept testing, a team of researchers from North Carolina State University and Indiana University found a game made using the framework fostered both learning and effective collaboration in sixth graders.

"There's been a lot of work on computer-supported collaborative learning," says Jonathan Rowe, co-author of a paper on the work and a research scientist in NC State's Center for Educational Informatics (CEI). "But that work hasn't focused on rich, narrative game environments—it's been more along the lines of online discussion forums for students.

"Meanwhile, there's also been a lot of work on narrative-centered learning environments," Rowe says. "But those have focused largely on single-player settings—because constructing immersive games that are educational and engaging for multiple players is extremely challenging."

"We've developed a conceptual framework for combining these two educational approaches—interactive narratives and collaborative, problem-based learning—and then created a software architecture and suite of game-creation tools for implementing that framework," says Bradford Mott, first author of the paper and senior research scientist at CEI.

The paper, "Designing and Developing Interactive Narratives for Collaborative Problem-Based Learning," will be presented at the Twelfth International Conference on Interactive Digital Storytelling, being held

at the Snowbird resort in Utah from Nov. 19-22.

"One of the things we focused on here was creating a set of tools that educators can use, regardless of their programming skills," says Robert Taylor, a research software engineer at CEI. "Specifically, allowing educators to modify a story's dialogue and plotlines, and to see those changes almost immediately in the game."

"Right now, this narrative editing feature is being used by our education research collaborators to help us make the best game possible," Mott says. "But at some point, this may be a feature that can allow for classroom-specific game customization."

The team of education and computer science researchers has already used the framework to develop a game called "Crystal Island: EcoJourneys," which focuses on ecosystems education. In pilot testing with a group of 45 middle schoolers, the researchers found students did learn from the game and exhibited effective collaboration skills.

"We deliberately chose a complex subject, because that makes for a scenario that lends itself to team-oriented problem solving," Rowe says. "This early-stage testing suggests that we're on the right track."

"We're now developing a more polished version of 'Crystal Island: EcoJourneys,' which we'll be testing on a larger scale next year," Mott says. "More importantly, the approach we're outlining here can already be used by others in the educational gaming community. This is an exciting area for the field."

More information: Bradford W. Mott et al. Designing and Developing Interactive Narratives for Collaborative Problem-Based Learning, *Interactive Storytelling* (2019). DOI: 10.1007/978-3-030-33894-7_10

Provided by North Carolina State University