Introducing TPACK
Technological Pedagogical Content Knowledge

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What is TPACK?

Technological Pedagogical Content Knowledge (TPACK) attempts to capture some of the essential qualities of knowledge required by teachers for technology integration in their teaching. At the heart of the TPCK framework, is the complex interplay of three primary forms of knowledge: Content (C), Pedagogy (P), & Technology (T) and their intersections. Considering the intersections we get:

- *Pedagogical Content Knowledge (PCK)*: Taking P and C together, we get knowledge of pedagogy that is applicable to the teaching of specific content
- *Technological Content Knowledge (TCK)* – At the intersection of T and C is the knowledge of the relationship between technology and content
- *Technological Pedagogical Knowledge (TPK)* - the existence, components and capabilities of various technologies as they are used in the settings of teaching and learning

And finally, at the intersection of all three knowledge domains is

- *Technological Pedagogical Content Knowledge (TPCK)* – The intersection of all three components characteristic of true technology integration and the negotiation of the relationships between these three components of knowledge.
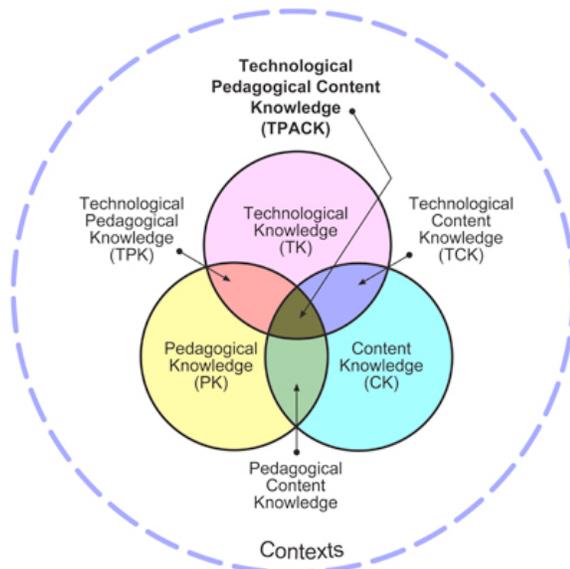
True technology integration is understanding and negotiating the relationships between these three components, as they play out in specific contexts. A teacher capable of negotiating these relationships represents a form of expertise different from, and greater than, the knowledge of a disciplinary expert (say a mathematician or a historian), a technology expert (a computer scientist) and a pedagogical expert (an experienced educator). Effective technology integration for pedagogy around specific subject matter requires developing sensitivity to the dynamic, transactional, relationship between all three components. There is no single technological solution that applies for every teacher, every course, or every view of teaching. Rather, solutions lie in the ability of a teacher to flexibly navigate the spaces defined by these key elements.

The critical role of teacher creativity: Most technological tools (think word-processors or compasses) have not been designed for educational purposes. Moreover the rapid rate of technology change (think Web 2.0 services on hand held devices) leads to increasing pressure on teachers to keep up with these new tools and devise new ways to integrate them in their teaching. This means that teachers need to go beyond "functional fixedness" and instead need to creatively repurpose these tools to make them pedagogically viable. This requires a deep understanding not just of the technology but also of the content to be covered, the pedagogical approaches to be supported and the contexts within which teaching/learning is to happen. Situational creativity, flexibility, tolerance for ambiguity, and a desire to "play" are key attributes of the TPACK knowledge teachers need to develop for successful technology integration in the 21st century.

Developing TPACK

Standard approaches that treat technology skill development in isolation from content and pedagogy will not work. There are a range of ways in which TPACK development can be fostered (both for pre-service and in-service teachers). Two are listed below (more can be found at the resources given below):

1. *The Learning Technology by Design* (LT/D): The LT/D approach argues that it is necessary to teach technology in contexts that honor the rich connections between technology, the subject matter (content), and the means of teaching it (the pedagogy). In this approach, teachers work collaboratively in design teams to solve authentic pedagogical problems.
2. *TPACK-based activity types* as a technique for professional development of teachers. This technique emphasizes domain specific activity types and argues that this may authentically and effectively assist teachers' and teacher educators' technology integration efforts.

Key Readings

What is it?

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A new framework for teacher knowledge. *Teachers College Record. 108*(6), 1017-1054.

AACTE Committee on Innovation and Technology (2008). *The handbook of technological pedagogical content knowledge for educators*. AACTE and Routledge, NY, New York. [Chapter 1: Introducing TPACK.]

How do we measure it?

Schmidt, D., Baran, E., Thompson A. D., Koehler, M., Mishra, P. & Shin, T. (2009). TPACK: The development and validation of an assessment instrument for preservice teachers. *JRTE, 42*, 123-149

Cox, S., & Graham, C. R. (2009). Diagramming TPACK in Practice: Using an Elaborated Model of the TPACK Framework to Analyze and Depict Teacher Knowledge. *TechTrends*, 53, 5. p. 60-69.

How do we develop it?

Koehler, M. J., & Mishra, P. (2005). What happens when teachers design educational technology? The development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research*, 32(2), 131-152.

Harris, J., Mishra, P., & Koehler, M. (2009). Teacher's technological pedagogical content knowledge: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, vol. 41, no. 4, PP. 393-416.

TPACK & Creativity

Mishra, P., & Koehler, M. J. (2009). Too Cool for School? No Way! *Learning & Leading with Technology*, (36)7. 14-18.

Mishra, P., Koehler, M. J., & Kereluik, K. (2009). The song remains the same: Looking back to the future of educational technology. *TechTrends*, 53(5), 48-53.

Mishra, P., Koehler, M. J., & Henriksen, D. (2011). The seven trans-disciplinary habits of mind: Extending the TPACK framework towards 21st century learning. *Educational Technology 51*(2), 22-28.

Learning More & Getting Involved

All TPACK all the time: http://www.tpack.org
TPACK Bibliography: http://www.mendeley.com/groups/522011/tpack/papers/

TPACK SIG @ SITE & TPACK newsletter
Newsletter archive and subscription info available at http://punya.educ.msu.edu/tpack/

Punya Mishra's (punya@msu.edu) blog on technology, creativity, design, and yes, TPACK
Web: http://punyamishra.com/

Matthew J. Koehler's (mkoehler@msu.edu) All Things TPACK page
Web: http://mkoehler.educ.msu.edu/tpack/