**TPACK Newsletter, Issue #16: May 2013**

Welcome to the sixteenth edition of the (approximately quarterly) 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**

"It doesn't matter how new an idea is. What matters is how new it becomes."
- Elias Canetti

**In This Issue**

**1. TPACK Newsletter Update**

The TPACK Newsletter currently has 1217 subscribers.  Our subscription numbers have held steady (within a range of about 40 addresses) for approximately one year. The newsletter has been published since January 2009.

**2. Recent TPACK Publications**

Below are recent TPACK publications that we know about: 34 articles, 5 chapters and 4 dissertations. If you know of others that were published within the past several months, please let us know (tpack.news.editors@wm.edu).

*Articles*

Angeli, C., & Valanides, N. (2013). Introduction to special issue: Technological pedagogical content knowledge. *Journal of Educational Computing Research, 48,* 123-126. doi: 10.2190/EC.48.2.a

Abstract: None

Angeli, C., & Valanides, N. (2013). Technology mapping: An approach for developing technological pedagogical content knowledge. *Journal of Educational Computing Research, 48,* 199-221. doi: 10.2190/EC.48.2.e

Abstract:
"Technology mapping™ is proposed as an approach for developing technological pedagogical content knowledge (TPCK). The study discusses in detail instructional design guidelines in relation to the enactment of TM, and reports on empirical findings from a study with 72 pre-service primary teachers within the context of teaching them how to teach with Excel. Repeated Measures MANOVA findings showed that TM was effective and efficient in developing TPCK competencies; however, development of TPCK competencies was directly related to the complexity of the design task, as this was determined by the educational affordances of Excel."

Antonenko, P. D. (2013). Two heads are better than one: Inservice teachers engaging in instructional design 2.0. *Journal of Digital Learning in Teacher Education, 29*(3), 72-81.

Abstract:
"This study investigated changes in inservice teachers' technological pedagogical content knowledge and technology integration self-efficacy as a result of engaging in collaborative instructional design with Web 2.0 tools. We collected survey and interview data in the pre/post format, and teaching portfolios served to triangulate survey and interview results. We observed improvements in both perceived technological pedagogical content knowledge and technology integration self-efficacy. Interestingly, the successes in implementing learning activities recorded in the teaching portfolios were attributed to the collaborative nature of instructional design, whereas the perceived weaknesses were attributed to personal planning skills. Although these findings cannot be generalized to the larger population, our results suggest that instructional design 2.0 can be a useful professional development activity for inservice teachers."

Arinto, P. (2013). A framework for developing competencies in open and distance e-learning. *International Review of Research in Open and Distance Learning, 14*(1), 167-185. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1393/2433

Abstract:
"Many open universities and distance education institutions have shifted from a predominantly print-based mode of delivery to an online mode characterised by the use of virtual learning environments and various web technologies. This paper describes the impact of the shift to open and distance e-learning (ODeL), as this trend might be called, on the course design practices of faculty members at a small single-mode distance education university in the Philippines. Specifically, the paper presents and analyses the faculty's perspectives on how their course design practices have changed and issues and challenges arising from these changes. The findings suggest that faculty training programs in ODeL should aim to develop a comprehensive range of ODeL competencies in a systematic and coherent way. Based on the findings, as well as research on practitioner development in teaching effectively with technology, a framework for developing ODeL competencies among faculty is proposed. Aside from covering the four areas of change in course design practice identified in the study, the framework also specifies levels of expertise (basic, intermediate, and advanced), indicating degrees of complexity of the knowledge and skills required for each area at each level. All of the competencies listed for all four areas at the basic level comprise the minimum competencies for teaching an online distance education course."

Bate, F. G., Day, L., & Macnish, J. (2013). Conceptualising changes to pre-service teachers' knowledge of how to best facilitate learning in mathematics: A TPACK inspired initiative. *The Australian Journal of Teacher Education, 38*(5), 14-30. Retrieved from http://ro.ecu.edu.au/ajte/vol38/iss5/

Abstract:
"In 2010, the Australian Commonwealth government initiated an $8m project called Teaching Teachers for the Future. The aim of the project was to engage teacher educators in a professional learning network which focused on optimising exemplary use of information and communications technologies in teacher education. By taking part in this network, participants were afforded opportunities to transform their practice through a range of localised initiatives that applied information and communications technologies to the art and science of teaching and learning. One of these initiatives involved re-engineering a university mathematics unit targeted at pre-service teachers. Information and communications technologies were purposefully embedded using Mishra and Koehler's (2006) Technological, Pedagogical and Content Knowledge model as a conceptual framework. This paper discusses the outcomes of the initiative. Pre-service teachers and staff involved in the unit shared their stories about the changes they had noticed in both their thinking and practice. The results of the initiative were heartening, and it is hoped that the constructs used will translate into other learning areas."

Benson, S. N. K., & Ward, C. L. (2013). Teaching with technology: Using TPACK to understand teaching expertise in online higher education. *Journal of Educational Computing Research, 48,* 153-172. doi: 10.2190/EC.48.2.c

Abstract:
"In this study, we used the TPACK profile as a framework for evaluating teaching expertise in higher education. Through interviews and non-participant observation, we created individual TPACK profiles for three professors within a college of education in a large Midwestern university. The profiles illustrate how each professor's degree of Content, Technology, and Pedagogical knowledge levels interact in unique patterns. We conclude that, when instructors' Technology Knowledge is defined solely as their ability to use various technology tools, a balanced and integrated TPACK profile is unlikely. In contrast, instructors who are able to explicitly articulate their understanding and application of Pedagogical Knowledge are more likely to demonstrate TPACK integration."

Benton-Borghi, B. H. (2013). A universally designed for learning (UDL) infused technological pedagogical content knowledge (TPACK) practitioners' model essential for teacher preparation in the 21st century. *Journal of Educational Computing Research, 48,* 245-265. doi: 10.2190/EC.48.2.g

Abstract:
"This article challenges educational computing researchers and teacher educators to consider a merger between universal design for learning and technological pedagogical content knowledge to create a practitioners' model to prepare teachers to graduate with the knowledge, skills, and dispositions needed to teach the full spectrum of learners. Presently, these models are being developed on parallel tracks because of the existing bifurcated system of general (regular) and special education. The two models together would create a cohesive, comprehensive, theoretical model for the preparation of 21st century teachers."

Blonder, R., Jonatan, M., Bar-Dov, Z., Benny, N., Rap, S., & Sakhnini, S. (2013). Can You Tube it? Providing chemistry teachers with technological tools and enhancing their self-efficacy beliefs. *Chemistry Education Research and Practice.* Advance online publication. doi: 10.1039/C3RP00001J

Abstract:
"The goal of this research was to examine the change in the skills, Technological Pedagogical Content Knowledge (TPACK) and self-efficacy beliefs of chemistry teachers regarding video editing and using YouTube videos in high-school chemistry lessons, as a result of a professional development program that focused on editing YouTube videos and the accompanying teaching pedagogy. Sixteen experienced chemistry teachers participated in a professional development course regarding video editing skills and the use of videos in chemistry teaching in Israel. Research tools consisted of (1) a pre-post

questionnaire, (2) interviews with teachers, (3) an analysis of the videos they edited (which were part of the course assignment), and (4) follow-up interviews conducted ten months after the end of the course. It was found that teachers improved their skills and developed a unique TPACK that combines videos with chemistry teaching needs. Self-efficacy beliefs were found to be high for most of the teachers: they all trusted in their ability to integrate videos in their chemistry teaching but not all of them were confident in their video editing skills."

Chai, C. S., Ng, E. M. W., Li, W., Hong, H-Y., & Koh, J. H. L. (2013). Validating and modeling technological pedagogical content knowledge framework among Asian preservice teachers. *Australasian Journal of Educational Technology, 29,* 41-53. Retrieved from http://ascilite.org.au/ajet/submission/index.php/AJET/article/view/174

Abstract:
"The Technological Pedagogical Content Knowledge (TPCK) framework has been adopted by many educational technologists and teacher educators for the research and development of knowledge about the pedagogical uses of Information and Communication Technologies (ICT) in classrooms. While the framework is potentially very important, efforts to survey teachers' TPCK efficacy has yet to identify all seven factors postulated by the framework. This study attempted to validate a TPCK efficacy survey by implementing it on an Asian group of 550 preservice teachers from China, Hong Kong, Singapore and Taiwan. The seven factors underlying the TPCK framework were identified which suggested the research instrument to be valid and reliable. The structural equation model proposed based on the TPCK framework supported eight out of 12 hypotheses about the relationships between TPCK constructs. The results indicate that the positive effects of the basic knowledge factors of CK, PK, and TK were indirect, occurring through the second layer of knowledge factors (TPK, TCK, and PCK). Implications for preservice teacher professional developments are discussed."

Ciampa, K., & Gallagher, T. L. (2013). Professional learning to support elementary teachers' use of the iPod Touch in the classroom. *Professional Development in Education, 39,* 201-221. doi: 10.1080/19415257.2012.749802

Abstract:
"This single case study reports on the programme of professional learning that a Canadian staff of elementary teachers (Junior Kindergarten to Grade Eight) and their school principal engaged in to learn to use a mobile multimedia device as an instructional resource. The professional learning was facilitated by two university researchers who used the gradual release of responsibility framework to work with the teachers' attitudes about using iPod Touches and their need for technological pedagogical content knowledge. Fourteen teachers co-planned and co-taught technology-enhanced lessons during a five-month period. This study

proposes a framework that outlines particular characteristics for supporting elementary teachers' effective integration of mobile multimedia technology into classroom practice. The school principal's role as a leader of technological change is highlighted along with the facilitators' roles as coaches as the teachers began to gradually embrace the multimedia technology as an instructional resource."

Gurung, B. (2013). Emerging pedagogics in changing contexts: Pedagogies in networked knowledge society. *Journal of Global Literacies, Technologies, and Emerging Pedagogies, 1,* 105-124. Retrived from http://joglep.com/index.php/archives/issue-1-volume-2/

Abstract:
"The notion of pedagogies is a multi-dimensional and emergent construct built within the interplay(s) of pedagogical components (i.e. technology, pedagogy, and content) and changing pedagogical contexts of society, economy, education, and science and technology, to name a few. But, the traditional/existing pedagogical frameworks fail to see the interplay between the components and the changing contexts of pedagogies. The traditional/existing pedagogies seem to be static and one-dimensional that either they exclusively focus in the components or in the contexts only. In this paper, I call for rethinking the traditional/existing pedagogies and framing them as "emerging pedagogies" so as to capture the emergent and multi-dimensional nature of pedagogy within the currently evolving pedagogical contexts of networked knowledge society, knowledge economy, diversity-oriented democracy, and digital literacies. Highlighting the strengths and weaknesses of two major pedagogical frameworks – i.e. "technological pedagogical content knowledge" (TPCK) and multicultural education (MCE), I offer a theoretical discussion for emerging pedagogies as a concept and as a practice. A recommendation is made for future research and theories pertaining to emerging pedagogies."

Hagerman, M., Keller, A., & Spicer, J. (2013). The MSU Educational Technology Certificate courses and their impact on teachers' growth as technology integrators. *Tech Trends: Linking Research & Practice to Improve Learning, 57*(3), 26-33. doi: 10.1007/s11528-013-0659-8

Abstract:
"The Educational Technology Certificate (ETC) courses at Michigan State University are a set of three courses that can be taken as a standalone qualification or as the first three courses in the Master's of Educational Technology degree. Together, the courses emphasize the development of technology skills and advanced mindsets for technology integration in the classroom. In this article, we provide examples of our approach to the teaching of technology skills and mindsets in ways that are adaptable across four distinct modes of instruction (online, hybrid, overseas and face-to-face). We also present student feedback and survey data that inform a critical evaluation of the

program's effectiveness. Findings suggest that the certificate courses help students to gain technological skills, to become more confident users of technology and more likely to help colleagues with tech-related questions. Interestingly, respondents also reported feeling like better teachers, in general, after taking these courses."

Handal, B., Campbell, C., Cavanagh, M., Petocz, P., & Kelly, N. (2013). Technological pedagogical content knowledge of secondary mathematics teachers. *Contemporary Issues in Technology and Teacher Education, 13*. Retrieved from http://www.citejournal.org/vol13/iss1/mathematics/article1.cfm

Abstract:
"The integration of technology, pedagogy, and content in the teaching of secondary mathematics was explored among 280 secondary mathematics teachers in the State of New South Wales, Australia.  The study adopted the technological pedagogical content knowledge (TPCK) model through the administration of a 30-item instrument called TPCK-M. The instrument consisted of three major theoretically based constructs: technological content knowledge (TCK), technological pedagogical knowledge (TPK) and technological pedagogical content knowledge (TPCK). Results indicated that PowerPoint and Excel constitute the two TCK modal technological capabilities while TPK scores revealed teachers' lower capacity to deal with the general information and communications technologies goals across the curriculum, such as creating digital assessment formats. TPCK-M scores seem to suggest a healthy standard in teachers' technological skills across a variety of mathematics education goals. However, the magnitude of such influence in practice needs to be further ascertained, given that the study identified a number of instructional, curricular, and organizational factors seriously inhibiting the integration of technology into teaching and learning. In general, to take advantage of more novel learning technologies, teachers need to be trained in working with online tools (webquests, wikis), mobile learning, and interactive whiteboards and in authoring digital learning resources."

Horzuma, M. B. (2013). An investigation of the technological pedagogical content knowledge of pre-service teachers. *Technology, Pedagogy and Education.* Advance online publication. doi: 10.1080/1475939X.2013.795079

Abstract:
"This study investigates whether pre-service teachers' learning approach and gender are related to their technological knowledge, their technological content knowledge, their technological pedagogical knowledge and their technological pedagogical content knowledge. The sample of the study consisted of 239 pre-service teachers. It was found that an instructional technology and material development course had a positive effect on pre-service teachers' technological knowledge, technological pedagogical knowledge and technological pedagogical

content knowledge. Furthermore, technological knowledge, technological content knowledge, and technological pedagogical knowledge accounted for 82% of the variance in technological pedagogical content knowledge. Students having a deep learning approach and a deep surface learning approach had significantly higher technological knowledge, technological pedagogical knowledge and technological pedagogical content knowledge scores after the course than before the course, but there were no significant differences between surface learning approach students' scores before and after the course."

Hosseini, Z., & Kamal, A. (2013). A survey on pre-service and in-service teachers' perceptions of technological pedagogical content knowledge (TPCK). *Malaysian Online Journal of Educational Technology, 1*(2), 1-7. Retrieved from http://mojet.net/pdf/v01i02/v01i02-01.pdf

Abstract:
"In the past two decades, technology has become an important part of the educational system. However, there are many evidences that indicate teacher deficiency in the use [of] technology in teaching. In order to effectively use technology in teaching, researchers have identified the need to possess Technological Pedagogical Content Knowledge (TPCK) a complex knowledge that enables teachers to select appropriate technology tools for teaching a particular content through a particular method of teaching. Thus, the present research aimed to measure teachers' knowledge for technology integration through the lens of TPCK. 236 pre-service and in-service teachers in five fields participated in this survey. An examination of the participants' TPCK showed that Pedagogy Knowledge (PK) was highest and Technological Pedagogical Knowledge (TPK) was lowest among participants. Furthermore, statistical analysis using MANOVA indicated that there was no significant relationship between the demographic variables of age and gender with TPCK and its components while the participants' field of study and teaching experience were significantly related to their TPCK. Moreover, the correlation between participants' attitudes toward using technology and TPCK was not found to be significant."

Hubbard, J. D., & Price, G. (2013). Cross-culture and technology integration: Examining the impact of a TPACK-focused collaborative project on pre-service teachers and teacher education faculty. *Journal of the Research Center for Educational Technology, 9*(1), 131-155. Retrieved from http://rcetj.org/index.php/rcetj/article/viewArticle/187

Abstract:
"Pre-service teachers developing Technological Pedagogical Content Knowledge (TPACK) and cultural awareness are critical for 21st century teaching. This action research study with 83 K-6 pre-service teachers examined the impacts of a collaborative project, between teacher education and technology faculty, which integrated cross-cultural learning experiences, social studies inquiry skills and

activities, and digital storytelling. Overall, pre-service teachers developed technological skills as well as an awareness of cultural similarities and differences. While pre-service teachers found instructional components of the collaborative project useful, no evidence suggested that they developed an ability to recognize transferrable pedagogy for future classroom use. Pre-service teachers viewed the project as a course requirement rather than a valuable professional development experience, indicating the need to augment this experience with approaches that more intentionally explore pedagogical applications of technology in real world situations. Teacher education faculty members were satisfied with most of the project's learning activities, confirming that the collaborative technology project brought about a cultural self-awareness for the pre-service teachers. They expressed the desire to implement similar projects in future courses, but admitted the need for additional technological experiences to replicate the project's design. These preliminary findings suggest that pre-service teachers need more information about how to recognize teaching strategies for future use, and instructors need to be involved in all stages of the project."

Jimoyiannis, A., Tsiotakis, P., Roussinos, D., & Siorenta, A. (2013). Preparing teachers to integrate web 2.0 in school practice: Toward a framework for pedagogy 2.0. *Australasian Journal of Educational Technology, 29,* 248-267*.* Abstract retrieved from http://www.ascilite.org.au/ajet/submission/index.php/AJET/article/view/157

Abstract:
"Web 2.0 has captured the interest and the imagination of both educators and researchers while it is expected to exert a significant impact on instruction and learning, in the context of the 21st century education. Hailed as an open collaborative learning space, many questions remain unanswered regarding the appropriate teacher preparation and the pedagogical impact of using Web 2.0 tools in the classroom practice. Do teachers feel comfortable and ready to adopt educational Web 2.0? What are their beliefs and perceptions regarding the educational potential of Web 2.0? What are the educational and contextual issues that determine teachers' challenges and decisions to use Web 2.0 in their classroom practice? This paper addresses the questions above by presenting the design and the implementation of a development program aiming to prepare teachers to make meaningful and purposeful use of Web 2.0 tools in their classroom. The model of technological pedagogical content knowledge and the authentic learning approach were the guiding principles that largely influenced the Web 2.0 pedagogical framework, which was designed and applied in this particular teacher preparation program. The program findings were encouraging as far as the participants' perceptions and beliefs towards educational Web 2.0 and the expected outcomes for the students. Implications and recommendations are drawn in relation to the use of the proposed Web 2.0 pedagogical framework to guide teachers' development and the effective implementation of Web 2.0 tools in the classroom to maximize benefits and enhance students' learning."

Koh, J. H. L., & Divaharan, S. (2013). Towards a TPACK-fostering ICT instructional process for teachers: Lessons from the implementation of interactive whiteboard instruction. *Australasian Journal of Educational Technology, 29,* 233-247. Abstract retrieved from http://ascilite.org.au/ajet/submission/index.php/AJET/article/view/97

Abstract:
"This paper describes an on-going design-based research project that aims to develop an instructional process to facilitate pre-service teachers' technological pedagogical content knowledge (TPACK) development as they learn to integrate information and communication technology (ICT) in their teaching content subjects. In conjunction with an initiative to prepare pre-service teachers for integrating interactive whiteboard (IWB) in their teaching subjects, an instructional process comprising of tutor modelling, *[sic]* hands-on exploration, and group-based design was implemented. The data collected during this first implementation cycle (Cycle 1) was used to enhance the second implementation cycle (Cycle 2) through the inclusion of classroom-based case studies, subject-based design ideas and opportunities for peer sharing. The findings from both implementation cycles reveal that strategies such as tutor modelling *[sic]* and hands-on exploration of ICT tools appeared to be more advantageous for fostering technological knowledge and technological pedagogical knowledge. Group-based design experiences supported the pre-service teachers to formulate TPACK. The paper concludes with a discussion about the future developments of these TPACK-fostering ICT instructional processes."

Koh, J. H. L., Woo, H-L., & Lim, W-Y. (2013). Understanding the relationship between Singapore preservice teachers' ICT course experiences and technological pedagogical content knowledge (TPACK) through ICT course evaluation. *Educational Assessment, Evaluation and Accountability.* Advance online publication. doi: 10.1007/s11092-013-9165-y

Abstract:
"Teacher education institutions conduct information and communications technology (ICT) courses to prepare preservice teachers (or initial teacher education candidates) to support their teaching practice with appropriate ICT tools. ICT course evaluations based on preservice teachers' perception of course experiences are limited in indicating the kinds of ICT integration knowledge or technological pedagogical content knowledge (TPACK) preservice teachers have gained throughout the course. Preservice teachers' ICT course experiences was found to influence their intentions to integrate ICT but its influence on their TPACK perceptions, if better understood, can inform teacher education institutions about the design of ICT courses. This study describes the design and validation of an ICT course evaluation instrument that examines preservice teachers' perceptions of ICT course experiences and TPACK. Hierarchical

regression analysis was performed on survey results collected from a graduating cohort of 869 Singapore preservice teachers who had undergone a compulsory ICT course during their teacher training program. These preservice teachers were being prepared to teach the different subject areas at primary, secondary, and junior colleges (or postsecondary institutions for 17–19 year olds) in Singapore. The regression model showed that preservice teachers' perceived TPACK was first influenced by their perceptions of course experiences that supported the development of intermediary TPACK knowledge components such as technological knowledge and technological pedagogical knowledge. The methodological implications for the design of ICT course evaluation surveys and the practical applications of survey results to the refinement of ICT course curriculum are discussed."

Maeng, J. L., Mulvey, B. K., Smetana, L. K., & Bell, R. L. (2013). Preservice teachers' TPACK: Using technology to support inquiry instruction. *Journal of Science Education and Technology.* Advance online publication. doi: 10.1007/s10956-013-9434-z

Abstract:
"This investigation provides detailed descriptions of preservice secondary science teachers' technology- enhanced inquiry instruction and their developing TPACK. Prior to student teaching, 27 preservice teachers were introduced to general guidelines for integrating technology to support reform-based science instruction. This instruction was in the context of a 2-year Master of Teaching program. Of the 27 preservice teachers, 26 used technology for inquiry instruction during student teaching. Our goals were to describe how these 26 preservice science teachers: (1) used educational technologies to support students' investigations and (2) demonstrated their developing TPACK through technology-enhanced inquiry instruction. Multiple data sources (observations, lesson plans, interviews, and reflections) allowed for characterization of participants' technology integration to support inquiry instruction and their decision-making related to the use of technology to support inquiry. Results indicated that participants incorporated technologies appropriate to the content and context to facilitate non-experimental and experimental inquiry experiences. Participants developing TPACK was evidenced by their selective and appropriate use of technology. Appropriate technology use for inquiry included the following: (1) to present an engaging introduction, (2) to facilitate data collection, (3) to facilitate data analysis, and (4) to facilitate communication and discussion of results. These results suggest that using digital images to facilitate whole-class inquiry holds considerable promise as a starting point for teachers new to inquiry instruction. Results of the present study may inform science teacher educators' development of content-specific, technology-enhanced learning opportunities that: prepare preservice teachers for the responsibility of supporting inquiry instruction with technology, facilitate the transition to student-centered instruction, and support TPACK development."

Morsink, P. M., Hagerman, M. S., Heintz, A., Boyer, D. M., Harris, R. Kereluik, K., & Hartman, D. K. (2010/2011). Professional development to support TPACK technology integration: The initial learning trajectories of thirteen fifth- and sixth-grade educators. *Journal of Education, 191*(2), 3-18. Retrieved from http://www.bu.edu/journalofeducation/files/2011/11/BUJOE-191_2_CASESTUDY.pdf

Abstract:
"This study examined the initial learning trajectories of 13 upper elementary teachers as they developed technological, pedagogical, and content knowledge (TPACK) while participating in a 7-month professional development program focused on integrating technology into their classroom practice. The program was collaborative and non-prescriptive: teachers worked on self-chosen summer projects with flexible support from a university-based partner. A descriptive multicase study design was employed to track teachers' learning progressions. Data included interviews, surveys, digital artifacts, and researchers' notes and memos. During the program, teachers developed varying degrees of TPACK. Analyses distilled six initial TPACK learning trajectories."

Mouza, C., & Karchmer-Klein, R. (2013). Promoting and assessing pre-service teachers' technological pedagogical content knowledge (TPACK) in the context of case development. *Journal of Educational Computing Research, 48,* 127-152. doi: 10.2190/EC.48.2.b

Abstract:
"This study investigated the extent to which case development allowed pre-service teachers to recognize the interactions and integration of technology with content and pedagogy in their own practice. These interactions form the core of what has been called Technological Pedagogical Content Knowledge (TPACK), a distinct type of knowledge required for effective use of technology in classroom teaching. Data were collected from 58 pre-service teachers in the context of a teacher education program in the United States. Results indicated that case development provided a fruitful context for helping pre-service teachers bring together different knowledge bases to design and implement effective technology-integrated lessons."

Nguyen, N., Williams, J., & Nguyen, T. (2012). The use of ICT in teaching tertiary physics: Technology and pedagogy. *Asia-Pacific Forum on Science Learning and Teaching, 13*(2). Retrieved from http://www.ied.edu.hk/apfslt/

Abstract:
"In the light of the education reform driven by Vietnam's government, information communication technologies (ICTs) are becoming integrated into education, while concurrently, teaching approaches are shifting from teacher-centred to

student-centred in Vietnam's universities. The innovation is top-down and is being applied on a large scale. Emerging from this innovation are some important issues about technology and pedagogy that need to be investigated."

Niess, M. L. (2013). Central component descriptors for levels of technological pedagogical content knowledge. *Journal of Educational Computing Research, 48,* 173-198. doi: 10.2190/EC.48.2.d

Abstract:
"Technological pedagogical content knowledge (TPACK) proposes a theoretical framework that incorporates four central components: an overarching conception of what it means to teach with technology, knowledge of students' thinking and understandings of specific topics with technologies, knowledge of curricular materials that incorporate technologies, and knowledge of instructional strategies and representations for teaching subject matter with technologies. This interpretive case study, conducted over a 3-year period, identified descriptors aligned with the four central components of TPACK to highlight differences in teachers' knowledge levels when integrating spreadsheets as learning tools in mathematics."

Porras-Hernández, L. H., & Salinas-Amescua, B. (2013). Strengthening TPACK: A broader notion of context and the use of teachers' narratives to reveal knowledge construction. *Journal of Educational Computing Research, 48,* 223-244. doi: 10.2190/EC.48.2.f

Abstract:
"Technological Pedagogical Content Knowledge (TPACK) as a framework to understand and foster teachers' knowledge for efficient technology integration has the value of unveiling new types of knowledge and departing from technocentric approaches. In this article, we consider two approaches to advance this framework. One of these opens the discussion on a more complex conception of context, along two dimensions: scope and actor. The second is an example of how TPACK can be useful in the phenomenological approaches of teachers reflecting on their practice using narratives in the tradition of European and Latin-American bodies of knowledge on systematization."

Saad, M., Barbar, A. M., & Abourjelli, S. A. R. (2012). Introduction of TPACK-XL for building pre-service teacher knowledge base. *Turkish Journal of Teacher Education, 1*(2). Abstract retrieved from http://tujted.com/index.php/tujted/article/view/6

Abstract:
"What is the nature of preservice teachers' knowledge base that enables them teach with technology? How preservice teacher education programs should be structured to build this knowledge base? In an effort to respond to these questions, this study examines the mostly recognized relevant theoretical

grounding of the nature of the teacher knowledge base. As a result, it introduces TPACK-XL as a transformative view of a strand of Mishra and Koehler (2005) TPACK (Technological Pedagogical And Content Knowledge) theoretical framework, named ICT-TPCK as proposed by Angeli and Valanides (2009). ICT-TPCK integrates the context (X) and the learner's (L) knowledge to contribute to TPACK with more specificity on ICTs in the field of educational technology. Mishra and Koehler proposed the TPACK model that describes teachers' integration of ICTs in their classroom practices. TPACK has become known as a useful overarching conceptual framework that builds on Shulman (1986) formulation of pedagogical content knowledge (PCK). In this paper, the authors' analysis of ICT-TPCK model aims to contribute to the discussions on how to educate preservice teachers within the ICT-TPCK framework principles. The detailed examination and refinement of the interrelated contributing knowledge bases of ICT-TPCK: ICTs (T), pedagogy (P), content (C), learners (L), and context (X) has led to pointing thirty-one constituent knowledge constructs. TPACK-XL is identified as the elaborated form of ICT-TPCK that highlights the interdisciplinary knowledge constructs that synthesize to lead to its core knowledge and, consequently, serve as an advanced lens of ICT-TPCK for preservice teachers' educators."

Sadaf, A., Newby, T.J. & Ertmer, P.A. (2013). Exploring factors that predict preservice teachers' intentions to use Web 2.0 technologies using decomposed theory of planned behavior. *Journal of Research on Technology in Education, 45*(2), 171-196.

Abstract:
"This study investigated factors that predict preservice teachers' intentions to use Web 2.0 technologies in their future classrooms. The researchers used a mixed-methods research design and collected qualitative interview data (n = 7) to triangulate quantitative survey data (n = 286). Results indicate that positive attitudes and perceptions of perceived usefulness are significant predictors of preservice teachers' intentions to use Web 2.0 technologies. Additional findings indicate that preservice teachers intend to use blogs, wikis, and social networking in their future classrooms to improve student learning, student-student and student-teacher interaction, collaborative learning, student writing ability, and sharing content knowledge. Although preservice teachers intend to use Web 2.0 technologies due to these pedagogical benefits, they believe that successful use of Web 2.0 depends on the meaningful integration of these technologies with the subject being taught, learning goals, and age level of their students. This study has implications for teacher educators who are preparing preservice teachers to use Web 2.0 technologies in their classrooms."

Shand, K., Guggino, P., & Costa, V. (2013). Planning with technology in mind: Preparing pre-service social studies teacher to integrate technology in the classroom. *Journal of the Research Center for Educational Technology, 9,*

174-191. Retrieved from
http://www.rcetj.org/index.php/rcetj/article/viewArticle/194

Abstract:

"Preparing pre-service teachers to plan with technology in mind fosters the development of technological pedagogical content knowledge that results in high quality technology use for teaching and learning. This paper presents a model of technology-rich instructional planning for pre-service social studies teachers. The quality and quantity of technology use in digital unit plans of 17 pre-service teachers was evaluated. A total of 85 lessons were analyzed. Participants were surveyed to self-report on how they planned for technology in their lessons. The lessons were also reviewed by education faculty to analyze the types of technology integrated in the instructional plans. Results show a sizeable amount of high-quality technology integration, mostly used for presentation purposes."

Shih, C-L., & Chuang, H-H. (2013). The development and validation of an instrument for assessing college students' perceptions of faculty knowledge in technology-supported class environments. *Computers & Education, 63,* 109-118. doi: 10.1016/j.compedu.2012.11.021

Abstract:

"Research in the area of educational technology has argued that the technological pedagogical content knowledge of faculty is crucial to addressing the challenge of teaching in higher education in the digital age, which is characterized by the common use of instructional technology in college classrooms and the ubiquitous presence of computing on college campuses. We developed and validated an instrument for assessing students" perceptions of faculty knowledge (SPFK) in technology-supported classroom environments. A total of 50 items in 4 constructs with 9 items in subject matter knowledge (SMK), 11 items in technological knowledge (TK), 6 items in knowledge of students' understanding (KSU), and 24 items in technological pedagogical content knowledge (TPACK) were developed for the instrument. The construct validity of this instrument was examined through confirmatory factor analysis. After checking the construct structure of the instrument, the multidimensional version of the rating scale model (MRSM) was used to analyze item response data. Results showed that after the elimination of item 17, the 49-item instrument for assessing college students" perceptions of faculty knowledge was validated in the current study. The reliability for each subscale of this instrument was found to be satisfactory when analyzing data with the MRSM model. Discussion of results and recommendations for future research are also provided."

Terry, L., Mishra, P., Henriksen, D., Wolf, L., & Kereluik, K. (2013). The reciprocal relationship between technology and psychology. *Tech Trends: Linking Research & Practice to Improve Learning, 57*(3), 34-39. doi: 10.1007/s11528-013-0660-2

Abstract:
"This article describes the design and implementation of the year 2 curriculum and student learning experiences in the Michigan State University Master of Arts in Educational Technology program. We discuss the ways that this second set of courses builds on the first year of the program that students encounter, and also describe the theoretical impetus and design-based implications for learning how to teach with technology in effective and creative ways. Students in this group usually come in with some prior knowledge of educational theory, as well as some experience of working with classroom technologies. We intentionally build upon this prior knowledge, to take it to the next level of a more sophisticated TPACK-oriented understanding of learning in technology-driven contexts. Our year 2 courses move classical educational psychology theories of learning, along with educational research issues, squarely into the modern context of educational technology and teacher leadership. Our curriculum design focuses centrally on making meaningful experiences for teachers around technology, and helping them develop the knowledge and skills to create such experiences for their students. Our goal is to develop teachers who see themselves as flexible designers of learning experiences through the creative re-purposing of existing technologies."

Tokmak, H. S. (2013). Changing preschool teacher candidates' perceptions about technology integration in a TPACK-based material design course. *Education as Change, 17*(1), 115-129. doi: 10.1080/16823206.2013.773927

Abstract:
"This qualitative case study investigates how preschool teacher candidates' perceptions about technology integration change during the technology-rich Material Design course that was based on the technology-pedagogical-content knowledge (TPACK) framework. Twelve preschool teacher candidates, enrolled in an Instructional Technology and Material Design course, participated in the study. Firstly, focus-group interviews were conducted and an open-ended questionnaire was administered. The results showed that the reasons of the preschool teacher candidates' negative perceptions about technology integration pertained to their not knowing how to use technology and finding technology unnecessary to use in preschool teaching practice. Secondly, four activities based on TPACK were designed to provide preschool teacher candidates specific experience on technology use and show preschool technology use examples with the purpose of changing these negative beliefs. Data were gathered through journals, assignments and a software evaluation form. According to the study results, most of the preschool teacher candidates' negative perceptions about technology integration became positive after experience with technology integration."

White, B., & Geer, R. (20??). Preservice teachers *[sic]* experience with online modules about TPACK. *Australian Educational Computing, 27*(3), 124-

132. Retrieved from http://acce.edu.au/journal/27/3/preservice-teachers-experience-online-modules-about-tpack

Abstract:
"Despite the fact that Information and Communication Technology (ICT) is valued as a tool for learning, the modelling *[sic]* for preservice teachers of ICT integration in the curriculum areas is often limited. In the recently approved AITSL standards for Initial Teacher Education Programs, knowledge of ICTs is explicitly mentioned in three of the standards. In order to address these requirements, online modules on the use of ICT in teaching and learning were developed as part of the Teaching Teachers for the Future project. This study reports on one university's use of these modules and the preservice teachers' responses to them. The modules were used as a component of a methodology course with the students completing an online survey after they had finished the modules. The modules were based around the TPACK (Technological Pedagogical Content Knowledge) framework (Mishra and Koehler, 2006) and incorporated videos of teachers and their students using ICT, lesson plans and useful ideas for incorporating ICT into the classroom. The preservice teachers were asked about structure and navigability of the modules, what they found to be the most useful aspects and how they could be improved. Overall the preservice teachers were positive about the modules and valued the videos and specific examples that would enable them to more effectively embed technologies in the classroom."

Wu, Y-T. (2013). Research trends in technological pedagogical content knowledge (TPACK) research: A review of empirical studies published in selected journals from 2002 to 2011. *British Journal of Educational Technology, 44*(3), E73-E76. doi: 10.1111/j.1467-8535.2012.01349.x

Abstract (excerpt):
"The TPACK framework has been recognized as an important theoretical foundation for technology integration research, and TPACK research in which the TPACK framework is explicitly used in exploring teachers' teaching with technology has been flourishing (eg [*sic*], Angeli & Valanides, 2009; Baran Chuang & Thompson, 2011; Mishra & Koehler, 2006; Polly, 2011). The understanding of the status of such emerging research would be helpful for educators and researchers in understanding the current TPACK research progress and choosing appropriate topics for further investigation. Therefore, this study aimed to review empirical TPACK studies published in influential international journals from 2002 to 2011."

Zhan, Y., Quan, J., & Ren, Y. (2013). An empirical study on the technological pedagogical content knowledge development of pre-service mathematics teachers in China. *International Journal of Social Media and Interactive Learning Environments, 1,* 199-212. doi: 10.1504/IJSMILE.2013.053600

Abstract:

"Based on the research theories and methods of the TPACK model, an empirical research study was conducted in a normal university in Shanghai, China, to investigate how to improve pre–service teachers' TPACK level. The subjects were pre–service mathematics teachers. The authors developed a learning–by–design micro–course and designed a TPACK Scale for the mathematics teachers, which aimed to test the change of their TPACK level before and after completing the micro–course. The result indicated that such a micro–course could effectively help the pre–service teachers improve their TPACK level. This paper describes the design and findings of the study, and provides suggestions for further improving the design of the micro–course to enhance pre–service teachers' TPACK."

*Chapters*

Hubber, P., & Loong, E. (2013). Increasing learner engagement of learning technologies and science TPACK through representational challenges. In C. Wankel, & P. Blessinger (Eds.) *Increasing student engagement and retention in e-learning environments: Web 2.0 and blended learning technologies* (pp. 83-112). Bingley, UK: Emerald Group Publishing Limited, doi: 10.1108/S2044-9968(2013)000006G006

Abstract:

"There have been calls to embed Information and Communication Technology (ICT) into pre-service teacher courses in preference to technology only courses as a means to provide graduate pre-service teachers with the necessary skills to integrate ICT into their teaching practice. This chapter describes a case study of a pre-service science education curriculum course that was designed to embed ICT into its curriculum, assessment and delivery. The tutor modelled [*sic*] best teaching practice in the use of learning technologies. The theoretical framework is Technological Pedagogical and Content Knowledge (TPACK) viewed through a representation construction approach. This approach involved the students undertaking a series of representational challenges where they constructed and critiqued representations. The study found increased student engagement with learning technologies and an enhanced TPACK over the period of the course. Several factors that may have led to these findings are discussed."

Incikabi, L., & Tokmak, H. S. (2013). Integrating technology into mathematics teaching: A TPACK (technological, pedagogical, content knowledge)-based course design for college students. In J. Keengwe (Ed.), *Research perspectives and best practices in educational technology integration* (pp. 288-303). Hershey, PA: IGI Global. Abstract retrieved from http://www.igi-global.com/chapter/integrating-technology-into-mathematics-teaching/74300

Abstract:

"The relationships between content, pedagogy, and technology are important for teaching, yet complex for teachers. The idea of technological, pedagogical, and content knowledge (TPACK) has emerged in the educational technology field as a framework to explain the complexity of technology integration. In contrast to a simple view of technology, TPACK framework emphasizes the connections, interactions, affordances, and constraints of content, pedagogy, and technology. TPACK framework presents a way of thinking about effective technology integration. The preparation of teachers for effective technology integration to instruction appears to be a key component of almost every improvement plan for education and educational reform programs. This chapter provides a course design example for teacher educators about how to give pre-service teachers experience integrating technology with their instructions. The instructor designed this course to enhance mathematics teacher candidates' understanding of TPACK as a result of an intense educational technology course sequence."

Meyer, M., Nowak, H., Zill, L. H., Dempsey, J. C., Hyatt, J., Omniewski, R.,…& Tomlinson, M., (2013). The art in action project. In M. B. Gregerson, H. T. Snyder, & J. C. Kaufman (Eds.), *Teaching creatively and teaching creativity* (pp. 37-50)*.* New York: Springer. Retrieved from http://www.springer.com/psychology/book/978-1-4614-5184-6

Abstract:

"Art in Action is a federally funded grant, designed to integrate the arts with math and reading instruction for elementary schools. Gazzaniga (2008) presents evidence connecting student learning in the arts to academic achievement in other subjects including math and reading. Three schools were chosen to participate in this four-year project, which pairs teaching artists with classroom teachers to creatively design and deliver arts infused instruction along with appropriate technologies. Trainings for teachers and artists include a graduate level course and multiple workshops and retreats. They are encouraged to work together to share their expertise in standards-based instruction and to infuse arts and core subjects together in unconventional ways. Consequently, the goals are to encourage both constructivist pedagogy and to increase 21st century skills of collaboration, creativity and critical thinking. The evaluation team is looking at student achievement scores in math and reading, teacher and artist attitudes as they reflect on instruction, and changes in the way classroom teachers deliver instruction over time. This chapter includes a section on TPACK and the arts, along with examples of how technology is infused in the project."

Newman, D. L. (2013). Changing the face of ELA classrooms: A case study of TPACK professional development. In J. Keengwe (Ed.), *Research perspectives and best practices in educational technology integration* (pp. 270-287)*.* Hershey, PA: IGI Global. Abstract retrieved from http://www.igi-global.com/chapter/changing-face-ela-classrooms/74299

Abstract:
"This chapter looks at the delivery of professional development on technological pedagogical content knowledge (TPACK), designed to increase teachers' abilities to integrate technology into ELA curriculum. Using TPACK and 21st century SCALE frameworks as a foundation, both stipend-based and embedded professional development models provided teachers with skills to integrate mobile technologies into classroom pedagogies, modifying or redesigning selected units of instruction. Change in teacher behavior was evidenced by direct observation of teachers' integration of technology into classroom practice, and their use of technology to support lesson plans aligned to state and common core learning standards in the classroom. Student outcomes include performance on teacher developed action research, attendance, and increased ability to meet learning standards."

Yurdakul, I. K., Odabasi, H. F., Sahin, Y. L., & Coklar, A. N. (2013). A TPACK course for developing pre-service teachers' technology integration competencies: From design and application to evaluation. In J. Keengwe (Ed.), *Research perspectives and best practices in educational technology integration* (pp. 242-269)*.* Hershey, PA: IGI Global. Abstract retrieved from http://www.igi-global.com/chapter/tpack-course-developing-pre-service/74298

Abstract:
"Technological Pedagogical Content Knowledge (TPACK) is one of the technology integration models that focuses on effective technology integration related to teacher competencies. This model is based on the interaction and combination of teachers' technology, pedagogy, and content knowledge. A new course was created using a TPACK model of education. In this context, the trainer takes responsibility of being a role model and the use of new technology-based applications for educational purposes appropriately updated. Additionally, integrating the TPACK model of education could make important contributions to technology integration in teacher training if the information is concretized with concept maps, if students are made creative in their own fields with digital storytelling, and if all these are transferred into a course environment via the Web with the help of a learning management system."

## 3. Recent TPACK Presentations

Boksz, B. (2013, April). *The phenomenology of teachers' TPACK, pedagogy, and Web 2.0.* Paper presented at the meeting of the Maryland Society for Educational Technology, Baltimore, MD.

Abstract:
"This session examines how and why teachers adapt their pedagogy to utilize Web 2.0 tools in instruction. Join us for a deep look at the relationship between

technology, pedagogy, and content knowledge, and how they impact instruction."
Edmodo Code: 9b9c5k

Boksz, B., & Wang, L. (2013, April). *An examination of teachers' integration of Web 2.0 technologies in secondary classrooms: A phenomenological study.* Paper presented at the meeting of the American Educational Research Association, San Francisco, CA.

Abstract:
"Web 2.0 tools may be able to close the digital gap between teachers and students if teachers can integrate the tools and change their pedagogy. The TPACK framework has outlined the elements needed to effect change, and research on Web 2.0 tools shows its potential as a change agent, but little research has looked at how the two interrelate. Using a rigorous phenomenological research methodology, the "lived experiences" of seven teachers successfully adapting pedagogy with Web 2.0 tools were examined giving an in-depth qualitative analysis of how and why teachers integrate Web 2.0 to change pedagogy. The research validated the use of TPACK as a framework as well as the use of phenomenological research methodology in researching about educational technology."

Niess, M., & Gillow-Wiles, H. (2013, April). *Learning trajectory for transforming teachers' knowledge for teaching mathematics and science with digital image and video technologies.* Paper presented at the meeting of the Society for Information Technology and Teacher Education, New Orleans, LA.

Abstract:
"This multiple case descriptive study examines the influence of a learning trajectory designed toward developing teachers' technological pedagogical content knowledge (TPACK) for teaching with digital image and video technologies. The researcher-conjectured learning trajectory embeds tasks with specific instructional strategies to engage ten K-12 in-service teacher participants in experiences designed for learning mathematics and science with these technologies. This rich description demonstrates the influence of how a researcher-conjectured learning trajectory situated in a social metacognitive-constructivist instructional framework influenced participants' thinking about their own thinking about learning mathematics/science and their thinking about the curriculum, instruction and their students' thinking and understanding when learning with these technologies. The result is an explanatory framework that interweaves descriptive tasks with specific instructional strategies that influence teachers' TPACK transformations."

[**Editors' Note:** Somehow, we missed these two presentations in our searches of the AERA and SITE 2013 online databases while preparing issue 15 of the newsletter. Apologies to Barbara, Ling, Maggie and Henry for our omissions!]

## 4. Recent TPACK-Related Dissertations

Barrett-Greenly, T. C. (2013). *Investigating the impact of professional development on teacher practices and beliefs regarding the use of mobile educational applications in the classroom* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses (AAT 3555257).

Abstract (excerpt):
"This project investigated the impact of a professional development (PD) institute designed to help practicing teachers realize the potential of mobile devices (i.e., iPads) for both teaching and learning, and consisted of three objectives. The first objective was to describe the pedagogical activities of a technology professional development program titled "iPad Technology Institute," which was offered on campus at the University of Delaware (UD) during the summer of 2011. The second objective was to investigate the impact of the institute activities on the technological knowledge, teaching practices and beliefs of the participating teachers. The final objective was to gain an understanding of the benefits, limitations and challenges of using mobile technology, specifically the iPad and its applications, in the classroom (from the teachers' perspective)."

Knips, M. A. (2013). *The eye of the beholder: An English teacher's attempt to transform her teaching through digital video composing* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses (AAT 3554461).

Abstract:
"Arguments for reforming urban schools to include 21st century learning tools focus on the current state of high drop out rates and student disengagement as trends that need to be addressed. A mature multimodal composing project in partnership with an urban school addressed these issues through digital video composing for students as part of the curriculum. My purpose in this longitudinal case study was to trace the path of a young English teacher out of professional development and into her classroom to understand her learning and pedagogical change as she introduced digital video composing for students. As a participant-observer in her classroom over a three year period, I documented her teaching while she worked to overcome numerous obstacles occurring due to the school district's changes in leadership and curricular vision. Data included fieldnotes, videotapes, interviews, classroom artifacts, and school district documents. Findings show how the teacher's personal, institutional and relational dynamics influenced her decisions as she attempted to include this technology as a new literacy tool for student learning. By following project materials and assignments, she began to make a shift towards developing a New Literacies stance during the first year as she facilitated students in creating their own stories. However, the following year, when computer access and increasing demands by administrators impacted her teaching, she took control of editing the videos, and students

returned to their traditional roles as participants in the meaning making rather than creators. Over time, she included technologies as personal efficiency tools rather than the social literacy practices promoted by the project. Her professional stance towards her students undermined her attempts to connect with them. The priority of test preparation for timed essay writing overrode all other considerations as the personal, institutional and professional issues converged to undermine innovative pedagogy in her classroom. In contrasting her experience with another teacher in vii the building, this case provides a microcosm of the fate of this project in the school district. Situating the case within the framework for adaptive expertise, culturally relevant pedagogy, and Multimodal Literacy Pedagogy provides explanatory theories to account for the cross-currents at work in the teacher and her classes, including her inability to perceive the engagement and thinking that her students exhibited through multimodal composing as real learning." (Editors' Note: See pp. 160 & 184 – 185)

Shively, C. (2013). *"Information at their hands:" Applying sociocultural theory to an analysis of the pedagogical moves of pre-service science teachers during a science lesson* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses (AAT 3554501).

Abstract:
"The National Science Education Standards (NSES) state that students must "experience scientific inquiry directly to gain a deep understanding of its characteristics" (Olson & Loucks-Horsley, 2000, p. 14). The standards also emphasize the use of technology to help students collect, organize, analyze, interpret and present data in ways similar to scientists. This means that pre-service science teachers must be prepared to teach science with inquiry and technology. This bounded case study examined the narratives associated with the science lessons taught by seven pre-service science teachers (PSTs) and uncovered the hidden dialogicality linked to the pedagogical moves they mediated during these science lessons. A sociocultural approach was used to study their pedagogical actions because their actions took place in the socially situated environment of a school classroom (Wertsch, 1993). Through a series of narratives told and constructed by each PST, I examined how they learned science as students, how they learned how to teach science and how they eventually taught a science lesson. Their narratives enabled me to see why the PSTs made the pedagogical choices they did when given the opportunity to teach with technology and to identify the key events in their stories that they felt compelled to tell me about the science experiences in their lives. I specifically looked at the tools and signs (Vygotsky, 1978) used during their lesson, how they spoke about these tools in their narratives and the hidden dialogicality (1993) contained in those narratives. Results showed that pre-service science teachers who grew up in an era of science education reform did not learn science using inquiry supported with technology, nor did they have student teaching placements that would have enabled them to learn how to teach with inquiry supported by technology. Results also indicated that pre-service science

teachers could successfully integrate a lower level of inquiry (Windschitl, 1993) supported by technology into a science lesson. The sociocultural analysis revealed that many historical, cultural and institutional factors contributed to the use of lower levels of inquiry use."

Stitger, J. R. (2013). *New Zealand teachers' understandings of cross-curricular ICT use and integration* (Doctoral dissertation)*.* Retrieved from http://otago.ourarchive.ac.nz/handle/10523/3941

Abstract:
"This thesis explored the beliefs and understandings of a group of teachers in New Zealand (NZ) across the levels of compulsory schooling, regarding the use and cross-curricular integration of ICT. Two broad research questions were developed to determine what teachers from different school levels understood ICT and integration to mean, and how these understandings influenced their daily teaching practice. A conceptual framework for analysing the data was developed from a review of relevant literature. A blended worldview of constructivism and social constructionism underpinned this emergent qualitative study. Data were initially collected through a self-administered survey that was sent out to 281 teachers at urban primary, intermediate, and secondary schools with 45 completed forms returned. The survey was followed by individual semi-structured interviews with 16 teachers. This data collection sequence was repeated with rural teachers to determine whether or not location was influential in ICT use and integration. Of the 74 survey forms sent out, 16 were completed and returned, and seven teachers were interviewed. The conceptual framework was used to analyse the survey data and the Technological Pedagogical and Content Knowledge (TPACK) framework used to analyse the interview transcripts.

The findings showed that NZ teachers' understandings of ICT use and cross-curricular integration differed from teacher to teacher, and between the school levels. Conceptualisations of ICT were determined to be an element responsible for these differences, in addition to a perceived relationship between the idea of ICT as synonymous with the computer. Teacher's understandings of ICT evolved from prior learning experiences, previous work or careers, teacher education, professional development, and interactions with colleagues, and students. A relationship between individual TPACK and institutional TPACK emerged, which could create tension between individual teachers and the school. This research has implications for effective cross-curricular ICT professional development for teachers in New Zealand. It revealed the nature of the complexities, which existed within the different school contexts. As such, this multifaceted TPACK model could be used to identify and resolve tensions between an individual and an institution, thereby facilitating improved cross-curricular ICT integration."

**5. Summer 2013 TPACK-Related Professional Development**

Does your K-12 school or school district/division use TPACK to frame professional development (PD) for classroom teachers? Judi Harris and Mark Hofer are organizing a **"TPACK Stories Symposium" on July 14 – 16, 2013** at the College of William & Mary in Williamsburg, Virginia, USA to help school- and district/division-based PD providers to share their "TPACK (PD) Stories" with each other. Two-member teams from 8 schools or school districts/divisions will be selected from applications submitted at: http://www.tpackstories.org/. Lodging, food, symposium materials, and a modest honorarium will be provided to each of the 16 symposium participants. IMPORTANT: **Applications are due Saturday, June 8, 2013.**

Want to contribute your classroom, school, or school district/division's TPACK Story, but can't join us in Williamsburg in July? Please consider submitting your story for review for publication online at: http://www.tpackstories.org/. Please view the video-based invitation at: http://youtu.be/LuSgc3Auedk.

**6. Selected TPACK-Related Blog Entries**

Borwick, J. (2013, March 25). The information technology department's role in higher education, seen through the "TPACK" model [Web log post]. Retrieved from http://www.heitmanagement.com/blog/2013/03/the-information-technology-departments-role-in-higher-education-seen-through-the-tpack-model/

Bulfin, S., Parr, G., & Bellis, N. (2013). Stepping back from TPACK [Web log post]. Retrieved from http://newmediaresearch.educ.monash.edu.au/lnmrg/blog/stepping-back-tpack

Jones, D. (2013, March 22). Does institutional e-learning have a TPACK problem? [Web log post]. Retrieved from https://davidtjones.wordpress.com/2013/03/22/does-institutional-e-learning-have-a-tpack-problem/

A response to David Jones's post:
Beer, C. (2013, March 23). Learning analytics and TPACK [Web log post]. Retrieved from http://beerc.wordpress.com/2013/03/23/learning-analytics-and-tpack/

Kehl, W. (2013, April 8). Teaching with technology in the classroom [Web log post]. Retrieved from http://gettingsmart.com/2013/04/teaching-with-technology-in-the-classroom/

**7. Other TPACK Updates**

Matt Koehler and Punya Mishra, professors at Michigan State University, report that "the Educational Psychology and Educational Technology Program at Michigan State University was the recipient of the '2013 Best Practice Award for the Innovative Use of Technology,' awarded by the American Association of Colleges of Teacher Education (AACTE). This award honors both their master's program as well as their doctoral (face-to-face and hybrid) programs for incorporating 'innovation beyond meeting national or state standards for program-wide educational technology integration.'" (http://punya.educ.msu.edu/2013/02/18/epet-program-wins-national-award/)

Read more about this award here: http://aacte.org/news-room/press-releases/aacte-honors-michigan-state-university-with-innovative-use-of-technology-award.html.

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IGI Global published a summary of an interview conducted with Maggie Niess of Oregon State University, done at the American Educational Research Association (AERA) conference in San Francisco last month. During the interview, Maggie discussed TPACK research and development, including an IGI Global book that she co-edited, *Educational Technology, Teacher Knowledge, and Classroom Impact: A Research Handbook on Frameworks and Approaches.* The interview ("TPACK in the Classroom: Developing Technological, Pedagogical, and Content Knowledge") is available online at: http://www.igi-global.com/newsroom/archive/tpack-classroom-developing-technological-pedagogical/1547/.

**8. 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., & Theisinger, D. (Eds.). (2013, May 23). TPACK newsletter issue #16: May 2013 [Electronic mailing list message]. Retrieved from http://punya.educ.msu.edu/research/tpck/newsletter-archive/

**9. 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 two 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 & Diana

…for the SITE TPACK SIG leadership:

Candace Figg, Co-Chair, Brock University
Petra Fisser,   Co-Chair, University of Twente
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