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Original Publication Citation

The SAGE Encyclopedia of Higher Education

Educational Technology Tools

Educational technology has the benefit of creating active learning environments in both online and face-to-face classrooms. With the globalization of education, numerous educational tools and resources have been developed to create authentic learning experiences in the classroom. These tools can vary from web-based collaboration tools, such as Google Docs and VoiceThread, to a video tool such as FlipGrid. Such technology can be used in both live (synchronous) or online (asynchronous) classroom settings. With so many options, understanding how to select tools and how they can be integrated into instruction is important and thus is the focus of this entry.

Selection of Tools

Four critical questions can be asked when selecting educational technology tools.

What Are the Learning Objectives?

This first question has nothing to do with technology—and that is the point. Because technology is intended to support instruction, the first question is to determine the learning objectives. Without a clear learning objective, it will be difficult to ensure a smooth integration of educational technology.

How Can Technology Help or Support the Learning Objectives?

Once the learning objectives are determined, technology can be looked at as a complement to, rather than a replacement, for instruction. An educational tool needs to provide a benefit specifically linked to the learning objective. For instance, if an instructor is teaching a writing class and wants to improve students' ability to write and provide critical written feedback, then the instructor would not want to use a video-based or audio-based tool, as this would not support the learning objective.

What Support Will Students Need in Using the Tool?

The next question considers the use of the tool from the student's perspective. It considers the resources or training materials that students will need—for example, will the student need a mobile device or a license to use the tool? Such factors are crucial to consider before introducing a tool to students, as obstacles can lead to student frustration.

Is the Tool Working?

This final question considers how the effectiveness of the tool will be evaluated. Such evaluation often involves obtaining the students' feedback on both the tool and the activities, as such insight can inform future iterations of the tool.

Technology Integration Frameworks

There are several frameworks specifically designed for integrating technology into instruction. Two of the more common ones are technological pedagogical content knowledge (TPACK) and Substitution, Augmenta-

tion, Modification, and Redefinition (SAMR), both of which are considered here.

TPACK

In a seminal article, Lee Shulman (1986) outlined the concept of pedagogical content knowledge which is how an instructor teaches their content—for example, how a science teacher creates a lesson around the dissection of a frog or an English teacher provides instruction on sentence diagramming and construction. Building from the work of Shulman and understanding the growing influence of technology, in 2006, Punyashloke Mishra and Matthew J. Koehler added the role of technology to Shulman's work. This would become known as *TPACK*.

This framework recognizes the role and influence that technology plays on instruction and further establishes the interwoven aspect of technology and pedagogy into classroom instruction. An example of TPACK could be an elementary physical education teacher who wants to use technology to reinforce the relationship between physical fitness and participation in sports. Students would use an online form to enter their resting heart rates and then complete various physical activities and add the associated heart rates. After entering all the heart rates, the students would then chart the differences and explore how different physical activities changed their heart rate.

SAMR

Another useful framework for integration of technology into instruction is SAMR. This framework was developed by Ruben Puentedura in 2014 and seeks to aid instructors in creating engaging and transformative learning experiences for their students. One of the benefits of this framework is the progression for each of the students.

An illustrative example could be using technology to transform a paper. Imagine that the initial assignment required students to compose a handwritten paper. For the Substitution step, students would be told to type the paper using Word. For the next step of Augmentation, the students could be tasked with using a writing tool such as Grammarly to review and offer suggestions for improvement to the paper. They could then upload the paper into Google Docs, which allows for synchronous collaboration, commenting, and chatting, and complete a peer review cycle—the Modification step. Finally, for the last step of Redefinition, the students could use FlipGrid or VoiceThread to submit their response to the initial prompt in video format. This tool allows the students to add additional multimedia elements and respond to each other's posts with video.

Final Thoughts

This entry looked first at questions that can assist in determining if educational technology is a good fit for the stated learning objectives. By asking these questions, an instructor can catch many of the implementation challenges that may surface and efficiently consider and evaluate different tools. It then briefly explored two popular technology integration frameworks, (1) TPACK and (2) SAMR. These frameworks are helpful for successfully integrating technology in support of the learning objectives and provide a process through which to continue to identify and explore new ways to integrate technology into instruction.

See also Educational Technology; Problem-Based Learning; Teaching Strategies

Websites

Resources to support SAMR Model: http://www.schrockguide.net/samr.html

What is TPACK Theory and How Can it Be Used in the Classroom?: https://www.mheducation.ca/blog/what-is-tpack-theory-and-how-can-it-be-used-in-the-classroom/

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- educational technology
- students
- learning objectives

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