

Video game-like software increases academic performance in low-achieving students

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Low-achieving students who were allowed to teach a virtual class performed better in their own courses, according to a new University of Georgia study. The students taught a virtual class through tutoring software, which increased the low-achieving college students' motivation and engagement in the classroom.

Students in the study were more likely to feel enjoyment-and less anger and boredom-after teaching reading assignments to avatars through virtual tutoring software created by ChanMin Kim, an assistant professor in the UGA College of Education, and her former [doctoral student](#), Seung Won Park. The study of UGA [students](#) was published in the March issue of Computers & Education.

The biggest finding, Kim said, was that the academic achievement "gap between high- and low-achieving students was reduced. This is a critical finding because high achievers tend to do well regardless of instructor. Lower-achieving students are the ones who need [motivation](#) and engagement support."

As a result of the virtual tutoring software, Kim found that students in the small study were statistically more likely to experience enjoyment and feel less anger and boredom, as measured separately on a 10-point grading scale, with 10 being the highest. Over the course of five reading assignments involving the software, total boredom went from 10 to 7.16. Anger went from 7.83 to 5.5. Enjoyment went from 8.94 to 10.

Her students' reading performance scores showed an increasing trend, and the variability in the student scores constantly decreased from the first to the fifth assignment, a finding that indicates the gap between the highest and lowest scores in each assignment diminished over time, she said.

Kim's goal is to apply learning-by-teaching as a way to help low-achieving students. Learning-by-teaching is a widely used method of instruction in which educators allow students to teach a lesson in the hopes that the students will better understand the topic of study.

To aid students, Park and Kim—who specialize in learning sciences and technology design—created tutoring software based on class reading assignments. Through the software, students taught their readings to virtual [avatars](#). After students tutored a virtual avatar designed with humanlike attributes, they reported higher feelings of enjoyment and greater engagement in readings.

The software also assessed students as to how well they taught the lesson.

Kim said that the virtual tutoring software works because of the choices students get to make in their learning. Students decide on whom to teach through selection of an avatar or virtual tutee, what to teach through selection of learning objectives and how to teach through selection of content presentations.

"When students first access the virtual tutee system, they choose a tutee they want to teach from six virtual tutees, each of which is characterized by personal information including name, hometown, hobbies and year in college," Park said. "Once students chose their tutee, they start teaching by beginning one of the tutoring sessions, which corresponds to a series of reading assignments."

In the virtual tutoring program, students determined their goals of what they wanted the tutee to learn. After picking learning objectives, students then chose one of two lesson notes—to provide a summary of the reading or explain key concepts. After the students picked and presented their lesson note, the virtual tutee then asked a series of questions for the students to answer.

After tutoring the virtual tutee, students were assessed based on how well the tutee learned. They also were surveyed on whether and how the tutoring system helped them engage in reading. The results were overwhelmingly positive.

"Students reported that the virtual tutoring system helped them persist with the reading assignments even though they did not want to read," Park said. "Students seemed to experience greater enjoyment and less boredom and less anger with the reading tasks. Also, students reported that the virtual tutoring system prompted them to engage in deep processing such as reflection, analysis and elaboration."

Park and Kim's virtual tutoring software is several years in the making. They have designed and implemented it over four separate semesters, each time collecting feedback and improving it.

Their plans include adding spoken narration to the tutoring system, which may give the software a more natural feel.

"It is possible that narrated speech further promotes students' perceived interaction with their virtual tutees and creates a more authentic tutoring environment," Park said. "I would like to study whether the narrated virtual tutee will have a stronger effect on student learning."

More information: "Boosting learning-by-teaching in virtual tutoring," *Computers & Education*, Volume 82, March 2015, Pages 129-140, ISSN

0360-1315, [dx.doi.org/10.1016/j.compedu.2014.11.006](https://doi.org/10.1016/j.compedu.2014.11.006)

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