

Digital games and classroom learning: Study finds helpful features, gaps

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Summary: A new report on how teachers use video games in classrooms identifies features they find most useful to track student learning, as well as gaps where better tools could help link games more closely to the curriculum.

FULL STORY



In Citizen Science, students must uncover and solve pollution problems in a lake.

Credit: Barry Fishman

A new report on how teachers use video games in classrooms identifies features they find most useful to track student learning, as well as gaps where better tools could help link games more closely to the curriculum.

The report, released today by the A-GAMES Project of the University of Michigan and New York University, is unique in that it focuses on features common to many games, rather than the effectiveness of individual games. A-GAMES stands for Analyzing Games for Assessment in Math, English language arts/Social Studies, and Science.

"We looked at how various features support educators in knowing what students know," said Barry Fishman, a professor at the U-M School of Information and the School of Education. "Our report is a call to the game development community about where they might focus next to make educational games even more useful."

To conduct the study--the second in a series--the researchers observed and interviewed 30 fifth-through eighth-grade teachers in public and private schools in New York.

The first A-GAMES report, released in December, was a nationwide survey in which 57 percent of teachers polled said they used digital games at least weekly.

Game-using teachers reported conducting more "formative assessment" than those who didn't use games, and facing fewer barriers in doing so. Formative assessment refers to the various ways educators check in on students' learning as it's happening. This is in contrast to "summative assessment," which measures learning at the end of the unit or term, or for high-stakes tests.

Formative assessment is one of teachers' main means of improving student learning.

In the latest A-GAMES study, researchers identified specific game features that help teachers track student learning, including: feedback systems such as points or stars, which essentially keep score in a game; dashboards that track student progress over time; and screen capture tools that students and teachers can annotate to communicate about games. While these features were beneficial, the researchers saw areas for improvement.

"Games designed for learning, especially for learning in schools, require features that differ from those in games for entertainment. The design of such features requires a deep understanding of classroom practice. Our study sheds light on such practices and features and it reveals the extent to which existing features are useful," said Jan Plass, a professor at NYU's Steinhardt School of Culture, Education and Human Development.

Dashboards, for example, were often hard for teachers to configure, and as many of them were within individual games, they amounted to separate grade books for each assignment. That's not ideal for teachers, who need overviews of each student's progress. And in many games, scores weren't linked closely enough to learning goals.

"The most surprising finding for me was that the most common mechanisms in games for reporting progress--things like points and stars--are not that useful for teachers," said U-M's Fishman. "For many of the teachers, it was hard to tell from these progress markers what the students were learning. So a student has 100 points. Does that mean they are learning addition?"

The study also found that potentially useful features can live outside games themselves, in wrap-around materials either provided by game designers or by third parties. For instance, a screen-grab tool called SnapThought was provided through educational resource developer BrainPOP's digital game portal called GameUp (all teachers in the study accessed the games through this portal).

Nearly all the teachers who used SnapThought reported that they valued it. Teachers could, for example, assign students to capture screens at certain points in the game to record their progress. The tool also let students explain under the screenshot what they were thinking at various stages, and, perhaps, what they think went wrong.

The tool served as an antidote to the transitory nature of games, and it helped give educators a window into game-playing students' learning processes. Other useful wrap-arounds included curriculum integration guides, related worksheets, quizzes and review questions. These external pieces, the study says, could enhance educational opportunities not only for individual games, but across multiple ones.

Games themselves aren't new to school. Fishman, who recalls his fourth-grade teacher hosting Jeopardy rounds, says they play an important role in engaging students.

"In order for someone to learn something, they first have to be focused and paying attention," he said.

What's increased over the past decade is the use and development of digital and online games. Today, they represent one of the fastest-growing areas of venture investment in education.

"The opportunities represented by digital media are exciting and a lot of them are untapped--such as tracking learners over time, personalizing education and letting students learn different topics at different speeds," Plass said. "Games provide support for all these innovations."

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