BEST PRACTICES FOR ALIGNING TECHNOLOGY WITH CURRICULUM

smartlab

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If technology is chosen, aligned, implemented, and assessed to benefit the learning environment, it has the power to enhance student learning in amazing ways.

In fact, technology can encourage collaboration, drive innovation, and potentially aid in closing the achievement gap by making learning more accessible to students of all abilities.

However, with so many technology options, how do we choose technology that is appropriate, affordable, and accessible? How do we make intentional choices to align technology and tools with our curriculum so that they have a meaningful impact on learning? Finally, how do we prove that our technology choices have impacted students positively?

WHAT WE'LL COVER IN THIS WHITE PAPER

HOW DO YOU CHOOSE APPROPRIATE TECHNOLOGY FOR YOUR LEARNERS?

ENCOURAGE HIGH-QUALITY LEARNING

One of the biggest challenges for teachers is finding technology that not only gives students the opportunities to utilize 21st-century tools, but takes learning experiences to a new level.

High-quality learning is more than just student engagement and excitement. High-quality learning is developmentally appropriate, allows for transfer of learning, and is accessible by students of different ability levels while still providing opportunities for each student to be challenged.

ENSURE ACCESSIBILITY

When considering what technology or tools to bring into the classroom to assist in teaching, it's important to ensure the technology or tool is accessible to all learners.

Choose technology that provides multiple means of representation. For example, technology with visual icons and programs with text-to-speech integrations[4] and translation programs will be accessible regardless of a student's reading level or primary language.

Additionally, a great teaching tool should allow students multiple entry points without requiring too many specific skills or background knowledge to engage with it.

Consider how learners will experience the technology. A technology that's too advanced could delay how and when students utilize it if they need to spend too much time learning to use it. Alternatively, if a technology is too simple, students with advanced computer skills may become disengaged as a result of feeling like the technology holds them back.

Choosing technology that matches the students' experience levels allows both students and teachers to focus on high-quality learning experiences.

When choosing technology or tools, consider programs that have enough versatility that they allow you to meet more students where they are and elevate their individual learning experiences.

The ideal tool provides access points for beginning learners, while supporting each student's growth with additional capabilities, complex functions, and application of advanced concepts and skills.

For example, presenting students with BBC micro:bit gives students an entry point to coding and control programming. Because the micro:bit is scalable, one student might use it to program basic controls to move through a maze or flash a series of lights, while another student can start out by building and programming a scientific sensor and transform their initial design into a unique invention.

Finally, don't forget to consider students' interests. When you facilitate connections between students' passions and their learning, it leads to increased engagement.

For example, the globally popular computer game, Minecraft, has been used to teach math, science, social studies, and language arts concepts successfully. The game is exciting, has multiple access points, builds on experiences, and, with a little planning, can provide students with unique and quality learning experiences while allowing them to make connections to a variety of academic concepts.

HOW DO YOU ALIGN TECHNOLOGY WITH CURRICULUM?

When integrating technology that enhances learning, we recommend choosing technology that aligns with the required curriculum; however, this can sometimes be a daunting task. After all, how do you ensure that the time students spend with technology contributes to their mastery of the standards?

CHOOSE A TECHNOLOGY THAT IS EASY TO USE

Choose technology that is user-friendly and intuitive like technology with buttons and symbols that are easily interpreted. For example, Google Slides/Drawing/Sheets, is easily understandable so students spend less time learning **how** to use it and more time creatively demonstrating their understanding.

Additionally, technology that includes relatively simple toolbars and functions allows students to focus on the learning and their sharing of learning instead of deciphering how to use the technology.

Alternatively, if the technology is more complicated, provide students with ample exploration time so they can get acquainted with the tool and learn how to operate it so that learning time can be spent using the tool to enhance their experience.

As teachers, we should view technology as an opportunity for students to experience content in new and more powerful ways rather than teaching students how to use the technology alone.

CHOOSE TECHNOLOGY THAT PROVIDES OPEN-ENDED LEARNING EXPERIENCES

Rather than choosing a technology that reinforces one particular skill or concept, look for tools that can be used for many purposes or in many units.

Versatile tools allow students to utilize them in a variety of situations to add breadth to their learning or combine it with other technology to explore concepts in more depth.

Additionally, the ability to synthesize technology allows students to redefine learning experiences in ways that would not be possible with just one piece of technology—this is the highest level of technology application in the Substitution, Augmentation, Modification, and Redefinition (SAMR) model[2].

For example, K'Nex Building Systems allows an entry point to basic concepts like 2D and 3D shapes, but it can be expanded to help students learn about simple machines, complex machines, as well as advanced engineering and physics concepts.

CONSIDER STANDARDS, BUT DON'T LIMIT YOUR OUTCOMES

It's always wise to consider how a particular technology or tool could be used to help your students master a specific standard and plan a learning engagement that guides students toward mastery. This is especially helpful if project-based learning or exploratory learning is not something

your students have a lot of experience with.

If, on the other hand, your students have experience with project-based learning, decide whether a project- or inquiry-based learning approach complements the tool or technology.

The beauty of project- and inquiry-based learning is that students gain valuable knowledge and skills far beyond the assessed standards.

Imagine you're teaching your students about graphing. You give the students a challenge to figure out the effect a car's weight has on its velocity. A key component of the project is to use collected data as evidence, which may also be your targeted standard. You choose Vernier scientific sensors and the accompanying data collection software to support this learning.

Although students will have to understand and analyze a graph to complete the challenge, they will also learn about the scientific method, gravity, and other physics concepts. This type of "by-product" learning provides opportunities for cross-curricular connections, spiraling, and additional chances for students to master concepts.

CHOOSE TECHNOLOGY THAT IS EFFECTIVE

One of the biggest challenges in bringing technology into the classroom is developing ways to measure its impact on students' performance. In many cases, educators must be able to justify the expense and presence of a particular technology to parents, administrators, and the community.

Developing a method to measure the impacts of technology on student learning is critical. Often times, teachers must make an educated decision to bring technology into the classroom and then wait until after the students have used it to gather data about its effectiveness.

This is a sufficient way to measure effectiveness if the technology turns out to be successful at increasing student learning; however, if your data suggests the chosen technology is not an effective tool, you could be left trying to justify your decision, looking for a replacement, and reteaching the lesson(s).

To help, the SAMR model, created by Dr. Ruben Puentedura, is a useful framework to help guide your decisions when integrating technology[3].

The SAMR model is set up like a spectrum— "on one end, technology is used as a one-to-one replacement for traditional tools, and, on the other end, technology enables experiences that were previously impossible"[3].

The SAMR model is an avenue for students to move from enhancing their learning to transforming it.

Consider this before-and-after example:

Original project/lesson:

- Design an inclusive playground, drawn to scale on graph paper, include a persuasive letter (written on paper) to the city council that states why the design should be chosen and funded.

SAMR project/lesson:

- Substitution: Students use the internet instead of books to determine actual dimensions and cost of equipment (playground equipment, building sizes, flower gardens, fountains, etc.), and to find research to support the use of inclusive playgrounds.
- Augmentation: Students use Tinkercad, a 3D-design tool, to design the layout of an inclusive playground.
- Modification: Instead of a handwritten letter to the city council, students create a multimedia presentation using Adobe Premiere describing why their park should be chosen. They enhance the presentation with images and a video showing the design process for their inclusive playground. This could also be paired with a 3D physical- or computer-modeling of the space.
- Redefinition: Students use Fusion 360,

a 3D-digital design program, to create the inclusive playground to scale. The students then create a virtual reality tour of the playground, highlighting each piece of equipment and how it is accessible to all children. Their scale model and persuasive statement is included in a video alongside interviews with future users of the inclusive playground. The digital submission is provided to the city council for review.

> "The ideal tool provides access points for beginning learners, while supporting each student's growth with additional capabilities, complex functions, and the application of advanced concepts and skills."

Another framework that can help you integrate technology most effectively is Dr. Sonny Magana's T3 Framework, which separates the application of technology for education into three levels. The T3 Framework increments the use and impact of educational technology tools into a hierarchy of three domains: T1) Translational, T2) Transformational, and T3) Transcendent[1].

The three levels provide a pathway to elevate the use of technology in the classroom and all educational spaces.

Technology used at the T1 Level is described by the automation and consumption of material in a digital way.

At the T2 Level, technology encourages production and contribution where students create their own digital representations of what they know and can do.

Finally, T3 technology integration includes social entrepreneurship and inquiry design where students find things about which they are passionate and utilize technology to solve problems that matter to them[1].

Collaboration, creativity, and student ownership in their learning are common themes found in the SAMR and T3 Framework, and are critical look-fors in other technology integration guides and models.

The most effective tool will be one that ultimately scaffolds students' independence so they can select the appropriate tool to solve a problem that is important to them.

SMARTLAB TECHNOLOGY AND CURRICULUM

To support educators in finding and implementing high-quality technology and developing meaningful engagements, Creative Learning Systems has researched and tested numerous learning tools and developed complementary curriculum that promotes meaningful engagement for all students.

This curriculum incorporates technology that is developmentally appropriate for the audience and is articulated K–12, encouraging students to utilize technology that moves them toward the use of professional-quality tools.

The curriculum is aligned to state standards and a variety of national standards, including Common Core and NGSS.

Additionally, the curriculum is designed so that students gradually take ownership of their learning, using the curriculum as a resource instead of a script.

In a SmartLab, students are encouraged to use their knowledge, skills, and interests to solve problems and conquer challenges about which they're passionate.

The Creative Learning Systems team of educators have researched, vetted, and selected technology and tools that support learning while developing complementary, standards-aligned curriculum. They do this to free educators so you can focus on facilitating inquiry-based learning and provide students with the invaluable opportunity to take ownership of their own learning.

CONCLUSION

The educational technology market has become saturated and, as educators, it can be challenging for us to determine which tools will transform the learning experiences of students.

The right technology will encourage collaboration, drive innovation, and help meet the individual needs of all of our learners.

Creative Learning Systems' solution, SmartLab Learning, eliminates the stress of navigating the technology integration process, and provides a clear solution designed to support high-quality student learning.

ABOUT CREATIVE LEARNING SYSTEMS

Creative Learning Systems has pioneered the conversion of traditional learning environments to project-based learning experiences since 1987. Today, Creative Learning Systems partners with the most innovative school leaders nationwide to provide personalized, project-based learning experiences and environments that increase a student's capacity through engaged, active, and social problem solving.

With SmartLabs' suite of solutions, we have provided students with hands-on, project-based learning experiences that ignite their passion for science, technology, engineering, and math; helped them build lifelong communication, collaboration, and critical-thinking skills; and empowered them to approach challenges with creativity.

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