IT'S NOT ABOUT THE TOOLS

Ed-tech training needs to go beyond specific tools and instead enable teachers with an adaptable, creative mindset.

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Every few months, a new ed-tech tool or device obviates its predecessor—giving teachers and school leaders little or no time to become familiar with the new technology or analyze its implications for teaching and learning (Schmidt-Crawford, Lindstrom & Thompson, 2018). To keep pace with all the change, teachers and school leaders are often immersed in a barrage of professional development intended to help them alter their best practices to adopt new tools and systems (Webster-Wright, 2009).

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Yet professional development that focuses on tool-centered approaches is often insufficient to meet teachers' needs in contemporary classrooms (Bakir, 2015). For starters, this type of training will never be able to adequately cover most new tools on the scene. Further, this type of training does not teach technology skills in an applied-learning manner, embedded in teaching projects or relevant contexts. It also may be inefficient, in terms of cost, if teachers or schools invest time, energy, or resources on learning tools that may change or become obsolete quickly.

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In an era of rapid change, what teachers need most isn't training on particular tools, but training that bolsters their own confidence in their creative ability to work with continual technological change in the classroom. As teacher educators and scholars interested in effective technology integration in the classroom, we've found that teachers need to develop what we call a *creatively focused, technology fluent* (CFTF) mindset. That is, they need a research-based approach that builds their creative instincts so they can incorporate technology for teaching and learning without dependence on specific tools. They also need opportunities to experiment with technology, creatively design artifacts, and learn in ways that measurably increase their confidence to transition from familiar technologies to novel ones.

Getting Creative

Psychological research has identified personal traits associated with creativity, including: flexibility, open-mindedness, tolerance for ambiguity, intellectual risk taking, and willingness to play and improvise (Silvia et al., 2009). These traits are habits of mind that are helpful in situations requiring creative thinking.

Such habits of mind shape the mindset we aim to cultivate in the CFTF training. Teachers with this mindset are more successful and confident in using technology because they are more adaptable and willing to try new things and play with ideas. Teachers who approach technology with open-minded confidence will find they can more easily weave content, pedagogy, and technology in novel and effective ways toward their learning goals.

The CFTF mindset can also help teachers design instruction that's aligned with content and technology in imaginative and nontraditional ways and that can provide creative pathways to academic success for socially and culturally underrepresented students (Henriksen, Mehta & Rosenberg, under review; Ladson-Billings, 2014; Mehta, 2017). For example, English language learners or students of color from diverse sociocultural backgrounds often struggle in traditional classrooms because their cultural backgrounds and literacies do not find the respect and space that they need. Digital spaces, such as Snapchat's video

options, can often allow expression of curricular content in personalized ways and offer creative opportunities for such students.

As teacher educators, we've had the opportunity to train teachers in developing the CFTF mindset through a Master of Arts in Educational Technology (MAET) summer program at a large Midwestern university.

This summer program is a three-year blended-learning alternative to a fully online program. It requires three courses (in educational psychology, leadership, and research methods) that are not directly technology-related and that are usually taken in the second year. The three courses are intentionally blended together to provide a seamless summer curriculum. There are two weeks of face-to-face training, followed by four weeks of online learning. Though the course topics are not explicitly technology-focused, we use summer sessions to cultivate a CFTF mindset for integrating technology into the classroom, de-emphasizing conventional skills or tool-based approaches to professional development.

Teachers need to be prepared to switch confidently between tools—irrespective of prior experience.

There are typically 10–20 in-service teachers and school leaders enrolled in the MAET program. Students often range in ages from their mid-20's up to retirement-age, are both new and veteran teachers, and represent a wide range of different school settings, grade levels, and subject matters.

In order to serve the needs of a diverse group of teachers, the curriculum in this program incorporates varied discussions, activities, improvisations, technology exploration time, and many large and small creative design challenges in which teachers play with technology to produce shareable products like videos, multimodal or interactive web-based spaces, tutorials in the form of "tech-tips," and others. Much of the learning time is spent actively and collaboratively, in lessons, activities, and projects aimed at creating content and becoming more technologically fluent. Most projects require creative design work using technology—either at the level of *micro-design* activities (mini creative projects or "quickfires" using technology), or *macro-design* activities (more extended project-based work). Micro-design activities are done on short timescales to engage with creative work through quick decisions—which also shows teachers that the uptake for new technologies need not be time consuming or complex.

Every learning experience in the course is designed for students to develop a CFTF mindset. The students think and work in collaborative and flexible ways as they learn by creating or making artifacts and continuously experiment with new tools. The teachers don't just watch videos or follow instructions—they make and share their own videos and lessons, and are given time and space to create content.

For example, a daily "Tech Tips" assignment encourages the teachers to explore and share new and useful applications of technology for themselves and other teachers. In another more extended assignment called DreamIT, we have teachers start by identifying either a challenge or a goal from their own teaching practice and work through a backward design process to identify how technology could support solutions toward their goal or address their challenge. They use a simple template to write up a funding proposal that describes how they could use technology to support their pedagogical goals or address challenges in their teaching. Many of our teachers have gone on to use this assignment as a basis to obtain grants, local district support, or even crowd-sourced funding.

A critical note here is that there is no direct instruction given to the teachers on any particular technology tools. In some cases, the teachers may explore several tools or software before they select the one that serves their task. The goal of the training is for teachers to be prepared to switch confidently between tools, irrespective of prior experience—and especially when their

prior experience is one of failure. This empowers them to adapt technology creatively and with discretion, rather than depending on particular learned tools prescribed amid ever-evolving trends.

A Study in Confidence

To gauge the effectiveness of the CFTF mindset, we recently conducted a study focusing on the summer courses for teacher-students in their second year of the MAET program. We tracked teachers' experiences across five different summer cohorts between 2012 and 2017.

Over the five different years, we collected pre- and post-class survey data from 74 teachers and analyzed their perceptions of confidence in using different technologies during the class. The survey included questions about tech tools and programs that the teachers used in the course and ones that they did not directly use in the course or may not have even heard of or used before. We marked each technology tool as involving *low*, *medium*, or *high* alignment with the goals of the course; high alignment meant technologies used directly in the class and low alignment meant technologies never used in the class. We wanted to see if teacher confidence with using technology was confined to the specific tools they used directly or if our CFTF mindset allowed their confidence to expand beyond the tools they had used to include with other technologies as well.

Our theoretical premise was that in a world where technologies are always changing, building a more general sense of confidence for the new may be even more valuable than directly learning tools that may be gone tomorrow.

We designed the survey items as active statements that mentioned a tool and a specific use of that tool—for example, "Editing a Podcast," "Using Cloud Storage," or "Creating a Smartphone App." In cases when a teacher did not know what a technology was, the instructors explained it to them. For each question, the teachers were given a five-point Likert-type scale to measure their confidence level in using a specific technology, ranging from one being "Not Confident" to five being "Very Confident."

Our findings showed that the CFTF approach to ed-tech training led to statistically significant increases in teacher confidence consistently across years of data (see Figure 1). More important, we also noted an increase in teacher confidence with technologies that were *not used* in the program—demonstrating a transfer of confidence across technologies. Teachers were never directly taught how to use any of the specific technologies used in the course, yet their perception of confidence with those technologies—and even some they hadn't even

FIGURE 1. Change in Teacher Confidence with Technology

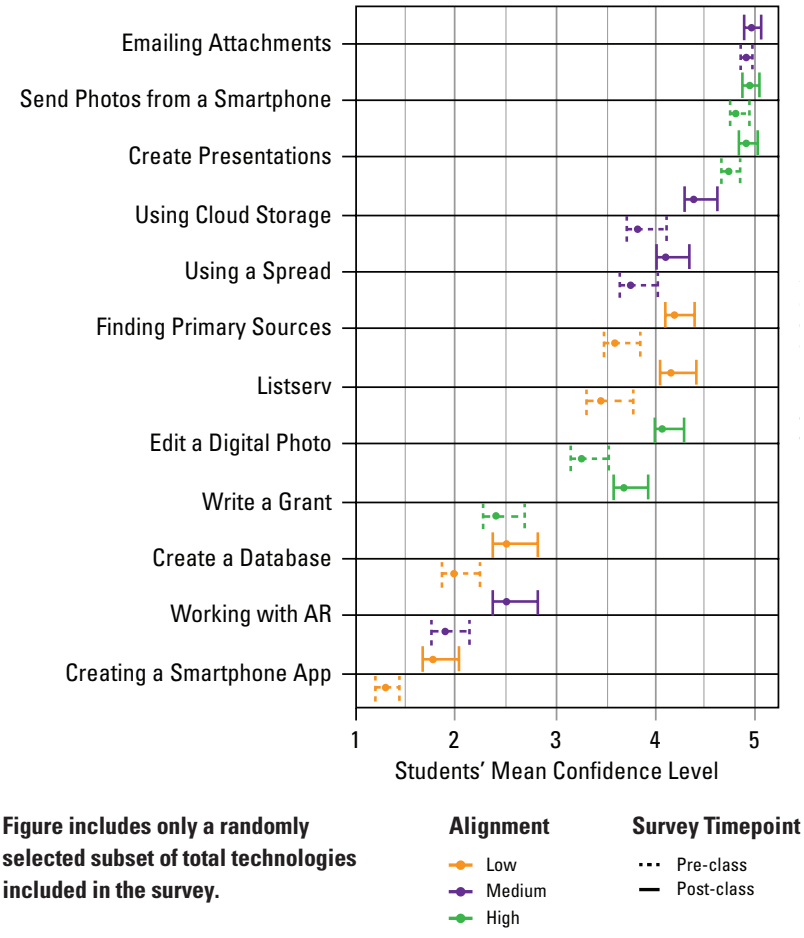

Figure includes only a randomly selected subset of total technologies included in the survey.

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heard of—improved. This suggests a CFTF mindset in school professional development could help teachers expand more easily to other unfamiliar tools and technologies.

Bruner (1996) noted:

> Being able to "go beyond the information" given to "figure things out" is one of the few untarnishable joys of life. One of the great triumphs of learning (and of teaching) is to get things organised in your head in a way that permits you to know more than you "ought" to. (p. 129)

Our findings reflect the potential for transfer with a CFTF mindset: By virtue of getting more opportunities to explore and create, teachers can feel more confident in learning technologies without *direct* instruction.

Teachers need time to explore and "play" with new technologies collaboratively.

This is not to say that frustration and failure do not happen. Indeed, these negative experiences are essential to the process of creativity and learning (Smith & Henriksen, 2016), and we are upfront in stating this philosophy with our teachers from the start. However, actively cultivating a mindset where teachers understand that failure is just fine *if* they see it as an opportunity to push through and learn helps to preempt the potential for stressful failure.

We also stress a collaborative spirit to help support teachers through failure. Giving them opportunities to work in small groups across different creative projects lets them check in with each other to problem solve and troubleshoot solutions.

Adapting to Change

Our observations have confirmed for us that school systems must give teachers opportunities to get creative and learn by design in hands-on ways so they can build confidence and develop a more fluid mindset toward technology. More tech-focused professional development experiences should allow teachers and school leaders to get comfortable with creative engagement with technology. The CFTF focus on flexibility, open-mindedness, willingness to try new things, and intellectual play or risk taking aligns with this idea of confidence via creativity.

This means, however, that classrooms and school environments must be supportive of such teacher learning and professional development. Leaders would do well to consider the habits of mind that we have described here and reflect on how these can become part of their school culture and teachers' professional development and learning opportunities. This may mean:

1. Ensuring that teachers are given *time to explore and "play"* with new technologies collaboratively. Offering teachers a set of tools to solve fun and relevant challenges indicates that finding solutions is more important than following strict paths to them.

2. Providing teachers *opportunities and experiences to be creative* with technology—such as learning technologies by designing or creating things with them (artifacts, lessons, plans, and more). For example, one group of teachers in our course was asked to create an inquiry video about possible misconceptions about sound in space. This group chose to use green screens and a late-night comedy format to interview experts.

3. Building *networks of collaboration within and between schools* for teachers to share ideas and learning. For example, during our program, teachers used Twitter and other social platforms to collaborate and brainstorm ideas. This networking continues even after the program, as new cohort members connect with older cohorts. Instead of feeling the need for a new technology-specific professional development, teachers have the confidence and independence to problem solve with their professional networks.

4. Embracing and *nurturing a CFTF mindset as school leaders*. School leaders and stakeholders can nurture this mindset within their districts by giving teachers the space to practice new tools and be creative with lesson planning. They can design spaces for collaboration and creative risk taking, further allowing teachers to assess different creative possibilities.

The future of education is difficult to predict, but we can expect that it will be shaped by continual advancements and changes in technology. Perhaps the best training teachers and school leaders might seek for this technological evolution is through opportunities to expand their creativity, build confidence in the ability to use evolving tools and platforms, and recognize their own potential as creative designers, with and through technology. EL

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