Mind the Gap: Why TPACK Case Studies?

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One teacher eagerly uses Google Reader to support the sharing of digital articles. Another has developed hundreds of creative and engaging lessons that rely heavily on using the overhead projector. A third teacher uses an interactive white board for displaying the text of his daily lectures. Each of these scenarios features a teacher employing educational technologies in order to support learners and content area goals.

The first teacher invests time in what seems like a helpful service from Google, one that is eventually discontinued. The second teacher uses an overhead projector in an interactive way with students, despite its old-fashioned reputation. The third teacher has access to the newest and greatest in interactive white boards, only to rely on it to facilitate lectures. In even these brief scenarios, we can see how complex teaching with technology can be and that identifying the most effective and promising technologies for use in the classroom remains a challenging task for many teachers.

The challenge is made even more daunting because the technologies themselves are changing so rapidly. Not surprisingly, teachers often feel overwhelmed just learning how to use newer technologies, let alone making decisions about how best to integrate them within disciplinary and classroom contexts. The choices of tools are myriad and the lists of features seemingly endless. Choosing one tool over another and investing time in learning those tools means that teachers are constantly weighing the pros and cons of each technology. These choices are also layered on top of curricular demands and the desire to connect with pedagogically sound practice.
Teaching with technology, moreover, can feel like a risk. It can often feel safer to teach with the familiar tools, be they pencils or books. Many teachers are intimidated by the logistical challenges of managing individual students' access to computers and the Internet.

Nonetheless, teachers increasingly find themselves called upon to help facilitate students' use of technology in order to help support digital citizenship or because the technology has found its way into the classroom (through district or school initiatives). Other teachers might find themselves making the opposite argument: as tech enthusiasts, they are responding to concerns that the content area learning might suffer in the face of using new technologies or that using digital tools distracts from good pedagogy.

The technology, pedagogy, and content knowledge (TPACK) framework (Koehler & Mishra, 2009; Mishra & Koehler, 2006) has entered this conversation as one way to frame the discussion about effective teaching with technology and how best to facilitate strong educational technological practices. The TPACK framework suggests that technologies should not be understood as isolated tools that can be layered on top of existing teaching practices, but rather that teachers should consider an integration of technology, pedagogy, and content knowledge in order to design highly effective learning experiences for students.

As the TPACK framework has matured, the research has described a variety of practices by which to understand teaching with technology within the complex context of the classroom. These practices and the findings of research (which are often published in research journals or presented at academic conferences) have often not made it into the hands of classroom teachers to directly influence teaching practice. Bridging this gap between research and practice is the object of this book.

This book provides both practitioners and researchers a way to see inside the technological, pedagogical, and content area choices that teachers are making. "Cases add context to theory," as Darling-Hammond and Snyder (2000, p. 529) noted. In this chapter, we will briefly introduce the TPACK framework, discuss the value of case study, and explore what it means to be a case of TPACK and how practitioners might apply the TPACK framework to their own classroom practices.

What is TPACK?

In its simplest form, the TPACK framework offers a way to think about educational technology and the issues surrounding the integration of technology into effective classroom instruction. As described by Mishra and Koehler (2006), the TPACK framework suggests that teachers approach technology not as an isolated skill to be mastered, but rather as an integrated form of knowledge that is interwoven with pedagogical and content area understandings. According to this framework, good teaching requires the thoughtful integration of technological knowledge, pedagogical knowledge, and content knowledge with the goal of designing discipline-based learning experiences for students.

The theory behind the TPACK framework is based on Shulman's (1986) work describing the knowledge required for effective teaching. Shulman championed the idea that successful teachers have a specialized form of knowledge, called pedagogical content knowledge, that represents

specific skills and understandings about teaching a particular subject matter or content area. In short, Shulman's (1986) work provided a way to think about how general and specific forms of content and pedagogical knowledge were important to the act of teaching. The TPACK framework extended the work by Shulman by also considering the role of technology in teaching, and how technology interacts, in both simple and complex ways, with content and pedagogy (see Figure 1).
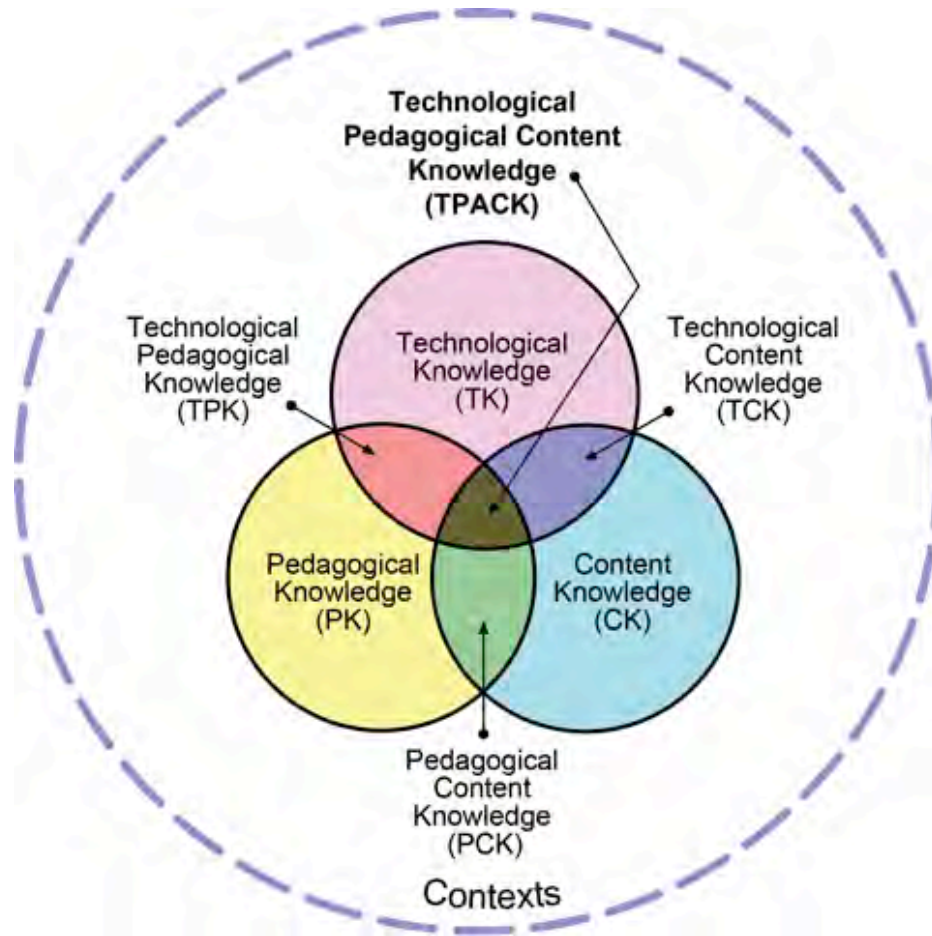

Figure 1. The components of the technological pedagogical content knowledge framework. Reproduced by permission from tpack.org

Specifically, there are three main bodies of knowledge in the TPACK framework:

- Content knowledge describes knowledge specific to the subject matter or domain for which a teacher is asked to teach.
- Pedagogical knowledge describes the teacher's understanding of best practices for teaching, various strategies, and instructional methods to support student learning.
- Technology knowledge describes the teacher's knowledge about technologies, both stable and evolving.

Additionally, the TPACK framework articulates how these three domains of knowledge interact with one another, as well as the way they might inhibit one another.

- Technological content knowledge describes the ways in which technologies and the content domain interact in ways that both impact and restrict one another. For example, reading and writing online are different than they are in traditional print, and effective literacy instruction requires an understanding of how new tools change and shape notions of literacy.
- Pedagogical content knowledge describes the ways a teacher interprets the content as both a learner and as a teacher and acknowledges that the process of engaging with content for the purpose of teaching it fosters a particular kind of knowledge. This domain includes understanding of how to teach particular topics within the broader subject matter, typical learning trajectories and misconceptions, and ways of assessing understanding.
- Technological pedagogical knowledge is a teacher's knowledge of the ways in which both teaching and learning alters with the addition of technology, especially technologies that have been repurposed for educational uses. This knowledge, for example, is demonstrated when a teacher structures online conversations differently than face-to-face discussions.
- Technological pedagogical content knowledge recognizes the deep understanding needed to weave together pedagogical, content, and technology knowledge in a way that each interacts in productive ways with the others into an act of effective teaching.

The TPACK framework itself has spawned a rich body of research into the ways teachers implement technology into their classrooms. Professional development has been designed and delivered based on this framework. Research has been conducted and published, and the larger academic discussion has shown the usefulness of TPACK as a framework for discussing these issues as well as ways to develop more practical knowledge for teachers and learners.

Despite all the work done using the TPACK framework, however, these efforts have been somewhat limited in helping classroom teachers see and understand effective uses of technology. This book represents a promising leap forward by offering concrete examples of TPACK in action, in actual classrooms, with actual students. These real-world examples serve as models to help teachers articulate the moves they make within the authentic context of the classroom that demonstrate their rich knowledge of how best to integrate technology.

Why Do We Need Cases?

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Case studies have a long history of use in both preservice and in-service teacher education. In general, case studies have been used as a way to highlight the contextual realities of teaching practice and to examine aspects of teaching in order to demonstrate or exemplify the complications that can arise within the classroom. Cases have been used to identify principles or concepts of a theoretical nature; to describe practice, to explore morals or ethics, to demonstrate dispositions and strategies, and also to provide an image of what is possible, among others (Schulman, 1992). Case

studies allow teachers and teacher educators to identify points of inquiry, points of tension, or points of insight. As noted:

> Typically, cases represent instances of teaching and learning that pose dilemmas, provide carefully assembled evidence or data, and, sometimes, describe the outcomes of various decisions in specific situations. Contexts for cases may be defined by the nature of the subject matter and students; the history of a class, an event, or an individual; and the situations observed or strategies attempted. (Darling-Hammond & Snyder, 2000, p. 529)

One of the greatest strengths of case studies is the manner in which they can highlight the rich telling detail, as well as local contextual factors that are often lost when teaching is discussed in more general terms.

The case study itself and its narrative structure tell the story of a moment in time in order that readers might witness what otherwise might have been invisible. When a case is studied, the reader can grapple with the decisions and choices shown in the case, as well as reflect on the outcome and imagine how different decisions might have led to different outcomes.

Case studies offer a snapshot into the complexities of the teaching context and make visible the often invisible decisions, logistics, and outcomes. The value of a case study"lies in its ability to draw attention to what can be learned from a single case (Schram, 2006, p. 107)." When taken together, as in this book, cases allow for readers to crisscross a complex domain and, thus, engage with a rich array of themes that play out differently in different cases.

Why Do We Need TPACK Cases?

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The TPACK framework describes a complicated and complex set of interactions in different domains of knowledge that teachers employ when designing learning experiences with technology. Looking at specific knowledge in isolation, however, can obscure the holistic set of interactions that occur when teachers integrate technology in the classroom. TPACK cases allow the reader to see these holistic interactions in the contexts of the classrooms where the learning experiences have been designed and implemented. Considering that the classroom is already a complex and complicated context, identifying the ways that the teacher's decision making process includes choices about pedagogy, content, and technology will help readers to imagine themselves informing their own decision making process in order to support teaching and learning with technology.

TPACK cases make visible what may not be readily apparent when educational technology is used in the classroom. Not only are teachers' practices are described but teachers themselves describe the instructional and design decisions they make as they choose a particular pedagogical strategy and technology to support the teaching of particular content.

Teachers in the case studies reflect on their decisions, and the case studies offer an entry into thinking that is normally invisible during classroom observations. In focusing on the use of technology in classrooms and highlighting the ways in which the TPACK informs teaching decisions, case studies of TPACK can show the ways in which those decisions reflect the teaching context, respond to the complexity of teaching and learning, and serve as inspiration for those hoping to improve teaching with technology.

To claim that something is a case of TPACK is to say that it instantiates several important dynamics of educational technology in action. First, it provides TPACK within a specific classroom context. Every classroom is different, and the TPACK framework takes into account the ways these differences might influence pedagogical and technological decisions, as well as the type of content knowledge students are learning. Additionally, TPACK case studies highlight the ecology of decisions that led to the teaching case in three main areas, including decisions about the specifics of the school, classroom and student population, the content area goals to be addressed, and the pedagogical choices grounded in best practices of teaching. Furthermore, each case underscores the technological choices that support, enhance, or are reflective of the pedagogical and curriculum goals set for the learners. Finally, the ways in which each of these separate choices enhance and constrain one another are considered and highlighted.

The TPACK cases are also intended to serve as a place of inspiration. They invite readers to imagine how certain pedagogical methods and technologies might work within their own context.

New pedagogies or technologies often bring with them a sense of risk in terms of implementation. Whenever a new technique is undertaken in the classroom, the teacher must grapple with the newness of the approach as well as helping the students learn the content or technology or maybe both at the same time. Sometimes, students are more knowledgeable about technologies than the teacher is. Teachers assume multiple risks when trying new approaches, and this risk may create resistance toward innovation. The case study, then, allows the teacher through the narrative to experience (and simulate, so to speak, in their mind's eye) the teaching moment without the concomitant risk.

Cases of TPACK, however, are not about advocating for (or against) a particular technology. The latest and greatest technologies today can be quickly outdated tomorrow. While cases can and should serve as inspiration, they should not be seen as rigid templates for integrating technology. TPACK cases are not about recommending one technology over another, but rather about showing the thinking behind the technological choice–and how it fits with choices made regarding content and pedagogy.

Additionally, the cases presented here may or may not be representations of the best pedagogical techniques, the best content standards, the best technologies, or the best way to balance these three areas. As discussed previously, case studies are important for representing how complicated the act of teaching is. Good case studies are complicated. A reader may disagree about an approach

taken in a case study discussed here. That moment of disagreement should be seen as a fruitful place to reconsider what a better approach might have been so that it might inform future practice.

TPACK cases provide an opportunity for readers to focus on concrete examples of TPACK in action and in context. They demonstrate the delicate balancing act between technology, pedagogy, and content, and how each of these enhance and constrain one another. Teachers can and do regularly pull off this balancing act, and each of the cases represented in this volume are one way to demonstrate TPACK in the real world. The cases highlight the thinking behind the decisions and actions teachers are taking, and in this way the cases can transcend a specific content area, pedagogy, and technology that might become dated over time.

Conclusion

Teaching with technology is constantly evolving even as our knowledge of effective teaching and content changes. The TPACK framework remains important despite these changes, precisely because it transcends specific content areas, pedagogies, and technologies to describe a broader approach to the question of effective teaching with technology. By itself, however, the framework may appear overly abstract and theoretical. TPACK cases provide an opportunity for teachers and researchers to engage with richly contextualized moments of teaching with technology–providing opportunities for a nuanced engagement with the framework. The case studies themselves may serve as a point of entry for those seeking to develop TPACK, or may function as examples of reflective practice. And, finally, they can serve as points of inspiration to other teachers who are seeking to improve their teaching.

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