

Book Review

The Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators

by The AACTE Committee
on Innovation and Technology
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The Innovation and Technology Committee of the American Association of Colleges of Teacher Education (AACTE) set down an important agenda for the future of teaching and the preparation of students in their edited book, *The Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators*. They enjoin the profession to bring together the teaching of subject matter with effective and appropriate uses of technology and to refine teaching practices to engage students in the use of technology as they investigate curriculum, express what they know and understand, and apply knowledge to construct new meaning. This complex task was explored through the lenses of pedagogical practices for teaching curriculum, classroom experiences, digital equity, and teacher development.

Strategies for learning to effectively and appropriately employ TPCK in the classroom were explicated through a theoretical framework, descriptions of integration into specific subject matter curriculum, and discussion of teacher development across the developmental continuum. Each chapter was written by different scholars in education and the handbook concludes with a chapter written by the entire AACTE Committee.

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What is Technological Pedagogical Content Knowledge (TPCK)?

Koehler and Mishra (2006, 2008) developed the conceptual framework for TPCK over more than seven years of research into situated learning of technology use by teacher candidates and higher education faculty. Their opening chapter builds on those initial findings with regard to the essential characteristics of teacher knowledge required for competency and explains the derivation of the TPCK framework. In 1968, Shulman coined the term “pedagogical content knowledge” to describe the idea that “pedagogical practice is uniquely connected to specific content areas” (AACTE, p. 273). In other words, the nature of subject matter content combined with student learning needs determines and shapes the pedagogy teachers must use. Koehler and Mishra (2008) propose that the addition of technology to the learning process affects not only the manner in which the subject matter content is represented but also the pedagogical approaches the teacher must employ. Thus, when technology, pedagogy, and content knowledge are skillfully used in the classroom, a new level of teacher practice evolves—one which could only exist through an understanding of how the interaction of the three elements work together to effectively support learning. Koehler and Mishra are careful to point out that each teacher must adapt instruction to the educational context (sociocultural, instructional, and technological) when designing instruction and that it is through continual practice with TPCK that a teacher refines the classroom experience.

An important chapter on “Bridging Digital and Cultural Divides” that highlights equity and multicultural perspectives on TPCK follows the framework. It proposed three digital divides to close: access to technology, access to achievement-enhancing technology-mediated instruction, and access to culture-sensitive technological pedagogy. This chapter exposed the social and psychological effects of technology usage in education, reinforced the situated nature of teaching, and pointed out that the complexity of variables in any teaching situation often requires the teacher to custom-make instruction to meet the unique needs of the student(s). Thus, the teacher must draw from experience and improvise so as to accommodate either the needs of the students or the limits imposed by access to the technology. This was an important topic to consider as an introduction to the next section to the handbook—curricular integration.

Integrating TPCK into Specific Subject Areas

This section examined the use of technology in specific subject matter areas and encompassed the topics of K-6 literacy, English literacy, world

language, social studies, mathematics, arts, science and technology, and physical education. Each chapter provided examples and cases of currently known effective practices for integrating pedagogy and content knowledge to teach and assess student learning within the specific subject area. These chapters served to elucidate a key to implementing the framework: the notion that TPCK factors unique to each subject matter area exist and they should be considered when designing instruction that includes technology in the learning process. They answer the question, how does one learn the TPCK factors? Through experience, reflection, and planning. A meta-view of this section of the handbook validates the premise proposed by Dwyer, Ringstaff, and Sandholtz (1991) that teachers move through an *evolution of thought and practice* (ETP) when learning to use technology:

Entry. *Learn the basics of using the new technology.*

Adoption. *Use new technology to support traditional instruction.*

Adaptation. *Integrate new technology into traditional classroom practice. Here, they often focus on increased student productivity and engagement by using word processors, spreadsheets, and graphics tools.*

Appropriation. *Focus on cooperative, project-based, and interdisciplinary work—incorporating the technology as needed and as one of many tools.*

Invention. *Discover new uses for technology tools...designing projects that combine multiple technologies.* (Apple, 1995, p.16)

The last two levels of ETP, appropriation and innovation, closely resemble what Koehler and Mishra proposed in the TPCK framework as the optimal intersection of TPCK.

Integrating TPCK into Teacher Education and Professional Development

The question of why technology has remained unused in so many schools underlies the purpose for TPCK. Three chapters proposed potential solutions. The developmental processes for guiding pre-service teachers to simultaneously master thinking about planning and organizing lessons while considering the local resources, student needs, and school culture were featured in the chapter on pre-service teaching. It explores how methods courses in teacher preparation programs can support candidates to make conscious decisions about best uses of technology and proposes potential solutions. Despite the fact that some schools may not have access to technology, pre-service teachers need to

be given opportunities to wrestle with thinking about how and when technology might enhance the learning process or enable students to do things they would not be able to do otherwise. The end goal of such exercises should be to support pre-service teachers to develop strategic thinking around TPACK.

For in-service teachers, who may have a larger repertoire of teaching pedagogies from which to draw experiential tales and evidence of learning in the classroom, suggestions were made to explore known successful activity structures in the context of this wealth of teachers' experiences. Such discourse helps to build communities of learners and encourages further dialog among in-service teachers. Whether or not a concomitant philosophical or attitudinal change occurs among in-service teachers will depend upon whether professional development activities recognize, appreciate, and build upon their prior experiences. This chapter proposed that the measure of success for in-service teacher professional development may ultimately lie in whether it succeeded in creating attitudinal change regarding the benefits and affordances of technology in the curriculum. The final chapter on "Advancing TPACK through Collaborations between Educational Associations" described the formation of National Technology Leadership Summit meetings where several organizations, including some that publish research journals, came together to identify and encourage discourse and research into TPACK across both pre-service and in-service education.

While there remains more to be done with regard to investigating the unique affordances of technology and how it may enrich or augment the learning process within the subject matter areas, the TPACK framework provides a structure through which we can begin to evaluate the quality of teacher development programs and the manner in which the use of technology may be embedded in that instruction. Stich (1997) called this immersive form of instructional design *functional context education* and advocated for learning new skills within the context in which the learner will apply those skills. For pre-service teachers then, the clinical practicum should include TPACK experiences, opportunity to reflect upon the TPACK teaching and learning process, and encourage transference of that clinical experience to professional practice. For in-service teachers, the goal may be for transference outside of the workshop to the classroom experience.

One area of importance not covered in the handbook as a separate content section was analysis of the use of technology to support individual student learning needs. This might have been a chapter on special education and inclusion, but more generally, it could have been a chapter on differentiating instruction for all students describing the

unique affordances of technology that foster access to and expression of knowledge; e.g., print, graphic, video, sound, etc. Connecting the use of technology to effective teaching and learning remains elusive in general, meeting the individual needs of full inclusion and English learners has been an even more challenging bridge to build for many regular classroom teachers. The chapter on pre-service teacher preparation defined “TPCK [as] more than a set of multiple domains of knowledge and skills that teachers need for teaching their students particular subject at specific grade levels. TPCK is a way of thinking within these multiple domains of knowledge” (p. 224). Similarly, Tomlinson stated, “What we call differentiation is not a recipe for teaching. It is not an instructional strategy. It is not what he or she does when she has time. It is a way of thinking about teaching and learning” (2000, p. 6). Perhaps there is a relationship between TPCK and effective differentiation of instruction to meet the needs of a diverse population of students and it, too, should be a way of thinking about teaching and learning.

In the future, the handbook should be expanded to include an alignment with standards for teacher development. Though the section on in-service teacher development briefly addressed the notion of creating a taxonomy for learning with technology, the book failed to identify underlying elements of instruction that subject matter areas have in common or the various levels of teacher expertise and student performance that characterize each level. Of particular value would have been a taxonomy of common types of learner interactions and teacher performances along the TPCK teacher development continuum or an alignment of TPCK performances with the International Society for Technology in Education National Educational Technology Standards for Teachers.

Conclusion

Twenty-first century technology and its resultant effect on learning, assessment and student performance needs to be explored in greater depth at every level of teacher development and across the subject areas. The *Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators* contributes a needed epistemological and practical framework for exploring the complex problem of integrating technology into teacher preparation and teacher development. It brought together a bevy of practiced scholars to form a chorus of support for quality research to document how technology can and should be used to facilitate instruction and the resultant effect on learner outcomes. The handbook provides philosophical and practical considerations for teacher prepara-

tion programs to consider when designing instruction, field placement, and for assessing candidate performance. Ultimately, “the success of education in the 21st century calls upon educators to confront broad pressures now shaping our children’s future” (The Partnership for 21st Century Skills, 2007, p. 1) and TPCK may be one pathway to meeting this challenge.

References

- Apple Computer. (1995). *Teaching learning & technology: A report on 10 years of ACOT research*. Cupertino, CA; Author.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record, 101*(6), 1017-1054.
- Partnership for 21st Century Skills. (2007, October). *21st century skills professional development*. Retrieved July 31, 2009, from http://www.21stcenturyskills.org/documents/21st_century_skills_professional_development.pdf
- Dwyer, D., Ringstaff, C., & Sandholtz, J. (1991). *The relationship between technological innovation and collegial interaction*. Cupertino, CA; Apple Computer.
- Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.
- Sticht, T. (2005, September). *Functional context education: Making learning relevant in the 21 Century*. Workshop Participant’s Notebook. Retrieved January 22, 2007 from www.nald.ca/library/research/fce/FCE.pdf
- Tomlinson, C. A. (2000, September). Reconcilable differences: Standards-based teaching and differentiation. *Educational Leadership, 58*(1), 6-11.