Augmented reality smart glasses to boost learning in the classroom

by Mallory Locklear
September 10, 2018

Technology is taking on an ever-growing role in the classroom, and many teachers now have access to tools like artificial intelligence (AI) tutoring systems. But while this type of tech can be useful, it also has its limitations. Though these systems offer a way to let students learn at their own pace, keeping teachers informed of how each student is performing hasn’t always been successful. This is often because dashboards that display how a student is doing are viewed with a laptop or tablet, which the teacher doesn’t always want to tote around as they move about the classroom.

But researchers at Carnegie Mellon University may have a solution – a set of augmented reality (AR) smart glasses that let teachers see how their class is performing in real time. Their system, called Lumilo, was designed with teachers in mind from the very beginning, and each step of the extensive development process was done alongside teachers who provided feedback on what types of information they needed and how they wanted to access it.

Giving teachers superpowers

When the process began, the researchers told teachers to imagine that anything was possible and then asked what they would want for their classrooms. Essentially, they asked teachers “what sorts of superpowers they might want,” according to Kenneth Holstein, a graduate student working on the project under Vincent Aleven and Bruce McLaren. “A lot of the ideas were around having this teacher vision power where they can look at the class and just see the [student performance] analytics.”

The result of the co-design process was Lumilo, smart glasses for teachers. When a teacher wears them, they’re shown class-level summaries as students work with an AI tutoring system as well as student-level performance indicators. Those indicators hover over every students’ head to give teachers a general idea of how they’re doing, noting whether that student is idle, is cheating, has made a lot of errors, or is doing well.

For any student, the teacher can also pull up additional information such as what that student is currently working on, what skills they have struggled with, and how likely they are to master those skills in the future.

Improved learning outcomes

The researchers have begun testing these glasses, initially with eight teachers and 343 middle school students in 18 classrooms across four schools. Holstein and his team found that the glasses and the analytics they provide led to improved learning outcomes – students performed better on post-tutoring tests – and also helped inform teachers which students needed their help the most.

“When wearing these glasses, their time was more redistributed to students who were really struggling,” says Holstein. “It’s as if the AI were reaching through the glasses to tell the teacher, ‘I am at my limitations here, I think we need your help at this particular moment.’”
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The researchers also wanted to see if the glasses themselves had an effect on students' performance, so they provided some teachers with models that lacked most of the analytic features. In those cases, the students also performed better on tests compared to those whose teachers didn’t wear glasses at all, though they didn’t perform as well as students whose teachers were given the full range of analytics. The researchers think this effect had more to do with adjusting students’ behaviors – such as a reduced likelihood of cheating – than it did with altering how teachers spent their time.

The research team plans to continue tweaking the design based on their findings. Going forward, they want to explore how Lumilo can help teachers with different levels of experience and see what students might want from such a system. Holstein says his group wants to “involve students much more directly and frequently in the design process moving forward along with teachers.”

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