TPACK Newsletter, Issue #20: May 2014

Welcome to the twentieth edition of the (approximately bimonthly) TPACK Newsletter! TPACK work is continuing worldwide. This document contains recent updates to that work that we hope will be interesting and useful to you, our subscribers.

If you are not sure what TPACK is, please surf over to http://www.tpack.org/ to find out more.

Gratuitous Quote About Technology

"Technology is anything that was invented after you were born."
— Alan Kay

In This Issue

1. TPACK Newsletter Update

The TPACK Newsletter has been published via the tpack.news email list since January 2009. It has 1221 (palindromic) subscribers currently. Subscription numbers have held steady (+ or – approximately 3%) since October 2011.

2. Recent TPACK Publications

Below are recent TPACK publications that we know about: 31 articles, 3 chapters, and 3 dissertations that have not appeared in past issues of this newsletter. If you know of others that were published within the past several months, please let us know at: tpacknews.editors@wm.edu.

Articles

Ansyari, M. F. (2013). In-service teacher professional development arrangements for technology integration: Some critical considerations. *International Journal of e-Education, e-Business, e-Management and e-Learning, 3*(4), 340-343. doi: 10.7763/IJEEEE.2013.V3.255 Retrieved from http://www.ijeeee.org/Papers/255-N10022.pdf

Abstract:
"Professional development arrangements for technology are essential for teacher capacity to improve students' achievement. Technological Pedagogical Content Knowledge (TPACK) framework which represents teachers' knowledge domains, consisting of content, pedagogy, and technology, is used in a number of professional development arrangements. This review is aimed at investigating the implementation of in-service teachers' professional development arrangements for technology integration using technological pedagogical content knowledge (TPACK) framework. In doing so, this review used five major online databases: ERIC, Web of Science, Scopus, Informaworld, and SpringerLink, with the criteria of studies addressing in-service teachers' TPACK professional development arrangements for technology integration, except for first aim since it addresses the concept of TPACK; deal with teachers teaching students without disabilities; and must be conducted between 2006 and 2012. In general, the results of this review show three different conceptualisations of TPACK model: initial model of TPACK, ICT-TPACK model, and elaborated TPACK model. Moreover, inquiry learning approach, peer-coaching, authentic learning, problem-based learning, project-based learning, and learning activity types were employed in successful TPACK professional development arrangements for in-service teachers. Finally, several conditions include engagement, authentic learning experiences, collaboration, supports, curriculum coherency, reflection, feedback, intensive training, and longer time."

Bustamaimte, C., & Moeller, A. J. (2013). The convergence of content, pedagogy, and technology in online professional development for teachers of German: An intrinsic case study. *CALICO Journal*, *30*(1), 82–104. doi: 10.11139/cj.30.1.82-104

Abstract:
"This qualitative case study describes a unique online professional development program utilizing Web 2.0 technologies for teachers of German using the Technological Pedagogical Content Knowledge (TPACK) model as a theoretical framework to promote technology literacy, expand German language proficiency and cultural knowledge, and integrate standards-based best practices in the teaching of second languages (Mishra & Koehler, 2006). Data sources included interviews, open-ended questions, course documents; and audio-visual products. Upon triangulation of these data, the following themes emerged as effective strategies in designing professional development programs: hands-on experience; convergence of technology, pedagogy, and content; discussion and reflection on pedagogy; and technology implementation into the classroom. These themes and strategies can aid in designing future

effective professional development programs for language teachers, teacher educators, and school districts."

Beeson, M. W., Journell, W., & Ayers, C. A. (in press). When using technology isn't enough: A comparison of high school civics teachers' TPCK in one-to-one laptop environments. *The Journal of Social Studies Research*. Retrieved from http://dx.doi.org/10.1016/j.jssr.2014.03.001

Abstract:
"In this multiple case study, the authors compare the instruction of two high school civics teachers during the 2012 Presidential Election. Both were highly-qualified practitioners who worked in schools with one-to-one laptop initiatives, creating an environment in which access to digital technology ceased to be an issue. Although both teachers regularly used technology in their classrooms, the authors describe stark differences in the complexity and authenticity of their instruction, which the authors attribute to the teachers' technological pedagogical content knowledge (TPCK). The authors conclude by discussing implications for better understanding TPCK within civics instruction, specifically in classrooms with one-to-one laptop access."

Bose, S. (2013). Integrated teacher education programme for open distance learning: A model for development and implementation. *Open Learning*, *28*(2), 120–134. doi: 10.1080/02680513.2013.814534

Abstract:
"Teacher education in India, including that offered by the open distance learning (ODL) system to thousands every year, imparts mainly pedagogic knowledge, although the need for integrated teacher education programmes has been underscored. As the Indira Gandhi National Open University (IGNOU), an ODL institution, will develop an integrated Bachelor of Education programme for secondary-level teachers, a model based on the Technological Pedagogical Content Knowledge (TPACK) framework has been proposed for developing and implementing it. The model takes cognisance of the systemic challenges to TPACK-based teacher education, but it does not envision radical changes in IGNOU's teacher education framework for addressing these challenges. It includes propositions with theoretical underpinnings for redesigning the major components of the framework while retaining its basic structure. The model has been described in terms of its rationale, its structure and the way it envisages the progress of teacher trainees from a phase of learning with the help of self-learning material designed for imparting integrated theoretical knowledge to one whereby they apply such knowledge in simulated situations, and finally moving on to a phase of situated learning during internship."

Carlson, D. L. E. E., & Archambault, L. (2013). Technological pedagogical content knowledge and teaching poetry: Preparing pre-service teachers to integrate content with VoiceThread technology. *Teacher Education & Practice*, *26*(1), 117–142.

Abstract:

"Although there Is a vast research base on the literacy practices of adolescents and the issues surrounding the integration of technology despite current widespread access to tools and the Internet (Cuban, 2003), very little has been completed on the attempts of teacher educators to integrate technology within a specific content area to prepare future classroom teachers (Boling, 2010; Bruce & Hogan, 1998; Goodson & Mangan, 1995; Koehler, Mishra, Yahya, & Yadav, 2004; Pang & Kamil, 2004). Based on the technological pedagogical content knowledge framework, the current study explores how technology can be used to improve teaching within the content area of English/language arts by examining the artifacts and reflections of 21 pre- and in-service secondary English teachers at a large university in the Southwestern United States. It explores how the digital medium VoiceThread could support their efforts to teach poetry. Results indicate that these future teachers found VoiceThread to be an effective tool to prepare, implement, and teach poetry to secondary students."

Chai, C. S., Koh, J. H. L., & Tsai, C. (2013). A review of technological pedagogical content knowledge. *Educational Technology & Society, 16*(2), 31-51.

Abstract:
"This paper reviews 74 journal papers that investigate ICT integration from the framework of technological pedagogical content knowledge (TPACK). The TPACK framework is an extension of the pedagogical content knowledge (Shulman, 1986). TPACK is the type of integrative and transformative knowledge teachers need for effective use of ICT in classrooms. As a framework for the design of teacher education programs, the TPACK framework addresses the problem arising from overemphasis on technological knowledge in many ICT courses that are conducted in isolation from teachers' subject matter learning and pedagogical training. The present review we have conducted indicates that TPACK is a burgeoning area of research with more application in the North American region. Studies conducted to date employed varied and sophisticated research methods and they have yielded positive results in enhancing teachers' capability to integrate ICT for instructional practice. However, there are still many potential gaps that the TPACK framework could be employed to facilitate deeper change in education. In particular, we suggest more development and research of technological environments base on TPACK; study of students' learning conception with technology; and cross fertilization of TPACK with other theoretical frameworks related to the study of technology integration."

Dawson, K., Ritzhaupt, A., Liu, F., Rodriguez, P., & Frey, C. (2013). Using TPCK as a lens to study the practices of math and science teachers involved in a year-long technology integration initiative. *Journal of Computers in Mathematics & Science Teaching*, *32*(4), 395–422.

Abstract:
"The purpose of this study was to examine the ways teachers enact technological**,** pedagogical and content practices in math and science lessons and to document the change with teachers involved in a year-long technology integration initiative. Six hundred seventy-two lessons were analyzed in this research using Technological, Pedagogical Content Knowledge (TPCK) (Mirshra & Koehler, 2006) as a framework to explore the technology integration practices of math and science teachers as

evidenced through lesson plans submitted at the beginning and end of a one-year technology integration effort. Results demonstrate math and science teachers use a wide array of technologies in their classroom practices, but mostly presentation software and Internet browsers. Most lesson plans could be characterized as low level cognitive demand in which students had to recall or remember factual information. Though teachers demonstrated growth over the year, most lesson plans were at a lower level of classroom technology integration. These findings have several implications for both theory and practice. A complete discussion is provided."

Di Blas, N., Fiore, A., Mainetti, L., Vergallo, R., & Paolini, P. (2014). A portal of educational resources: Providing evidence for matching pedagogy with technology. *Research in Learning Technology*, *22*, 1-26. doi: 10.3402/rlt.v22.22906

Abstract:
"The TPACK (Technology, Pedagogy and Content Knowledge) model presents the three types of knowledge that are necessary to implement a successful technology-based educational activity. It highlights how the intersections between TPK (Technological Pedagogical Knowledge), PCK (Pedagogical Content Knowledge) and TCK (Technological Content Knowledge) are not a sheer sum up of their components but new types of knowledge. This paper focuses on TPK, the intersection between technology knowledge and pedagogy knowledge – a crucial field of investigation. Actually, technology in education is not just an add-on but is literally reshaping teaching/learning paradigms. Technology modifies pedagogy and pedagogy dictates requirements to technology. In order to pursue this research, an empirical approach was taken, building a repository (back-end) and a portal (front-end) of about 300 real-life educational experiences run at school. Educational portals are not new, but they generally emphasise content. Instead, in our portal, technology and pedagogy take centre stage. Experiences are classified according to more than 30 categories ('facets') and more than 200 facet values, all revolving around the pedagogical implementation and the technology used. The portal (an innovative piece of technology) supports sophisticated 'exploratory' sessions of use, targeted at researchers (investigating the TPK intersection), teachers (looking for inspiration in their daily jobs) and decision makers (making decisions about the introduction of technology into schools)."

Grisham, D. L., & DeVere Wolsey, T. (2014). Podcasting for deeper science learning. *California Reader*, *47*(3), 18–26.

Abstract:
"When complex ideas are explored in science contexts, students and teachers often draw on many sources of information as they transform ideas from their static form to dynamic understanding. Constructed or transformed knowledge results in deeper learning and retention. Using the technological, pedagogical content framework (TPACK), a university professor worked with teacher candidates to create podcasts that would transform their understanding of science teaching and learning. This article reports how science-teacher candidates used podcast technology to envision their pedagogy from one where they simply transmit science content to students to one of transformation."

Hsu, C.Y., Liang, J.C., Chai, C.S., & Tsai, C.C. (2013). Exploring preschool teachers' technological pedagogical content knowledge of educational games. *Journal of Educational Computing Research*, *49*(4), 461–479.

Abstract:
"Current technological pedagogical content knowledge (TPACK) studies are inclined to treat technology in a general manner, an approach which may not be able to provide adequate guidelines to improve teacher preparation and professional development when teaching with games. This study developed two new questionnaires, namely the Technological Pedagogical Content Knowledge-Games (TPACK-G) survey to investigate 352 preschool teachers' confidence in their TPACK-G, and the Acceptance of Digital Game-Based Learning (ADGBL) survey to assess their acceptance of game-based learning. The results show that both instruments exhibit satisfactory validity and reliability. Through a path analysis, the framework of the TPACK-G proposed in this study was supported. In addition, preschool teachers' experience with games and their attitudes toward game-based learning contributed positively to their reported game knowledge. Perceived learning opportunities and attitudes toward game-based learning had direct relations with game pedagogical knowledge. Lastly, experience with games contributed to game pedagogical content knowledge."

Kafyulilo, A., Fisser, P., & Voogt, J. (2014). Teacher design in teams as a professional development arrangement for developing technology integration knowledge and skills of science teachers in Tanzania. *Education and Information Technologies*, *19*(2), 1–18. doi: 10.1007/s10639-014-9321-0

Abstract:
"This study investigated the impact of teacher design teams as a professional development arrangement for developing technology integration knowledge and skills among in-service science teachers. The study was conducted at a secondary school in Tanzania, where 12 in-service science teachers participated in a workshop about technology integration in science teaching and worked in design teams to prepare technology-enhanced biology, chemistry and physics lessons. Through collaboration in design teams, teachers were able to make science animations using PowerPoint and record videos to use in their teaching. The designed lessons were taught in the classroom and reflected upon thereafter by all teachers. In order to determine the change in teachers' technology integration knowledge and skills, data were collected before and after the professional development arrangement by using questionnaire, interview and observation data. Focus group discussion and reflection questionnaire data were used to assess teachers' experience of working in design teams at the end of the professional development arrangement. Findings showed an increase in teachers' technology integration knowledge and skills between pre- and post-measurements. Collaboration in design teams had the potential for teachers to share knowledge, skills, experience and challenges related to technology-enhanced teaching."

Karadeniz, Ş., & Vatanartıran, S. (2013). Adaptation of a TPACK survey to Turkish for secondary school teachers. *International Journal of Human Sciences, 10*(2), 34-47.

Abstract:

"The purpose of this study is to adapt technological pedagogical and content knowledge (TPACK) survey which was developed by Koh, Chai & Tsai (2010). The survey was administered to 285 teachers who teach a variety of subject areas at the secondary school level in Edirne. The translation equivalence, back translation and content validity done by the specialists. All data was analysed by using Lisrel 8.7 and IBM SPSS 19. The results of the confirmatory factor (CFA) analysis were as follows: χ2/sd 2.89, RMSEA .08, GFI .85, AGFI .81, RMR .03, SRMR .03, NFI 98, NNFI .99 and CFI .99. The CFA results showed that original 5 factor scale fitted with Turkish data. Cronbach alpha coefficients were .74, .87, .89, .92 and .84 for the factors respectively and .94 for overall TPACK survey. Item total correlations ranged from .56 to .91. All t-test results of upper27% and lower27% group were meaningful. The findings revealed that TPACK survey was a valid and reliable instrument for measuring secondary school teachers' TPACK."

Kirkland, A. B. (2014). Models for technology integration in the learning commons. *School Libraries in Canada*, *32*(1), 14-18.

Abstract:

"The article offers the author's insights on the integration of technology in learning context. Topics discussed include the importance of technology on teachers when teaching, models of learning with technology and technology integration, and the benefits of technology on teacher-librarianship and teacher-librarian. Two types of models that were mentioned are technological, pedagogical and content knowledge (TPACK) and substitution, augmentation, modification, redefinition (SAMR)."

Koh, J.H.L., Chai, C. S., & Tsai, C. (2014). Demographic factors, TPACK constructs, and teachers' perceptions of constructivist-oriented TPACK. *Journal of Educational Technology & Society, 17*(1), 185-196.

Abstract:

"Teachers' knowledge for implementing constructivist instruction with technology is termed as their constructivist-oriented technological pedagogical content knowledge. There are currently no available surveys for understanding teachers' perceptions in this aspect. Therefore, teachers' perceived knowledge gaps in terms of constructivist-oriented technology integration are not well understood. Using the Technological Pedagogical Content Knowledge for Meaningful Learning Survey, this study examines the constructivist-oriented technological pedagogical content knowledge perceptions of 354 practicing teachers. The survey was first validated through exploratory and confirmatory factor analyses. Regression analysis found that teachers' perceptions of technological pedagogical knowledge, technological content knowledge, and technological knowledge had the largest positive relationships with their constructivist-oriented technological pedagogical content knowledge. It was not related to teachers' age and gender but primary school teachers and those with more teaching experience tend to be less confident of their constructivist-oriented technological pedagogical content knowledge. These results show that when teachers develop intermediate forms of technological pedagogical content knowledge, it contributes to their confidence for constructivist-oriented technology integration.

The specific challenges faced by experienced teachers and primary school teachers need to be better understood and considered when designing teacher technology professional development."

Meriç, G. (2014). Determining science teacher candidates' self-reliance levels with regard to their technological pedagogical content knowledge. *Journal of Theory & Practice in Education*, *10*(2), 352–367.

Abstract:
"The aim of this study was to investigate the Science Teacher Education program teacher candidates' self-reliance on their technological, pedagogical, content knowledge (TPACK). Moreover, the study aimed to examine whether the Science teacher candidates' TPACK self-reliance with respect to their genders and grade levels. The participants of this survey study were 130 teacher candidates who continued their education at Çanakkale Onsekiz Mart University Faculty of Education Primary education department Science teacher program in their 1st, 2nd, 3rd and 4th grades in the fall semester, 2013-2014 year. The data were collected through the "Technological, Pedagogical, and Content Knowledge Self-Confidence" scale developed by Graham, Burgoyne, Cantrell, Smith, and Harris (2009), translated into Turkish by Timur and Tasar (2011), and the "Demographic specialties'" determined by the researcher. According to the research study, it was found that the Science teacher program students' self-reliance on their TPACK was high. Moreover, the results of the study showed that the Science teacher candidates' self-reliance on their TPACK did not differ with regard to the gender and grade level."

Övez, F. T. D., & Akyüz, G. (2013). İlköğretim matematik öğretmeni adaylarının teknolojik pedagojik alan bilgisi yapılarının modellenmesi. [Modelling technological pedagogical content knowledge constructs of preservice elementary mathematics teachers.] *Eğitim Ve Bilim*, *38*(170), 321-334.

Abstract:
"The aim of this study is to test the validity and reliability of the 'Technological Pedagogical Content Knowledge' (TPACK) scale, developed by Schmidt et al., (2009) by adapting it to Turkish and equation modeling to examine the relationship between the scale dimensions by structural. The scale obtained after the linguistic equivalence test was applied to 473 undergraduate students at the department of teaching mathematics in primary education. Exploratory and confirmatory factor analyses were conducted in order to review the validity of scale. In addition, in order to investigate the relationship between the scale dimensions of the structural equation model was constructed. The reliability was reviewed through the significance of the difference between the upper and lower 27%- groups and the Cronbach's alpha coefficient. The findings revealed that the scale had a four-factor structure and the fit indexes were within the acceptance boundary. The Cronbach's alpha reliability was greater than 0.91 and the reliability values of its all subdimensions were greater than 0.70. All differences of the upper and lower 27%- groups between the item averages were significant. These results indicate that the Turkish version of TPACK scale is a valid and reliable measurement tool."

Özgen, K., Narli, S., & Alkan, H. (2013). Matematik öğretmen adaylarinin teknolojik pedagojik alan bilgileri ve teknoloji kullanim sikliği algilarinin incelenmesi. [An investigation of mathematics teacher trainees' technological pedagogical content knowledge and their perception of the frequency of technology use.] *Electronic Journal of Social Sciences*, *12*(44), 31–51.

Abstract:
"The purpose of the present study was to investigate mathematics teacher trainees' level of technological pedagogical content knowledge (TPACK) and the effects of their perception of the frequency of technology use on TPACK. The participants were 340 teacher trainees studying at primary and secondary mathematics teacher education departments. The data was collected via the TPACK scale and a personal information questionnaire. The data was analysed using frequency, percentage, mean and multivariate analysis of variance calculations. The results indicated that teacher trainees' TPACK scores differed significantly in relation to their perception of the frequency of technology use. A comparison among the factors of the TPACK according to the participants' perception of the frequency of technology use revealed significant differences between technological knowledge (TK), technological pedagogical knowledge (TPK), technological content knowledge (TCK) and TPACK. However, no significant differences were observed for the factors pedagogical knowledge (PK), content knowledge (CK) and pedagogical content knowledge (PCK). Also, it is found that teacher trainees who had a positive perception of the frequency of technology use had a higher level of TK, TPK, TCK and TPACK compared to other teacher trainees."

Pendleton, M. (2013). Through the lens: Multimodal science, math, and literacy practices in an elementary classroom. *Meridian*, *16*(1), 1–12.

Abstract:
"This article on current practices examines how transactional literacy theory and New Literacies are married in the modern elementary classroom by exploring two integrated activities through a Technological Pedagogical Content Knowledge (TPACK) framework. The first activity, Meteorologist Reports, integrates literacy, science, and technology. The second activity, Problem Solving Mania, integrates literacy, math, and technology. These activities and their theoretical import may help teachers understand and apply cutting-edge developments in the field and integrate them with traditional reading theory, and may help teachers embrace the rigor afforded by the Common Core State Standards Initiative."

Polly, D. (2014). Deepening pre-service teachers' knowledge of technology, pedagogy, and content (TPACK) in an elementary school mathematics methods course. *The Journal of Computers in Mathematics and Science Teaching, 33*(2), 233-250.

Abstract:
"This paper presents the findings of a study that examined pre-service teachers' development of knowledge about technology, pedagogy and content (TPACK) during a mathematics pedagogy course focused on elementary school mathematics in the United States. Data sources included

work samples from pre-service teachers as well as an open-ended survey collected at the end of the semester. Inductive analysis of the data indicated that pre-service teachers demonstrated varying levels of technological knowledge, but all demonstrated greater gains in their knowledge of mathematics content and pedagogical content knowledge. Implications for the design of pre-service mathematics education courses focused on elementary school mathematics are also shared."

Sahin, I., Celik, I., Akturk, A. O., & Aydin, M. (2013). Analysis of relationships between technological pedagogical content knowledge and educational internet use. *Journal of Digital Learning in Teacher Education*, *29*(4), 110–117.

Abstract:
"This study analyzes the relationships between preservice teachers' technological pedagogical content knowledge (TPACK) and their self-efficacy beliefs in educational Internet use. Findings show statistically significant relationships among the knowledge domains in technology, pedagogy, content, and their intersections. Also, results from the canonical correlation analysis show that a statistically significant and strong relationship exists between the knowledge dimensions in the TPACK model and the self-efficacy beliefs in educational Internet use. Specifically, technology, content, and technological content knowledge domains are statistically significant predictors of preservice teachers' self-efficacy beliefs in educational Internet use."

Sancar-Tokmak, H., Yavuz Konokman, G., & Yanpar Yelken, T. (2013). Mersin Üniversitesi okul öncesi öğretmen adaylarının teknolojik pedagojik alan bilgisi (tpab) özgüven algılarının incelenmesi. [An investigation of Mersin University early childhood pre-service teachers' self-confidence about their technological pedagogical content knowledge (TPACK).] *Journal of Kirsehir Education Faculty*, *14*(1), 35–51.

Abstract:
"The aim of this study was to investigate the Early Childhood program teacher candidates' self-confidence on their technological, pedagogical, content knowledge (TPACK**)**. Moreover, the study aimed to examine whether the Early Childhood teacher candidates' TPACK self-confidence differs with respect to their genders and grade levels. The participants of this survey study were 154 teacher candidates who continued their education at the Mersin University Early Childhood Education program in their 2nd, 3rd and 4th grades in the fall semester, 2011-2012 year. The data were collected through the "Technological, Pedagogical, and Content Knowledge Self-Confidence" scale developed by Graham, Burgoyne, Cantrell, Smith, and Harris (2009), translated into Turkish by Timur and Taşar (2011), and the "Demographics Questionnaire" developed by the researchers. According to the research study, it was found that the Early Childhood teacher candidates' self-confidence on their TPACK was high. Moreover, the results of the study showed that the Early Childhood teacher candidates' self-confidence on their TPACK did not differ with regard to the gender and grade level."

Shinas, V. H., Yilmaz-Ozden, S., Mouza, C., Karchmer-Klein, R., & Glutting, J. J. (2013). Examining domains of technological pedagogical content knowledge using factor analysis. *Journal of Research on Technology in Education, 45*(4), 339-360.

Abstract:
"This study analyzes the relationships between preservice teachers' technological pedagogical content knowledge (TPACK) and their self-efficacy beliefs in educational Internet use. Findings show statistically significant relationships among the knowledge domains in technology, pedagogy, content, and their intersections. Also, results from the canonical correlation analysis show that a statistically significant and strong relationship exists between the knowledge dimensions in the TPACK model and the self-efficacy beliefs in educational Internet use. Specifically, technology, content, and technological content knowledge domains are statistically significant predictors of preservice teachers' self-efficacy beliefs in educational Internet use."

Srisawasdi, N. (2014). Developing technological pedagogical content knowledge in using computerized science laboratory environment: An arrangement for science teacher education program. *Research & Practice in Technology Enhanced Learning, 9*(1), 123-143.

Abstract:
"Over the last decade, traditional educational practices in teacher education have not provided prospective teachers with all the necessary skills for teaching students to acquire the skills to cope with the challenges of society in the 21st century. For this reason, there is a worldwide trend toward producing teachers with high teaching competency. To promote competency in using technologies to the teaching of specific content in the classroom context, the epistemology of Technological Pedagogical Content Knowledge (now known as TPCK or TPACK) is used as a basis for designing a particular arrangement of courses for science teacher education programs, thereby to help meet the needs of the 21st century teacher education development. In order to situate the transfer of how to cultivate TPACK in science teacher education program for others, this article demonstrates details of the alignment of courses for preservice science teacher preparation based on a proposed framework of a TPACK-based computerized laboratory environment for science teaching. Also, the implications of adaptation and the support of the transfer of the program would enable an effective transfer of design and practice in order to prepare preservice teachers in science teaching. The possibility of transferring such course arrangement to the other contexts of science teacher education programs could not be discounted."

Tantrarungroj, P., & Suwannatthachote, P. (2013). Enhancing pre-service teacher's self-efficacy and technological pedagogical content knowledge in designing digital media with self-regulated learning instructional support in online project-based learning. *Creative Education, 3*(8), 77-81. doi: 10.4236/ce.2012.38B017

Abstract:
"This study investigated pre-service teachers' self-efficacy in designing digital media and their techno- logical pedagogical content knowledge (TPCK) for designing digital media using different

forms of self- regulated learning instructional support for online project-based learning. The study used a 2 × 2 factorial research design. The sample consisted of 232 pre-service teachers from an institution situated in Bangkok, Thailand. The four different forms of self-regulated learning instructional support for online project-based learning were PB + SQ + PA, PB + SQonly, PB + PAonly, and PBonly. Two-way Multivariate Analysis of Variance (MANOVA) was used for data analysis. The results showed significant differences in pre-service teachers' self-efficacy and TPCK posttest scores. No main effect was found between two different self-regulated learning strategies (SQ and PA) upon the means of self-efficacy in designing digital media scores and TPCK scores. The self-regulated learning strategies (SQ and PA) had a statistically significant interaction upon the means of self-efficacy in designing digital media scores while the self-regulated learning strategies (SQ and PA) had no interaction upon the means of the TPCK scores."

Tseng, J.-J., Lien, Y.-J., & Chen, H.-J. (2014). Using a teacher support group to develop teacher knowledge of Mandarin teaching via web conferencing technology. *Computer Assisted Language Learning*, 27(1), 1–21. doi: 10.1080/09588221.2014.903978

Abstract:
"Due to its continuous advancement, web conferencing technology is increasingly being integrated into foreign language education; thus, teachers are able to carve out a niche by providing learners with an opportunity to learn a foreign language at a distance without time and space constraints. However, little is known about the relationship between foreign language teachers' use of web conferencing technology and their technological pedagogical content knowledge (TPACK). This study therefore aims to assist Mandarin as a foreign language (MFL) teachers to develop their TPACK of web conferencing teaching, and a teacher support group is used to facilitate the TPACK development of four MFL teachers. The data related to assessing their TPACK development are derived from an online meeting, reflective reports, and individual interviews. The results indicate that the teachers' TPACK grew due to increased awareness of the affordances and constraints of web conferencing technology in an MFL teaching environment. They understood how to enhance learners' input, expand their interaction, and facilitate their production via the use of Internet resources such as multimedia and web-based applications. The teachers also acknowledged that the teacher support group had played an instrumental role in developing their TPACK of teaching MFL via web conferencing technology. The implications and limitations of the study are also presented."

Tuysuz, C. (2014). Determination of pre-service teachers' self-confidence levels towards technology subdimension of technological pedagogical content knowledge. *International Journal of Academic Research, 6*(1), 34-41.

Abstract:
"In this study, it was aimed to determine pre-service teachers' self-confidence towards subcomponents related to Technological Pedagogical Content Knowledge and technology. For this purpose, Technological Pedagogical Content Knowledge Self-Confidence Scale (TPCKSCS) which had been developed by Graham et al. whose was adapted by Timur and Tasar (2011) was used. The study was carried out with 368 students studying at seven different departments of

the faculty of education at Mustafa Kemal University in academic years of 2012-2013. At the end of the study, the pre-service teachers' self-confidence towards technological component of technological pedagogical content knowledge was found out high. Furthermore, statistically significant relationship in a positive way was found among all the sub-dimensions of TPCK self-confidence scale. In addition, it was figure out that there was statistically meaningful difference in favor of the students in Computer Education and Instructional Technologies department among them and other departments in all sub-dimensions among pre-service teachers' self-confidence towards technological component of technological pedagogical content knowledge depending on program types which they study. In the study, it was also found out that there was no statistically meaningful difference among pre-service teachers' self-confidence towards technological component of technological pedagogical content knowledge depending on gender."

Urban-Woldron, H. (2013). Integration of digital tools into the mathematics classroom: A challenge for preparing and supporting the teacher. *International Journal for Technology in Mathematics Education*, *20*(3), 115–123.

Abstract:

"Research findings about the impact of digital technologies on learning of mathematics in schools suggest that teachers do not yet extensively exploit the potential of educational technologies as they do not feel appropriately prepared. What do teachers need to know about educational technology and how can they acquire this knowledge? These questions have guided the design of a training course addressing the development of Technological Pedagogical Content Knowledge (TPCK). Accordingly to this aim, the course supported practicing teachers with opportunities to develop their individual TPCK, how to understand the use of particular technologies changes both teaching and learning. The study examined how teachers used educational technology to enhance their lesson plans by creating learning opportunities for their students. Findings of the study point to a relationship between quality of lesson plans and intensity of participation in an online-course; the course materials appeared to stimulate teachers to develop their TPCK."

Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & van Braak, J. (2013). Technological pedagogical content knowledge – a review of the literature. *Journal of Computer Assisted Learning, 29*(2), 109-121. doi: 10.1111/j.1365-2729.2012.00487.x

Abstract:

"Technological Pedagogical Content Knowledge (TPACK) has been introduced as a conceptual framework for the knowledge base teachers need to effectively teach with technology. The framework stems from the notion that technology integration in a specific educational context benefits from a careful alignment of content, pedagogy and the potential of technology, and that teachers who want to integrate technology in their teaching practice therefore need to be competent in all three domains. This study is a systematic literature review about TPACK of 55 peer-reviewed journal articles (and one book chapter), published between 2005 and 2011. The purpose of the review was to investigate the theoretical basis and the practical use of TPACK.

Findings showed different understandings of TPACK and of technological knowledge. Implications of these different views impacted the way TPACK was measured. Notions about TPACK in subject domains were hardly found in the studies selected for this review. Teacher knowledge (TPACK) and beliefs about pedagogy and technology are intertwined. Both determine whether a teacher decides to teach with technology. Active involvement in (re)design and enactment of technology-enhanced lessons was found as a promising strategy for the development of TPACK in (student-) teachers. Future directions for research are discussed."

Wetzel, K., Buss, R., Foulger, T. & Lindsey, L. (2014). Infusing educational technology in teaching methods courses: Successes and dilemmas. *Journal of Digital Learning in Teacher Education, 30*(3), 89-103.

Abstract:
"In this action research study, we describe the implementation of a program to infuse technology in general methods courses as a requirement of a teacher preparation program. Results from teacher candidate focus groups revealed successes and dilemmas of infusing technology into the courses. Candidates ably described prospective use of elements of the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006), but were less confident of their ability to develop and implement content-based lessons in which P–12 students employed technology to meet content and technology standards. Recommendations include continuing to fine-tune the new courses, providing more resources for professional development (PD), and encouraging instructors to participate in more PD leading to greater modeling of hands-on learning with a focus on content and pedagogical uses of technology."

Yeh, Y.-F., Hsu, Y.-S., Wu, H.-K., Hwang, F.-K. & Lin, T.-C. (2013). Developing and validating technological pedagogical content knowledge-practical (TPACK-practical) through the Delphi survey technique. *British Journal of Educational Technology*. Advance online publication. doi: 10.1111/bjet.12078

Abstract:
"Technological pedagogical content knowledge TPACK refers to the knowledge set that teachers currently use to further improve the quality of their teaching and assist their students in learning. Several TPACK models have been proposed, either for discussing TPACK's possible composition or its practical applications. Considering that teachers' practical experiences should also be critical to the development of those teachers' knowledge, this study invited a research panel (six researchers) and an expert panel (54 science-related educators) to propose and validate the framework of TPACK-practical. After two rounds of anonymous communications that followed Delphi survey techniques, a total of eight dimensions of TPACK-practical and corresponding indicators were identified and rated as having high levels of importance. Among these knowledge dimensions, the knowledge of direct information and communication technology uses for enhancing teachers' professionalism and students' conceptual comprehension was rated with a high level of importance. Also, disciplinary differences were found to exist between the different groups of experts. Biology teachers showed significantly higher ratings across all knowledge dimensions, whereas physics teachers' ratings were comparatively low. Such findings suggest

that the structure and content of subject matter shapes not only the way they teach with technology but also the thinking logics they build longitudinally from their learning experiences."

Yigit, M. (2014). A review of the literature: How pre-service mathematics teachers develop their technological, pedagogical, and content knowledge. *International Journal of Education in Mathematics, Science and Technology, 2*(1), 26-35. Retrieved from http://ijemst.com/issues/2_1_3_Yigit.pdf

Abstract:
"In recent years, researchers have advanced the Technological, Pedagogical, and Content Knowledge (TPACK) framework to describe both in-service and pre-service teachers' knowledge related to effectively integrating technology. This study is a systematic literature review about pre-service mathematics teachers' (PSMTs) development of TPACK, and the review is limited to the peer reviewed articles published between 2005 and 2013 (February). The main purpose of this study is to investigate and analyze the articles in mathematics education research that have explored how PSMTs develop their TPACK and how their development impacts their future teaching of mathematics. Specifically, the literature review attempts to identify PSMTs' development of the components of the TPACK framework, their perspectives for their future teaching, how their development of TPACK can be measured, and strategies to develop their TPACK. Findings show that PSMTs' active involvement in technology-enhanced lessons or courses is the major strategy to develop their TPACK and to improve their future teaching of mathematics."

Chapters

Devedzic, V. (2014). Technology enhanced learning – The wild, the innocent and the E Street shuffle. In V. Trajkovik & M. Anastas (Eds.), *ICT Innovations 2013: ICT Innovations and Education* (Vol. 231, pp. 1–15). New York, NY: Springer. doi: 10.1007/978-3-319-01466-1_1

Abstract:
"Although Technology Enhanced Learning (TEL) is still developing and attracts a lot of R&D attention, initiatives and funding worldwide, it has been around for quite some time and allows for a critical assessment. Once just "somewhere at the intersection of pedagogy and learning technology", today TEL spans many other fields and phenomena, like social and organizational processes, computer games, knowledge management, standardization, policy making in various sectors, sustaining the impact of learning, and efforts to overcome digital divide. Still, not everything goes smoothly. As reports and surveys indicate, there are many challenges ahead, still waiting to be tackled."

Koehler, M., Mishra, P., Kereluik, K., Shin, T., & Graham, C. (2014). The technological pedagogical content knowledge framework. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 101–111). doi: 10.1007/978-1-4614-3185-5_9

Abstract:
"In this chapter, we introduce a framework, called technological pedagogical content knowledge (or TPACK for short), that describes the kinds of knowledge needed by a teacher for effective technology integration. The TPACK framework emphasizes how the connections among teachers' understanding of content, pedagogy, and technology interact with one another to produce effective teaching. Even as a relatively new framework, the TPACK framework has significantly influenced theory, research, and practice in teacher education and teacher professional development. In this chapter, we describe the theoretical underpinnings of the framework, and explain the relationship between TPACK and related constructs in the educational technology literature. We outline the various approaches teacher educators have used to develop TPACK in pre- and in-service teachers, and the theoretical and practical issues that these professional development efforts have illuminated. We then review the widely varying approaches to measuring TPACK, with an emphasis on the interaction between form and function of the assessment, and resulting reliability and validity outcomes for the various approaches. We conclude with a summary of the key theoretical, pedagogical, and methodological issues related to TPACK, and suggest future directions for researchers, practitioners, and teacher educators."

Ruthven, K. (2014). Frameworks for analysing the expertise that underpins successful integration of digital technologies into everyday teaching practice. In A. Clark-Wilson, O. Robutti, & N. Sinclair (Eds.), *The Mathematics Teacher in the Digital Era* (pp. 373–393). doi: 10.1007/978-94-007-4638-1_16

Abstract:
"This chapter examines contemporary frameworks for analysing teacher expertise which are relevant to the integration of digital technologies into everyday teaching practice. It outlines three such frameworks, offering a critical appreciation of each, and then explores some commonalities, complementarities and contrasts between them: the Technological, Pedagogical and Content Knowledge (TPACK) framework (Koehler & Mishra, *Contemporary Issues in Technology and Teacher Education, 9*(1), 2009); the Instrumental Orchestration framework (Trouche, L. (2005). Instrumental genesis, individual and social aspects. In D. Guin, K. Ruthven, & L. Trouche (Eds.), *The didactical challenge of symbolic calculators: Turning a computational device into a mathematical instrument* (pp. 197–230). New York: Springer.); and the Structuring Features of Classroom Practice framework (Ruthven, *Education* & *Didactique, 3*(1), 2009). To concretise the discussion, the use of digital technologies for algebraic graphing, a now well established form of technology use in secondary school mathematics, serves as an exemplary reference situation: each of the frameworks is illustrated through its application in a study of teacher expertise relating to this topic (respectively Richardson, *Contemporary Issues in Technology and Teacher Education, 9*(2), 2009; Drijvers, Doorman, Boon, Reed, & Gravemeijer, *Educational Studies in Mathematics, 75*(2), 213–234, 2010; Ruthven, Deaney, & Hennessy, *Educational Studies in Mathematics, 71*(3), 279–297, 2009)."

3. Recent TPACK-Related Dissertations

Escuder, A. (2013). *Middle school teachers' usage of dynamic mathematics learning environments as cognitive instructional tools* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (UMI No. 3576231)

Abstract:
"This study described, analyzed, and compared the internal and external factors that prevented or fostered the implementation of a cognitive tool, GeoGebra, in the mathematics practices of 12 middle school teachers who had completed a master's degree program in mathematics successfully. Through the application of a case study approach as a systematic method for the analysis of qualitative data, and under a social constructivist framework, the study examined different factors such as concerns of teachers; their beliefs about technology, mathematics as a subject, math teaching, and learning; external factors such as resources and school support; their TPACK development; and their instrumental orchestration approach through classroom observations.

Among the major findings, the study revealed that the personal concerns of the teacher users of GeoGebra included the desire to continue learning the new features of the software, as well as the desire to connect themselves with others in common endeavors for the benefit of other teachers and, ultimately, the students. The external factors such as lack of working computers did not impede but restricted their use of GeoGebra in the classroom. There was a consensus among the teacher users that they had to strike a balance between their professional goals and the available resources. The users expressed feelings of accomplishment as professionals and had been recognized as such by the several awards they received. They did not over-emphasize the challenges they encountered, instead downplaying them with the result of engaging students and providing them with the best learning experiences they could."

Stanley, D. (2013). *Like a palm tree in a hurricane: A dual case study of digital text in the inclusive classroom.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (UMI No. 3606915)

Abstract:
"This qualitative dual case study with a cross-case comparison explored the attitudes, beliefs, and intentions of teachers regarding the implementation and use of digital text in the inclusive classroom. Grounded in Harris, Mishra, and Koehler's (2009) framework of Technological, Pedagogical, Content Knowledge (TPACK) and Rose and Meyer's (2002) framework of Universal Design for Learning (UDL) as a blueprint for designing inclusive classrooms that provide materials and methods, the purpose of this study was to identify how two teachers in inclusive classrooms located in South Texas, describe their experiences using digital text for students with learning disabilities. This purpose was also driven by the rationale that teachers are now required to provide curriculum and instructional delivery in accessible format to meet the learning needs of a diverse group of students.

The findings indicated that both participants experienced challenges and struggles integrating digital text into the inclusive classroom. Their individual responses to the challenges and struggles affected their ability to implement UDL principles into their lesson design, and maintain the relationship between their TPACK components. The findings also indicated that a strong collaborative relationship between general education and special education teachers provided a solid foundation for the delivery of sound instruction that maintained balance between the TPACK components and created opportunities for learning that engaged and motivated a diverse population of students.

The implications of this study raises questions about the ways in which special education and general education teachers are trained both professionally and academically to facilitate a collaborative relationship within the inclusive classroom. Furthermore, this study raises the question about the role of campus and district administrators in bringing together a collaborative relationship between general education and special education teachers."

Tetreault, S. G. (2014). *Personal-level factors and Google Docs use in Monmouth County middle schools.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (UMI No. 3613602)

Abstract:
"Technology has become an essential part of the world, both in people's personal and professional lives. Digital assessments such as those being implemented in New Jersey as part of the Partnership for Assessment of Readiness for College and Careers (PARCC) will soon be instituted on a large scale; these require students to be able to utilize computer technology in order to be able to complete the assessment. Therefore, it is imperative that administrators know the most effective ways to successfully diffuse and have teachers implement technology across their classrooms. This study examined how the technological innovation Google Docs has diffused through schools/districts in Monmouth County, NJ and determined that there are significant relationships between the frequency and complexity of professional use of Google Docs and personal-professional characteristics of middle school classroom teachers.

Through the use of an online survey, quantitative data about teachers' personal-professional characteristics and the frequency and complexity of respondents' uses of Google Docs was collected from 35 out of the 53 schools in Monmouth County; roughly 45% of the surveyed population provided viable responses. Linear regression was used to determine which independent variables had a statistically significant correlation with the dependent variable "Google Docs Usage Score" (GDUS), a measure of the frequency and complexity of Google Docs use. The independent variables culled from the literature that were included for consideration were decision method (optional, collective, or authority); innovator type (innovator, early adopter, early majority, late majority, laggard); and the following personal characteristics: years of teaching experience; subject area taught; grade levels taught; number of types of technology used personally; number of types of technology used professionally; and technological, pedagogical, and content knowledge (TPACK) score (Mishra & Koehler, 2003).

Using quantitative methods, this study determined that there was a statistically significant association between the frequency and complexity of teachers' use of Google Docs and the following variables: optional decision method; innovator, early adopter, and early majority innovator types; the subject areas Mathematics and Visual and/or Performing Arts; the number of types of technology used professionally; and TPACK score. These findings provide administrators with several concrete variables to consider when attempting to encourage the diffusion of a technological innovation such as Google Docs into a school. Additionally, when combined with research by Wisnicki (2014), it was found that personal factors have a larger impact on Google Docs implementation than do environmental factors. Limitations of the study might include sample size and the formulation of the Google Docs usage questions on the survey.

This study is significant because it builds on the diffusion work of Rogers (2003) and the Concerns-Based Adoption Model of Hall, Wallace, & Dosset (1973), and adds clarity to the literature on diffusion of educational technology within schools. This study also provides a new theoretical construct for examining the levels of use of Google Docs, which could potentially be expanded to include a measurement for other types of educational technology."

4. Recent TPACK Presentations

Gonczi, A. L., Maeng, J. L., Bell, R. L., & Whitworth, B. A. (2014, January). *Computer simulation professional development: program elements that make a difference.* Paper presented at the 2014 Association for Science Teacher Education Conference, San Antonio, TX. Abstract retrieved from http://vista.gmu.edu/assets/docs/research/ASTE_2014_Simulations.pdf

Abstract:
"This study sought to identify professional development implementation variables that may influence the extent and quality of instructional computer simulation use during science instruction. Two participant cohorts in a state-wide professional development program received different computer simulation professional development. Cohort 1 included 52 elementary and 11 secondary teachers and received technically focused computer simulation professional development. Cohort 2 included 98 elementary and 49 secondary teachers. The second cohort's computer simulation professional development provided 3 additional elements thought to influence instructional computer simulation use: (a) modeling desired computer simulation use within an inquiry-based lesson, (b) provision of content-relevant lesson planning time; and (c) modeling desirable instructional support methods. Quantitative and qualitative methods analyzed participants' surveys responses, interviews, classroom observation reports, and classroom instruction while using simulations. A similar percent of cohort 1 and 2 participants used computer simulations during science instruction. In addition, computer simulation use to support nature of science, problem based learning, and inquiry instruction were similar for both cohorts. However, the overall quality of computer simulation implementation was greater in cohort 2 as evidenced by greater external instructional support. These findings have implications for the design and implementation of computer simulation professional development. Technology-related professional development elements commonly expected to increase

classroom transfer may be ineffectual in certain educational contexts that limit instructional technology availability."

Jaipal Jamani, K., & Figg, C. (2013). The TPACK-in-practice workshop approach: A shift from learning the tool to learning about technology-enhanced teaching. In E. Ivala (Ed.), *Proceedings of the 8th International Conference on e-Learning* (Vol. 2, pp. 215–223). Cape Town, South Africa: Cape Peninsula University of Technology.

Abstract:
"Technology professional development workshops primarily focus on technical skill training and these skills are often taught out of context and seem remote from classroom practice. How can educators learn how to teach with technology in a variety of disciplinary areas so that their professional learning experiences are considered valuable and are readily integrated into their teaching practice? This paper presents the Framework of TPACK-in-Practice--concrete teacher actions, or practice-derived teacher knowledge about teaching content with technology--and illustrates the framework's usefulness in developing the TPACK-in-Practice Workshop approach to design content-centric technology professional development experiences for teachers and higher education faculty. A content-centric approach to teaching with technology advances the learning of content goals through the use of technology, and a current framework that has been adopted by teacher educators internationally is that of TPACK, proposed by Mishra & Koehler. This model, developed from Shulman's notion of pedagogical content knowledge, illustrates the interactions among technology knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) in teaching. To bridge the gap between the theoretically defined knowledge components of the TPACK model, and the actions that demonstrate these knowledge components in practice, the authors conducted qualitative, longitudinal studies with pre-service teachers and in-service teachers in the field. Findings of these studies led to the development of the Framework of TPACK-in-Practice which identifies teacher actions that characterize teacher knowledge important for successful tech-enhanced teaching, specifically the knowledge components of TCK-in-practice, TPK-in-practice, and TPCK-in-practice. Subsequent implementation of the Framework of TPACK-in-Practice in pre-service technology courses and with in-service teachers revealed four design elements promoting a shift from learning the tool to learning how to teach with the tool (technology-enhanced teaching). These elements include: (a) modeling a technology-enhanced activity (learning with the tool) to set the context and purpose for tool use, (b) integrating 'pedagogical dialogue' in a modeled lesson, (c) developing activity-specific technical skills (TK in context) through short tool demonstrations, and (d) applying TPACK-in-Practice to design an independent task. The preceding four elements constitute the TPACK-in-Practice Workshop approach and provide guidelines for designing content-centric professional development workshops to develop teacher knowledge about how to teach with technology. The TPACK-in-Practice Workshop approach enables teachers to leave professional development workshops with the knowledge to be able to teach WITH the technology rather than just the skills be use the technology as is promoted in traditional technology training workshops."

Papanikolaou, K., Gouli, E., & Makri, K. (2013, February). *Designing pre-service teacher training based on a combination of TPACK and communities of inquiry*. Paper presented at the 2013 Fifth World Conference on Educational Sciences, Rome, Italy. Abstract retrieved from https://www.researchgate.net/publication/259869397_Designing_pre-service_teacher_training_based_on_a_combination_of_TPACK_and_Communities_of_Inquiry

Abstract:
"A main challenge in designing pre-service teacher training courses that promote teachers to elaborate on the learning opportunities that ICT can provide to students, is to make it happen in a constructive manner promoting reflection, collaboration, and discourse. Aiming to contribute to this direction of research, we propose a design rational for blended learning scenarios for pre-service teacher training combining Technological Pedagogical Content Knowledge (TPACK) framework with Communities of Inquiry (CoI) and viewing teacher training as an authentic process involving participants in learning design activities. TPACK is used as the basis for designing the curriculum and content of the course in the form of learning design activities for trainees. CoI is used as the basis for designing learning strategies, support and learning activities that promote higher levels of learning in a blended learning context. Based on the proposed rational, the design specifications of the one-year teacher training course on technology enhanced learning provided by the School of Pedagogical and Technological Education (ASPETE) in the context of the postgraduate certificate in education for graduates of a variety of disciplines, are presented and discussed."

5. Recent TPACK-related Blog Entry

Johnson, D. (2014, February 22). Using the TPACK model to evaluate apps. [Web log post]. Retrieved from http://doug-johnson.squarespace.com/blue-skunk-blog/2014/2/22/using-the-tpack-model-to-evaluate-apps.html

Excerpt:
"I've always been distressed by the "app-happy" frenzy of many teachers and techies. Let's install every app! Let's go to every educational website! Let's assuage our FOMO and jump on board each sparkly bit of code! When I go to a conference, I want to see every "5000 Best Websites for Teachers" presentation! Woo, woo!

What would happen if before using *any* technology resource with kids, a simple form based on the TPACK model needed to be completed? It would simply require that these questions be answered:

1. What is the content knowledge, skill set, or standard this resource will help you meet?
2. What best-practice pedagogy does this resource use to help teach the content?
3. What are the technical requirements of the resource?"

6. TPACK Newsletter Suggested Citation

Our thanks to Lisa Winebrenner, who wrote to suggest that *we* suggest a citation format for you 'academic types' who might want to cite something that appears in this humble virtual publication. Our reading of the most recent (6th edition) of the *Publication Manual of the American Psychological Association* suggests that the citation should look like this:

Harris, J., & Rodriguez, K. (Eds.). (2014, May 16). TPACK newsletter issue #20: May 2014 [Electronic mailing list message]. Retrieved from http://www.tpack.org/

7. Learning and Doing More with TPACK

Interested in learning more about TPACK or getting more involved in the TPACK community? Here are a few ideas:

- Visit the TPACK wiki at: http://tpack.org/
- Join the TPACK SIG at: http://site.aace.org/sigs/tpack-sig.htm
- Subscribe to the tpack.research, tpack.teaching, tpack.grants and/or tpack.future discussion lists at: http://site.aace.org/sigs/tpack-sig.htm
- Access the TPACK Learning Activity Types taxonomies at: http://activitytypes.wmwikis.net/
- Access three tested TPACK assessment instruments at: http://activitytypes.wmwikis.net/Assessments

Please feel free to forward this newsletter to anyone who might be interested in its contents. Even better, have them subscribe to the TPACK newsletter by sending a blank email to sympa@lists.wm.edu, with the following text in the subject line: subscribe tpack.news FirstName LastName (of course, substituting their own first and last names for 'FirstName' and 'LastName' — unless their name happens to be FirstName LastName, in which case they can just leave it as is).

If you have a news item that you would like to contribute to the newsletter, send it along to: tpack.news.editors@wm.edu.

Standard End-Matter

If you have questions, suggestions, or comments about the newsletter, please send those to tpack.news.editors@wm.edu. If you are subscribed to the tpack.news email list, and — even after reviewing this impressive publication — you prefer not to continue to receive the fruits of our labors, please send a blank email message to sympa@lists.wm.edu, with the following text in the subject line: unsubscribe tpack.news

- Judi & Kim

…for the SITE TPACK SIG leadership:

Petra Fisser,	Co-Chair, SLO Expertise Center, National Curriculum Development
Josh Rosenberg,	Co-Chair, Michigan State University
Candace Figg,	Rocking Chair, Brock University
Mark Hofer,	Sedan Chair, College of William & Mary
Judi Harris,	Wing Chair, College of William & Mary
Mario Kelly,	Futon, City University of New York
Matt Koehler,	Chaise Lounge, Michigan State University
Punya Mishra,	Recliner, Michigan State University