Leveling up the learning experience for civil engineering students

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Video Abstract

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Abstract

In a civil engineering class in Ireland, college students take their seats, open their tablets, cell phones, or laptops, and choose jerseys. They're gearing up for a mad dash across Europe – cycling hard over hills and speeding through valleys – as they compete for best standing in Le Tour de France. To win the race, they need to answer questions on topics like structural engineering and stress analysis. But the game isn't really about winning – it's about making learning more effective, interactive, and fun. Designed by University College Dublin civil engineering professor Arturo Gonzalez, 'Surviving Le Tour de France' is a real-time assessment tool that improves the educational experience of both students and teachers alike. It works like this. A teacher prepares lectures and accompanying questions, which are delivered in stages. Each stage corresponds to a different leg of a simulated cyclist race that progresses over the course of a semester. Students use their own Wi-Fi-enabled devices to answer the questions. Correct answers move them forward, and ties are broken according to answering speed. Progress is tracked through anonymous identifiers on a screen at the front of the class. Although definitely more interesting than the typical lecture-hall experience, does the race actually deliver? To find out, Gonzalez tested the game in two college-level civil engineering classes. Participating students gave feedback through anonymous questionnaires, and average final exam scores were compared to those from the prior year's traditionally taught classes. Overall, the students liked the approach. They felt that their retention of the material improved, that they were quicker to recognize gaps in understanding, and that the game made them want to work harder and study previous lecture before attending class. And their final exam scores backed these statements: students taught with the game module scored up to 29% higher on the tests than those taught in the prior year. It should be noted that it's wasn't just students who benefitted from the game. Teachers saw in real-time how well their class understood material and quickly identified struggling students. Future work aims to up the graphical interface of the game to give students an even more realistic cycling experience as they learn.