OPINION: The four ways we can train teachers to use technology that hasn't been invented yet

Substitution, augmentation, modification, redefinition

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Credit: Getty Images

Education critics often see technology as unnecessary bells and whistles to a curriculum that has sufficed for decades. But the reality is that technological innovation today is opening the door to entirely new methods of teaching that have never before been feasible.

New tools have changed how teachers interact with their students, and how the students interact with the materials being taught. More than 100 years ago, the chalkboard was a great teaching tool. It's since been replaced by interactive whiteboards, document cameras, tablets and virtual reality headsets, each slightly more functional than its predecessor.

Changes today are not just incremental improvements of old tools. They are helping us move to a new paradigm, and teachers need to be prepared not only for the tools available today, but for the tools that we can't fathom are coming in the next 10, 15 or 20 years.

Without a roadmap, how can we be sure our teachers are prepared to handle the coming tidal wave of educational technology that only shows signs of getting larger?

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It's not enough to simply provide access to new tools. Certainly, it's impossible to incorporate the use of virtual reality goggles or headsets if you don't know how to use them, but knowing what each button does is only the beginning. Teachers must also be able to see the potential in a given object and how it can be tapped to unlock greater learning opportunities.

Every new device or new piece of software that is used in the classroom varies in the impact it will have on learning.

The most basic level is substitution. An online version of *Jeopardy* to review course material may be more visually appealing but is similarly as functional as any kind of review game that teachers have used in the past.

The second level is augmentation, where technology acts as a direct tool substitution, but also provides functional improvement. Perhaps this makes learning or grading slightly simpler or more proficient, but it doesn't lead to new horizons.

These two levels are largely dependent on the tool itself, rather than the teacher's ability to use and innovate with it. Conversely, maximizing the tool requires teachers to see potential in them, and find ways to unlock it.

When this is possible, teachers reach the third level of modification, where technology allows for projects and tasks to be redesigned. Online polling platforms such as Socrative and Kahoot! not only make quizzing more fun, but they provide students and teachers with immediate feedback. These real-time analytics illustrate if there are gaps in student understanding that require additional time, or if it's time to move on to new concepts.

Finally, the greatest level of impact that teachers can unlock is redefinition. Assignments and tasks are now possible that were previously inconceivable. Instead of written reports, perhaps students can now produce a research project as a video or an interactive digital timeline.

The demands for research and learning are the same, but these additional avenues provide new opportunities to foster student engagement, allow students to create, and require students to "own" their own understandings. These four levels of technology integration — Substitution, Augmentation, Modification and Redefinition — are known as the SAMR Model. Developed by Ruben Puentedura, the model provides teachers a framework for determining the efficacy of various technology options

Unlocking the coveted redefinition impact through education technology frequently requires teachers to stretch outside of their comfort zone. Often, they're more than willing to do so, provided they've also been given the necessary tools, training, teams and time to succeed. Trial and error is key, and is something that current and future teachers should embrace.

It's why our department has also reached out to veteran teachers in the surrounding community through events such as the Teacher Technology Summer Institute, where teachers join together to learn tools they'll then take back to their classrooms and use every day. The tools are theirs to keep, so long as they engage in a yearlong action research project and report back on what worked and what didn't.

The goal is to determine new best practices for devices that are ever-changing. The sooner we unlock the full potential of the tools, the sooner we can unlock the full potential of the teachers to use them, and ultimately redefine the role education plays in student development.

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