TPACK Newsletter, Issue #14: February 2013

Welcome to the fourteenth edition of the (approximately quarterly) TPACK Newsletter! TPACK work is continuing worldwide, and is appearing in an increasing diversity of publication, conference, and professional development venues. 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

"Design is not just what it looks like and feels like. Design is how it works."
-Steve Jobs

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1. TPACK Newsletter Update

The TPACK Newsletter currently has 1209 subscribers. It has been distributed for just over four years.

2. Recent TPACK Publications

Below are recent TPACK publications that we know about: 26 articles, 4 chapters and 1 book. If you know of others that were published within the past several months, please let us know (tpack.news.editors@wm.edu).

Articles

Alayyar, G. M., Fisser, P., & Voogt, J. (2012). Developing technological pedagogical content knowledge in pre-service science teachers: Support from blended learning. *Australasian Journal of Educational Technology, 28*(8), 1298-1316.
Abstract:

"The Technological Pedagogical Content Knowledge (TPACK) framework has been used to prepare pre-service science teachers at the Public Authority of Applied Education and Training in Kuwait for ICT integration in education. Pre-service teachers worked in teams to design an ICT solution for an authentic problem they faced during in-school training. Pre-service teachers were separated into two groups. The first group was coached by ICT, pedagogy, and content experts. The second group was offered a blended condition, by which they had access to an online portal with different tutorials and examples, with opportunities to meet with different experts whenever they wanted. Pre-test and post-test design data were collected for attitudes toward ICT, ICT skills, and TPACK. The findings show that the self-reported TPACK, the score of attitudes toward ICT, and ICT skills increased in both groups. However, the blended support condition reported a higher increase in the participants' technological knowledge (TK), technological pedagogical knowledge (TPK), their attitude toward ICT as a tool for instruction and productivity, and ICT enjoyment. This indicated that students perceived the blended condition for supporting design teams as a more desirable method for enhancing their development of TPACK."

Alsofyani, M. M., bin Aris, B., Eynon, R.., & Abdul Majid, N. (2012). A preliminary evaluation of short blended online training workshop for TPACK development using technology acceptance model. *Turkish Online Journal of Educational Technology, 11*(3), 20-32.

Abstract:
"The use of Short Blended Online Training (SBOT) for the development of Technological Pedagogical and Content Knowledge (TPACK) is a promising approach to facilitate the use of e-learning by academics. Adult learners prefer the blend of pedagogies such as the presentation, demonstration, practice and feedback if they are structured and instructor-led with an efficient training length. In this paper, we suggest that SBOT has the potential to create a highly preferred environment for training if adult learning principles are considered. The study explores the evaluation of this mode of training by using Technology Acceptance Model (TAM). The results show a great acceptance for this mode of training. Moreover, in practice, dual training modes can be offered for TPACK development programs, which may consist of face-to-face training and SBOT."

Annetta, L., Frazier, W., Folta, E., Holmes, S., Lamb, R., & Cheng, M-T. (2013). Science teacher efficacy and extrinsic factors toward professional development using video games in a design-based research model: The next generation of STEM learning. *Journal of Science Education & Technology, 22*(1), 47-61.

Abstract:
"Designed-based research principles guided the study of 51 secondary-science teachers in the second year of a 3-year professional development project. The project entailed the creation of student-centered, inquiry-based, science, video games. A professional development model appropriate for infusing innovative technologies into standards-based curricula was employed to determine how science teacher's attitudes

and efficacy where impacted while designing science-based video games. The study's mixed-method design ascertained teacher efficacy on five factors (General computer use, Science Learning, Inquiry Teaching and Learning, Synchronous chat/text, and Playing Video Games) related to technology and gaming using a web-based survey). Qualitative data in the form of online blog posts was gathered during the project to assist in the triangulation and assessment of teacher efficacy. Data analyses consisted of an Analysis of Variance and serial coding of teacher reflective responses. Results indicated participants who used computers daily have higher efficacy while using inquiry-based teaching methods and science teaching and learning. Additional emergent findings revealed possible motivating factors for efficacy. This professional development project was focused on inquiry as a pedagogical strategy, standard-based science learning as means to develop content knowledge, and creating video games as technological knowledge. The project was consistent with the Technological Pedagogical Content Knowledge (TPCK) framework where overlapping circles of the three components indicates development of an integrated understanding of the suggested relationships. Findings provide suggestions for development of standards-based science education software, its integration into the curriculum and, strategies for implementing technology into teaching practices."

Bauer, W. I., Hofer, M., & Harris, J. (2012). Grounded tech integration: Music. *Learning & Leading with Technology, 40*(3), 30-32.

Description:
"To assist teachers with technology integration, we offer comprehensive sets of learning activity types in ten curriculum areas, with specific educational technologies suggested that can best support each type of learning described. The learning activity types are organized into subcategories, so that each content-based collection comprises an informal taxonomy. Once teachers have determined the learning goals for a particular lesson, project, or unit, they review the activity types in the taxonomy/ies for the content area(s) being addressed, selecting and combining learning activities that will best help students to achieve the designated goals. Since appropriate educational technologies are recommended for each learning activity type, choosing the activities helps teachers to subsequently select well-matched technologies to support the plan. We think of this as "grounded" technology integration, since it is based in content, pedagogy, and how teachers plan instruction."
        The TPACK-based music taxonomy overviewed in this article is available online at: http://activitytypes.wmwikis.net/Music.

Bull, G., Thompson, A. D., & Schmidt-Crawford, D. A. (2012). New directions for ed tech journals: Encouraging and facilitating use of video in publication. *Journal of Digital Learning in Teacher Education, 29*(2), 37-38.

Abstract:
"Information about several papers discussed at a meeting hosted by the National Technology Leadership Coalition (NTLC) in the U.S. is presented. Topics include vido-based [*sic*] teaching cases, and technology, pedagogy, and content knowledge

(TPACK), and development of preservice teachers. The meeting featured speakers including Marilyn Strutchens and Willy Kjellstrom."

Chai, C. S., Koh, J. H. L., Ho, H. N. J., & Tsai, C.-C. (2012). Examining preservice teachers' perceived knowledge of TPACK and cyberwellness through structural equation modeling. *Australasian Journal of Educational Technology, 28*(6), 1000-1019.

Abstract:
"This study examined outcomes from an information and communication technology (ICT) course designed on the basis of the meaningful learning framework and general cyberwellness issues. It also examined the relationships among Singaporean preservice teachers' perceptions of the constructs pertaining to technological pedagogical content knowledge (TPACK), and their perceived ability to integrate cyberwellness knowledge when designing web-related learning. Two questionnaires were administered to 668 and 628 preservice teachers before and after the ICT course to elicit the relationships. Five TPACK knowledge constructs (PK, CK, Web 2.0-related TK, TPK, TPACK) and the teachers' cyberwellness knowledge were identified from factor analysis results. The pre-post course surveys indicate that the preservice teachers perceived strong gain in 5 out 6 constructs measured. Additionally, the structural equation model analysis revealed that cyberwellness knowledge contributes significantly to TPK and TPACK, based on the preservice teachers' perception. As such, the study argues that the preservice teachers' confidence to integrate their cyberwellness knowledge into their teaching may play an important role in influencing how they plan and design web-based learning. Cyberwellness knowledge may be an important knowledge component to foster when considering the future development of teachers' TPACK for web-based learning."

Dempsey, C., Harris, J., & Hofer, M. (2013). Grounded tech integration: Visual arts. *Learning & Leading with Technology, 40*(5), 36-38.

Description:
"One way to help teachers to integrate technologies meaningfully is to focus upon instructional planning. When teachers plan according to their students' curriculum-based learning needs, they typically organize their lessons, units and projects around content-based learning activities. When considering how to integrate technologies effectively into instruction, we suggest that teachers begin with selecting these content-based learning activities, based upon the learning processes and outcomes intended for the lesson, project, or unit being planned. Educational technologies can then be chosen according to how well their use can support students' learning in each of the activities that have already been planned.

How can these selection processes be supported within the constraints of teachers' busy schedules? To assist teachers in choosing among a full range of learning activity types in each content area, we have developed and published comprehensive taxonomies of learning activity types in each of ten curriculum areas. The learning activities in each of the taxonomies are organized into subcategories to make working with the taxonomies more efficient. Once teachers select and sequence a

combination of activity types that will help their students meet identified curriculum-based learning goal(s) for a particular lesson, project, or unit, they then consider the digital tools and resources suggested for each selected learning activity type. Because the suggested technologies are uniquely suited to support, extend, and/or enhance each content-based learning activity, we consider this planning process to be a "grounded" approach to technology integration that is focused upon students' curriculum-based learning."

This article provides an overview of the learning activity types taxonomy in visual arts. The taxonomy itself is available online at: http://activitytypes.wmwikis.net/Visual+Arts.

Dilworth, P., Donaldson, A., George, M., K., Searson, M., Starkweather, K., Strutchens, M.,...Robinson, S. (2012). Preparing teachers for tomorrow's technologies. *TechTrends: Linking Research & Practice to Improve Learning, 56*(4), 11-14. doi: 10.1007/s11528-012-0581-5

Abstract:
"The editorial discusses technology education for teachers, with particular focus given to a framework titled TPACK which focuses on technological knowledge, pedagogical knowledge, and content knowledge. The origin and application of TPACK are examined, and the importance of technological understanding for teachers is emphasized."

Doğan, M. (2012). Prospective Turkish primary teachers' views about the use of computers in mathematics education. *Journal of Mathematics Teacher Education, 15*(4), 329-341. doi: 10.1007/s10857-012-9214-3

Abstract:
"The use of computers and technology in mathematics education affects students' learning, achievements, and affective dimensions. This study explores prospective Turkish primary mathematics teachers' views about the use of computers in mathematics education. The sample comprised of 129 fourth-year prospective primary mathematics teachers from two different universities in Turkey. Data consisting of participants' written responses were qualitatively analyzed and categorized according to TPACK. Results show that the prospective teachers' views about computers and their use in mathematics are usually positive. They enjoy working with computers, even though they are only able to perform relatively minor calculations with computers. They stated that improved use of computers can help them to learn and teach mathematics more effectively. However, they did not feel confident about their ability to teach mathematics using computers."

Dron, J. (2012). The pedagogical-technological divide and the elephant in the room. *International Journal on E-Learning, 11*(1), 23-38. Retrieved from http://www.editlib.org/p/33288

Abstract:

"There is a widely held belief in e-learning circles that pedagogy must come before technology. In this paper it is argued that, not only is that not true, but that it is a weak distinction as pedagogies, insofar as they represent a set of techniques and tools for learning, are as much technologies as the computers, forums, virtual classrooms and institutional structures in which they are used. This perspective has some significant implications as to how we should research and use educational technologies. The nature of the relationship between different technologies is examined and some conclusions drawn about implications for educational research, and how technologies should be designed. A major outcome of this analysis is to consider the importance of factors apart from pedagogies and other technologies that lead to effective learning experiences. It is argued that this is the elephant in the room that is largely ignored in educational technology research."

Foulger, T. S., Buss, R. R., Wetzel, K., & Lindsey, L. (2012). Preservice teacher education benchmarking a standalone ed tech course in preparation for change. *Journal of Digital Learning in Teacher Education, 29*(2), 48-58.

Abstract:
"In an effort to reform a teacher education program by strengthening content-area preparation and adding opportunities to practice by extending the time for student teaching, Arizona State University's Mary Lou Fulton Teachers College eliminated a group of teacher education courses, including the standalone educational technology course. Educational technology faculty members were charged with developing an alternative approach of infusing technology into methods courses. Our first step was to conduct this benchmarking study of the standalone course to determine the successful lessons and practices that should be incorporated into the new program design. Results from analysis of pre- and post-course survey results and focus-group data indicated that candidates' confidence and TPACK scores increased in the standalone course. We will share benchmarks that arose from the study with program developers for adoption or adaptation to the new technology-infused courses where appropriate. Findings may also be useful to other teacher credentialing institutions that are changing to a technology-infused instructional approach."

Guzey, S. S., & Roehrig, G. H. (2012). Integrating educational technology into the secondary science teaching. *Contemporary Issues in Technology and Teacher Education, 12*(2), 162-183. Retrieved from http://www.editlib.org/p/39130/

Abstract:
"The integration of technology in teaching is still challenging for most teachers, even though there has been a historical growth of Internet access and available educational technology tools in schools. Teachers have not incorporated technology into their teaching for various reasons, such as lack of knowledge of technology, time, and support. In this study, three beginning science teachers who successfully achieved technology integration were followed for 3 years to investigate how their beliefs, knowledge, and identity contributed to their uses of technology in their classroom instruction. The findings demonstrate that the participating teachers were all intrinsically

motivated to use technology in their teaching and this motivation allowed them to enjoy using technology in their instruction and kept them engaged in technology use. The major findings of the study are displayed in a model, which indicates that the internalization of the technology use comes from reflection and that teachers' use of technology in classroom instruction is constructed jointly by their technology, pedagogy, and content knowledge; beliefs; identity; and the resources that are available to them. The study has implications for teachers and teacher educators for successful technology integration into science classrooms."

Hsu, P. S. (2013). Examining changes of preservice teachers' beliefs about technology integration during student teaching. *Journal of Technology and Teacher Education, 21*(1), 27-48.

Abstract:
"The purpose of this qualitative case study was to examine changes in preservice teachers' beliefs about technology integration during the student teaching semester in USA. This study used in-depth interviews, review of documents, and observations. The findings indicated the preservice teachers' beliefs about technology integration changed in two directions. Although changes may be attributed to cooperating teachers' practices about technology integration, this study suggested that cooperating teachers' modeling does not necessarily lead preservice teachers to change their beliefs about technology integration in a positive way. Thus, this study suggested a need to build reflective activities for preservice teachers to gain access to the cooperating teachers' thinking process in the modeling process."

Juniu, S., Harris, J., & Hofer, M. (2012). Grounded tech integration: Physical education. *Learning & Leading with Technology, 40*(2), 34-36*.*

Description:
"To assist teachers with technology integration, we offer comprehensive sets of learning activity types in ten curriculum areas, with specific educational technologies suggested that can best support each of the types of learning described. The learning activity types are organized into subcategories, so that each content-based collection of learning activity types forms an informal taxonomy. Once teachers have determined the learning goals for a particular lesson, project, or unit, they review the activity types in the taxonomy for the content area(s) being addressed, selecting and combining learning activities that will best help students to achieve the designated goals. Since appropriate educational technologies are recommended for each learning activity type, choosing the activities helps teachers to subsequently select technologies to support the plan in practical and usable ways. We think of this as "grounded" technology integration, since it is based in content, pedagogy, and how teachers plan instruction. We have identified 56 physical education learning activity types to date."

The TPACK-based physical education learning activity types taxonomy overviewed in this article is available online at:
http://activitytypes.wmwikis.net/Physical+Education.

Kaya, S., & Dağ, F. (2013). Turkish adaptation of technological pedagogical content knowledge survey for elementary teachers. *Educational Sciences: Theory & Practice, 13*(1), 302-306.

Abstract:
"The purpose of this study was to adapt the Technological Pedagogical Content Knowledge (TPACK) Survey developed by Schmidt and colleagues into Turkish and investigate its factor structure through exploratory and confirmatory factor analysis. The participants were 352 elementary pre-service teachers from three large universities in northwestern Turkey. For statistical analyses SPSS and LISREL programs were used. Cronbach Alpha reliability coefficients of subscales ranged between 0.77 and 0.88. Exploratory factor analysis results showed that the factor structure of the Turkish version of the survey was similar with the original version. According to the confirmatory factor analysis results, the goodness of fit indices indicated a good model fit. Based on the results, it was concluded that the TPACK Survey is appropriate for Turkish culture."

McDonald, S. (2012). The challenge to situate digital learning technologies in preservice teacher mathematics education. *Contemporary Issues in Technology and Teacher Education, 12*(4), 355-368.

Abstract:
"This paper focuses on how preservice primary teachers can be supported to embrace digital learning technologies (DLTs) in their teaching of mathematics. The nature of the instruction and the assessment in the final mathematics unit of the bachelor of education program were changed. Despite being tagged as "tech-savvy," preservice students use digital technologies primarily for social networking and information retrieval. These uses of digital technologies do not guarantee any facility for their utilization as learning technologies, which may result in early career teachers being unprepared to enact the effective use of expensive equipment in schools. The provision of a communal constructivism environment supported student learning as they met the challenges of creating interactive digital applications to teach a mathematical concept to their peers. This paper is likely to be of interest to mathematics educators who are trying to steer preservice teachers away from "worksheet maths" as well as other preservice teacher educators who wish to incorporate digital technologies into their content and methodology units."

Meng, C. C., & Sam, L. C. (2013). Developing pre-service teachers' technological pedagogical content knowledge for teaching mathematics with The Geometer's Sketchpad through lesson study. *Journal of Education and Learning, 2*(1), 1-8. Retrieved from http://www.ccsenet.org/journal/index.php/jel/article/view/23809

Abstract:
"The purpose of this study was to develop pre-service secondary teachers' technological pedagogical content knowledge (TPACK) for teaching mathematics with The Geometer's Sketchpad (GSP) through Lesson Study (LS). Specifically, a single-group pretest-posttest design was employed to examine whether there was a significant

difference in the pre-service secondary teachers' TPACK for teaching mathematics with GSP after engaging in LS which was incorporated into the mathematics teaching methods course during the first semester of the 2011/2012 academic session in a Malaysian public university. Forty-six pre-service secondary teachers who enrolled in the course completed both the pretest and posttest questionnaires on teachers' TPACK for teaching mathematics with GSP. The results of the paired-samples t-test indicated that there was a significant difference in the pre-service secondary teachers' TPACK for teaching mathematics with GSP for all the subscales after engaging in LS."

Murphy, K. (2013). Technology techniques: Using them the right way. *Science Scope, 36*(5), 6-7.

Abstract:
The author discusses the importance of using the appropriate educational technology in a classroom setting, noting Technological Pedagogical Content Knowledge (TPACK), which focuses on the integration of technology with teacher knowledge. The article addresses the importance of avoiding technocentric instruction, or education focused on the technology instead of on the student. It includes discussion of the educational technologies Glogster, VoiceThread, and Animoto.

Niess, M., & Gillow-Wiles, H. (2013). Advancing K-8 teachers' STEM education for teaching interdisciplinary science and mathematics with technologies. *Journal of Computers in Mathematics and Science Teaching, 32*(2), 219-245.

Abstract:
"This primarily online Master's degree program focused on advancing K-8 teachers' interdisciplinary mathematical and science content knowledge while integrating appropriate digital technologies as learning and teaching tools. The mixed-method, interpretive study examined in-service teachers' technological, pedagogical, and content knowledge (TPACK) within the context of interdisciplinary content knowledge, pedagogical strategies for teaching interdisciplinary topics, and technological knowledge when applied to teaching and learning interdisciplinary content. The results documented ways specific coursework in the graduate program impacted the teachers' overarching conceptions of teaching interdisciplinary topics, their knowledge of students' understanding and thinking, their instructional strategies, and their knowledge of curriculum and curriculum materials for learning in interdisciplinary contexts with the integration of appropriate technologies."

Otrel-Cass, K., Khoo, E., & Cowie, B. (2012). Scaffolding with and through videos: An example of ICT-TPACK. *Contemporary Issues in Technology and Teacher Education, 12*(4), 369-390. Retrieved from http://www.editlib.org/p/40416

Abstract:
"In New Zealand and internationally claims are being made about the potential for information and communication technologies (ICTs) to transform teaching and learning. However, the theoretical underpinnings explaining the complex interplay between the

content, pedagogy and technology a teacher needs to consider must be expanded. This article explicates theoretical and practical ideas related to teachers' application of their ICT technology, pedagogy, and content knowledge (TPACK) in science. The article unpacks the social and technological dimensions of teachers' use of TPACK when they use digital videos to scaffold learning. It showcases the intricate interplay between teachers' knowledge about content, digital video technology, and students' learning needs based on a qualitative study of two science teachers and their students in a New Zealand primary school."

Peeraer, J., & Van Petegem, P. (2012). The limits of programmed professional development on integration of information and communication technology in education. *Australasian Journal of Educational Technology, 28*(6), 1039-1056.

Abstract:
"In the framework of a development cooperation program on quality of education in Vietnam, a professional development trajectory for teacher educators on the use of information and communication technology (ICT) in education was developed and implemented over the course of a three-year program. We describe how the framework on Technological Pedagogical Content Knowledge inspired the development of the program. In a longitudinal panel study, we followed a group of 1191 teacher educators (the "total accumulated popluation" [*sic*]). We describe the trainees' reaction to training and learning outcomes and we compare the use of ICT by educators who participated in the program with those who did not participate. Data was collected from self-reported questionnaires and focus group interviews. Comparison of the use of ICT for teaching over the course of the program shows that an ICT core group of enthusiasts made significant progress in integrating ICT into teaching practice. Exploratory multiple regression analysis highlights technological pedagogical knowledge and membership of a community of practice as significant factors for improved use of ICT. Nevertheless, the elements of the professional development program explain only 26.2% of variance. We discuss the extent to which programmed professional development can have an effect on integration of ICT in education and reflect on how to make training programs more effective."

Rienties, B., Brouwer, N., & Lygo-Baker, S. (2013). The effects of online professional development on higher education teachers' beliefs and intentions towards learning facilitation and technology. *Teaching & Teacher Education, 29*, 122-131. doi: 10.1016/j.tate.2012.09.002

Abstract:
"An important development in higher education is the increased learning possibilities brought by ICT. Many academics seem reluctant to embrace technology. An online teacher training program was followed by 73 academics from nine higher educational institutions. Data were gathered using the Technological Pedagogical Content Knowledge (TPACK) model and the Teacher Beliefs and Intentions questionnaire using a pre–post test-design. The results amongst 33 participants who completed both pre- and post-test indicate that TPACK skills increased substantially. Over time academics

were less convinced about the merits of knowledge transmission. Disciplines and institutional cultures, time investment and beliefs towards employability influenced training retention."

Semiz, K. & Ince, M. L. (2012). Pre-service physical education teachers' technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations. *Australasian Journal of Educational Technology, 28*(7), 1248-1265.

Abstract:
"The purposes of this study were to (1) identify the Technological Pedagogical Content Knowledge (TPACK), Technology Integration Self Efficacy (TISE) and Instructional Technology Outcome Expectations (ITOE) of pre-service physical education teachers, (2) examine the relationships among TPACK, TISE and ITOE, and lastly (3) examine the differences between pre-service physical education teachers who perceived and who did not perceive technology integration by their university instructors on TPACK, TISE, and ITOE scores. Findings indicate that while TPACK, TISE and ITOE perceptions of pre-service physical education teachers were at satisfactory levels, university instructors were not good role models in the use of technology in their classrooms. Pre-service teachers reported that integration of physical education and sport-related emerging technologies were almost non-existent in the teaching practices within the university setting. TPACK, TISE, and ITOE were moderately related with each other ($p<0.05$). Pre-service teachers' self-perceptions of TPACK, TISE, and ITOE were positively influenced by their perception of university instructors' technology integration into teaching in university courses ($p<0.05$). Providing professional development programs for the teacher education program instructors, both in technology integration in teaching and in emerging physical education and sports- related technologies, is recommended."

Siko, J., & Barbour, M. K. (2012). Homemade PowerPoint games: Game design pedagogy aligned to the TPACK framework. *Computers in the Schools, 29*(4), 339-354. doi: 10.1080/07380569.2012.734430

Abstract:
"While researchers are examining the role of playing games to learn, others are looking at using game design as an instructional tool. However, game-design software may require additional time to train both teachers and students. In this article, the authors discuss the use of Microsoft PowerPoint as a tool for game-design instruction and the philosophical justifications for its use. They examine the research that has been conducted using homemade PowerPoint games in the classroom and detail how the implementation of the games has evolved in a manner that reflects the Technological Pedagogical Content Knowledge framework."

van Olphen, M., Hofer, M., & Harris, J. (2012-2013). Grounded tech integration: ESOL. *Learning & Leading with Technology, 40*(4), 37-39.

Description:

"The [TPACK-based] taxonomy overviewed [in this article] organizes 67 specific ESOL teaching strategies into eight general recommendations for working with [English language learners]: communicate clearly, make content understandable, check students' understanding, elicit students' responses, demonstrate and model, encourage interpersonal communication, group students to assist their learning, and promote cross-cultural awareness. Once teachers select [specific curriculum-based] learning activity types and accompanying ESOL strategies to incorporate within a specific lesson, unit, or project, they then consider the suggested technologies associated with each."

This taxonomy of technology-supported ESOL teaching strategies is available online at: http://activitytypes.wmwikis.net/ESOL.

Walker, A., Recker, M., Ye, L., Robertshaw, B., Sellers, L., & Leary, H. (2012). Comparing technology-related teacher professional development designs: A multilevel study of teacher and student impacts. *Educational Technology Research and Development, 60*(3), 421-444. Retrieved from http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1005&context=iagroup

Abstract:

"This article presents a quasi-experimental study comparing the impact of two technology-related teacher professional development (TTPD) designs, aimed at helping junior high school science and mathematics teachers design online activities using the rapidly growing set of online learning resources available on the Internet. The first TTPD design (*tech-only*) focused exclusively on enhancing technology knowledge and skills for finding, selecting, and designing classroom activities with online resources, while the second (*tech + pbl*) coupled technology knowledge with learning to design problem-based learning (PBL) activities for students. Both designs showed large pre-post gains for teacher participants (N = 36) in terms of self-reported knowledge, skills, and technology inte- gration. Significant interaction effects show that teachers in the *tech + pbl* group had larger gains for self-reported knowledge and externally rated use of PBL. Three general- ized estimating equation (GEE) models were fit to study the impact on students' (N = 1,247) self reported gains in behavior, knowledge, and attitudes. In the resulting models, students of *tech + pbl* teachers showed significant increases in gain scores for all three outcomes. By contrast, students of tech-only teachers showed improved gains only in attitudes."

Chapters

Foster, A. (2012). Assessing learning games for school content: The TPACK-PCaRD framework and methodology. In D. Ifenthaler, D. Eseryel, & X. Ge (Eds.), *Assessment in game-based learning: Foundations, innovations, and perspectives* (pp. 201-215). New York, NY: Springer Science + Business Media. doi: 10.1007/978-1-4614-3546-4_11

Abstract:

"In this chapter, two studies are used to demonstrate an assessment process for learning in games in two different contexts, one using the technological pedagogical content knowledge (TPACK) and another using TPACK and the play, curricular activity, reflection, and discussion (PCaRD). First, TPACK and how it is used to guide the creation of assessments is described. For a more detailed understanding of TPACK as an analytical lens for games with a focus on pedagogy and content see 1, Foster, Mishra, and Koehler in *Learning to Play: Exploring the Future of Education with Games* (2011). Second, the PCaRD model and its role in integrating games for learning in varying contexts is described. Third, study 1, an after-school study in a computer room with upper-elementary children using a commercial entertainment game is described, followed by study 2 in a high school classroom using a commercial educational game. Finally, the implications of this combination using the TPACK and PCaRD models together to create assessments and to keep the process of game-based learning in classroom focused on contexts, pedagogy, and content are explained. Using both a theoretical and empirical approach, this chapter will show how the TPACK framework and the PCaRD approach facilitated assessment and integration of games for learning."

The following three chapters comprise Part I of the newly published book, *Research on Technology in English Education*, summarized here:

"This book brings together the voices of leading English Education researchers who work to offer views into the changing landscape of English as a result of the use of digital media in classrooms, out of school settings, universities and other contexts in which readers and writers work. But, as in most useful texts, the purpose is more nuanced and far reaching than simply offering a glimpse into where we currently find ourselves as a field. In sum, the collection brings together and interweaves what we are coming to know and understand about teaching English within a shifting digital landscape as well as the implications for teacher education and the discipline of English Education specifically.

The intended audience for this particular book is English educators, doctoral candidates in the field of English education, researchers and scholars in the field, and English language arts teachers – especially those interested in the impact digital technologies can have in our field." (http://www.infoagepub.com/products/Research-on-Technology-in-English-Education)

Hicks, T. (2013). Developing technological pedagogical content knowledge through English teacher research and a pedagogy of multiliteracies. In C. A. Young & S. Kajder (Eds.), *Research on technology in English education* (pp. 3-32). Charlotte, NC: Information Age Publishing.

Shoffner, M. (2013). Placing technologies in preservice English teacher reflection: Connecting reflective practice and TPACK. In C. A. Young & S. Kajder (Eds.), *Research on technology in English education* (pp. 63-86). Charlotte, NC: Information Age Publishing.

Spires, H., Hervey, L., & Watson, T. (2013). Scaffolding the TPACK framework in reading and language arts: New literacies, new minds. In C. A. Young & S. Kajder (Eds.), *Research on technology in English education* (pp. 33-62). Charlotte, NC: Information Age Publishing.

Books

Syh-jong, J. (2012). *From PCK to TPACK: Research and development.* Hauppauge, NY: Nova Science Publishers, Inc.

Abstract:
"One criticism of school-based instruction is the use of outdated teaching methods and contents to equip current students for future society. Schoolteachers in the 21st century need to be equipped with professional teacher knowledge, which has been referred to as Pedagogical Content Knowledge (PCK), and Technological Pedagogical Content Knowledge (TPCK). This implies that teachers have the ability to apply technology into their pedagogical strategies and content representations for teaching specific topics to promote students learning efficiency. This book discusses four studies related to PCK research and development and also four studies related to TPACK research, development and applications. The principal audiences for this book include all level school teachers, graduate students, academic researchers, and college teachers and scholars."

3. Recent TPACK Presentations

Bauer, W. I. (2012, November). *Integrating technology in the music classroom: Operationalizing technological pedagogical and content knowledge (TPACK) through activity types.* Presentation given at the Association for Technology in Music Instruction Conference, San Diego, CA.

Abstract:
"To successfully achieve technology integration in music classrooms and rehearsals requires careful planning of student learning experiences, a difficult process for teachers who have little background in the pedagogies of teaching with various technologies. An activity types (http://activitytypes.wmwikis.net) approach to instructional planning emphasizes consideration of curricular learning goals and generalized learning activities before considering the affordances and constraints of various technologies that may be used to support student learning. This presentation will describe the development and refinement of a taxonomy of music learning activity types that were developed through a collaborative effort between a music education content specialist/researcher and two educational technology researchers who are experts in TPACK and the activity types paradigm. The resultant musical activity types, available under a Creative Commons license, are designed to provide a reference for teachers that connect curricular content with content-based activities and technologies that will support those activities."

Doyle, H., & Reading, C. (2012, November). Building teacher educator TPACK: Developing leaders as a catalyst for change in ICT education. Presentation given

at the *Ascilite Conference 2012*, Wellington, New Zealand. Abstract retrieved from http://www.editlib.org/p/42598/

Abstract:
"Teacher educators with TPACK are critical to the development of the ICT competence of the next generation of teachers. To effect real change in ICT education leaders must be developed amongst teacher educators as well as teachers. An Australian university implemented a supported program of professional development for teacher educators as they implemented innovative ICT-rich practice. This paper reports on data collected before, during and after the process to inform planning. Areas identified where teacher educator TPACK was lacking were used to inform the professional development process. For a variety of ICT competences teacher educators were generally convinced of the usefulness but not so convinced of their own confidence. Enablers of learning identified by teacher educators, who had engaged in innovative practice, showed that they were building TPACK that would equip them to be leaders and thus catalysts for change in ICT education."

Hammett, R., St. Croix, L., & Wicks, C. (2012). Enhancing online and face-to-face teaching with social networking sites and digital literacy activities. In T. Bastiaens & G. Marks (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2012* (pp. 1036-1041). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Abstract:
"This paper discusses efforts to enhance classroom relations, learning climate and understanding of the pedagogical possibilities of digital technologies, both online and face-to-face, with social networking sites. The case study of the online course, which was offered to graduate students who were mostly teachers, discusses the use of an Elgg to supplement an online course created in Desire2Learn. In the second case study, where the undergraduate course was offered face-to-face, Edmodo was used as a teaching tool and social networking space. Data in these case studies come from various sources: student course evaluations (CEQs), the social networking sites themselves (with ethical consent), a survey about Elgg use, and a TPACK survey (see www.tpck.org). These data were analyzed to reveal attitudes toward the social networking sites, uses the students made of them, and students' self-reported technological, pedagogical and content knowledge (TPACK) and its intersections."

Mitchell, M. (2012). Transforming teaching; mathematical content, pedagogy and technology, a messy problem! In T. Bastiaens & G. Marks (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2012* (pp. 288-293). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Abstract:
"My session will discuss the results of a pre and post Technological Pedagogical

Content Knowledge (TPACK) survey that I have given to approximately 60 students over the last two years in my Mathematics Through Computers course. I teach the course face to face and online."

Phillips, P., Hammett, R. F., St. Croix, L., & White, G. (2012). Teaching with digital technologies: A case study using TPACK. In T. Bastiaens & G. Marks (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2012* (p. 315). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Abstract:
"This presentation will discuss what online instructors say about their experiences with and knowledge of digital technologies for teaching and learning. It will also discuss how their feedback contributed to the understanding of competencies required for integration of technology and informed future professional development plans for university instructors. The research data come from a version of the Technological, Pedagogical and Content Knowledge (TPACK) survey (Schmidt et al. 2009-10; used with permission) administered to online instructors. TPACK is a framework for both research and teaching that measures three domains of knowledge - content, pedagogy and technology - and their interconnectedness. The findings of this research will inform the development of a plan for teaching and learning and professional development activities at our university."

Robert Jupit, A. J., Minoi, J.-L., Arnab, S., & Yeo Wee, A. (2012, October). Story-telling and narrative methods with localised content to preserve knowledge. In P. Felicia (Ed.), *Proceedings of the 6th European Conference on Games Based Learning* (pp. 210-218). Sonning Common, UK: Academic Publishing International.

Abstract:
"In today's globalized age, there exists the risk that individual cultures and customs could lose their importance and identity. This paper explores the notion that the traditional method of passing down knowledge from one generation to the next through story-telling could be enhanced in a more engaging ways using ubiquitous mobiles and computer technologies. This paper focuses on the importance of story-telling and narrative methods, which are also common in the Iban culture, and their relationship to a game-based intervention. Specifically, a pedagogic approach utilising a narrative-based method is employed. This method correlates the cultural content and game technology development based on the Cultural Technological Pedagogical Content Knowledge (Cu-TPACK) framework. The content knowledge component of the framework used for promoting cultural awareness would include key elements of cultures which are symbols, rituals, heroes, values and man's relationship with a god/deity, nature and people. The pedagogical knowledge component includes methods and strategies to promote and encourage understanding and respect of the culture. With the advancement of game technology, games can be initiated for learning cultural awareness. Game-based learning (GBL) implies self-learning abilities and allows

transfer of learning from other cultures. The aim of integrating GBL and cultural elements is for knowledge preservation on culture."

Wilkin, C., Rubino, C., Zell, D., & Shelton, L. (2012, October). Where technologies collide: A technology integration model. In T. Bastiaens & G. Marks (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2012* (pp. 1701-1711). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Abstract:
"Technology is transforming teaching in ways that break down classroom walls while improving course quality and capitalizing on educators' creativity. Rather than using technology in an adhoc [*sic*] way, technology needs to fit the content and pedagogical style of the teacher. Our article builds on the extant literature on the necessary knowledge to integrate content, pedagogy, and technology (TPACK) in higher education. We provide a comprehensive model that outlines the factors that lead to the development of TPACK, the relationship between TPACK and the use of technology, and outcomes gleaned from technology-enhanced learning. Our proposed model is an important first step to considering the precursors and outcomes of TPACK. Without considering the extensions that we have identified in our Technology Integration Model, the linkages between TPACK and desirable outcomes (e.g., student learning, satisfaction, and engagement) are unclear. As a result, our proposed model has implications for educators and institutions alike."

4. Recent TPACK-Related Dissertations (15 indexed/located in the last 2 months!)

Boksz, B. A. (2012). An examination of teachers' integration of Web 2.0 technologies in secondary classrooms: A phenomenological research study. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(04), 3545427.

Abstract:
"This study examined the process teachers used to change their pedagogy to deliver effective instruction using Web 2.0 tools. A phenomenological approach examined the "lived experiences" of seven secondary teachers through in-depth interviews giving this study an in-depth qualitative analysis of teachers and technology.

The widening digital divide between teachers and students causes a barrier for educators trying to reach their students. Students are raised with pervasive technology, while teachers are using Web 2.0 tools on a personal basis, but may not yet be successful in adapting their pedagogy to effectively use the tools for instruction. The ease of use and user friendly interface of Web 2.0 tools makes them a possible catalyst to help teachers change their pedagogy.

Past teacher professional development focused on providing teachers with the technical knowledge to bridge the gap, but has fallen short of causing the paradigm shift needed to change pedagogy to use current tools effectively. The Technological Pedagogical and Content Knowledge (TPACK) framework has been used in

professional development and proven to lead to an effective change in teachers' pedagogy. Most current research has examined both the TPACK framework and Web 2.0 tools, but few researchers have looked at the teacher perspective on the issue.

The findings of this study indicated the types of Web 2.0 tools and how they are being utilized, the reasons why teachers are using the tools for instruction, and the technological factors influencing their use. Lastly, the impact their TPACK had on their success in adapting pedagogy points to the need for support either through professional development or support from colleagues. The "lived experiences" of the teachers provided implications for professional development assisting in making the change process easier for teachers, administrators, and students. This study provided an in-depth look at the relationship between in-service teachers, their TPACK, and how it relates to educational technology. In addition, this study demonstrated the rigorousness of phenomenology as a primary research method for educational technology."

Bray, S. E. (2012). The effects of teacher education experiences on the development of preservice teachers' technological pedagogical content knowledge. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(05), 3535496.

Abstract:
"Teacher education programs play an integral role in preparing preservice teachers to integrate technology in their future classrooms. Unfortunately, teachers continue to report feeling unprepared to integrate technology into their K-12 classrooms. In an effort to bring clarity to the issue of technology integration, Mishra and Koehler (2006) established the technological pedagogical content knowledge (TPACK) framework. Building on Shulman's (1986) idea of Pedagogical Content Knowledge, TPACK emphasizes the interaction and interplay between the three core knowledge domains of pedagogical knowledge, content knowledge, and technological knowledge (Mishra & Koehler, 2006). The development and understanding of TPACK is viewed as essential in order for teachers to effectively teach using technology (Koehler & Mishra, 2008).

This study was undertaken to determine the differences in pretest-to-posttest TPACK composite scores for students who were enrolled in a stand-alone technology course and to examine the extent to which field experiences and methods coursework predicted the explained variability in TPACK pretest-to-posttest difference scores. During the fall of 2011, the Survey of Preservice Teachers Knowledge of Teaching and Technology was administered online to 42 preservice teachers enrolled in a stand-alone technology course, Introduction to Technology Integration at a mid-sized private university with an accredited teacher education program. Results of a paired sample *t* test indicated pretest-to-posttest gains in mean composite scores in all knowledge domains with the largest gains in the three technology domains of TCK, TPK, and TPACK. Results of the multiple regression analysis determined that methods coursework and field experiences did not significantly contribute to the variance in any of the TPACK difference scores. Program recommendations and recommendations for future research conclude the study."

Burke, L. S. (2012). Online professional development: Using data to evaluate program effectiveness in preparing faculty to teach online. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 73*(11), 3513726.

Abstract:
"This study investigated a sample of community college faculty who participated in an online professional development program. The purpose of the study was to determine the relationship between participating in an online professional development program and changes in participants' self-assessed knowledge about tasks associated with effective online teaching. The study examined what professional development activities the participants found to be most useful in preparing them to teach in an online environment. The study also aimed to determine what professional development activities gave the participants the greatest knowledge gains.

An evaluation was accomplished by first ensuring that the professional development was well designed to meet the training goal of increasing faculty knowledge with respect to technology, pedagogy, and content, and the combination of each of these areas (TPACK). Second, the evaluation referred to principles of adult learning and Kirkpatrick's evaluation model as a framework for guiding the data collection. The pre- and post-survey was conducted and quantitative methods utilized to collect and analyze the data. The analysis showed that there were statistically significant differences in learning gains. Participants who participated in the online professional development program improved their self-assessed knowledge about tasks associated with effective online teaching, indicating that they felt more confident about their technology, pedagogy, and content knowledge. Participants also demonstrated improvement in their attitudes of preparation relating to an online teaching experience and ranked certain activities as more useful than others."

Coleman, G. (2012). Integrating student laptops into classrooms: A teacher-led PLC journey. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 73*(12), 3524971.

Abstract:
"This ethnographic study was conducted by a high-school teacher (participant-observer) who studied the cultural and pedagogical challenges that he and his colleagues encountered as they transitioned their classrooms from "paper and pencil" technology to those which integrated student laptops. The researcher facilitated a professional learning community (PLC) in order to support colleagues through their transition from notebook to netbook based classrooms. The PLC convened during five forty-five minute sessions scheduled throughout the 2009-10 school year at a 1,000-student, suburban high school. Data for the study were acquired through participation/observation within the PLC and through semi-structured interviews with eleven research participants who were members of the PLC, which took place over a two year period. Findings from the study revealed a need for teachers to discover not only how to use the technology--which in itself is crucial--but more importantly for educators to appreciate the power that the technology has to impact the culture within classrooms. A new paradigm is proposed here, Student Teacher Technology (STT), which intends to contribute to

Mishra and Koehler's (2006, 2010) scholarship on Technology Content Pedagogy Knowledge (TPACK). STT requires that educators ask not only, "How can digital technology contribute to students' learning?" as posed by Mishra and Koehler's (2006, 2010). More importantly, educators also need to ask, "With the integration of digital technology in the classroom, how can educators ensure the development of all aspects learning--from social, to emotional, to scholarly--for the whole child?""

Fleagle, C. L. (2012). Identifying faculty motivations to increase technology use in pedagogy at a midwestern university. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 73*(10), 3511387.

Abstract:
"The purpose of this qualitative study was to make meaning of the experiences of six faculty members at Midwestern University and how they make sense of the combined use of technology, pedagogy, and content within the classroom. One way this study expanded the available knowledge base and filled the gap in the literature was to provide a voice for the six faculty members. Through interviews and document analysis, meaning was connected for the six faculty members. The focus during data analysis was the phenomenon of the use of technology in pedagogy practices of the faculty members. Focusing on the phenomenon supported the process of making meaning of the combined experiences of the six faculty members interviewed.

　　　　Listening to the faculty members make meaning of how the benefits and barriers of using technology in the classroom drive their decision making about technology integration provided needed insight into the following themes that emerged; technology and pedagogy are inseparable, pedagogy and technology, benefits and barriers of using technology and support.

　　　　Suggestions for practice would be to have faculty meet with a learning technology specialist to determine individual technology needs of faculty using the TPACK Technology Tool first. Learning technology specialists then need to select faculty who are lone rangers to begin teaching technology-by-design projects in their classes so other faculty would see successful technology adoption across campus by their colleagues that could spread a diffusion of innovation."

Johnson, L. D. (2012). The effect of design teams on preservice teachers' technology integration. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(05), 3550513.

Abstract:
"This study examined the effect of a specific instructional approach called design teams on preservice teachers' attitudes toward technology, their technology skills, and their Technological Pedagogical Content Knowledge (TPACK). In a design teams approach, participants work in collaborative teams to design solutions to solve real-world problems. This quasi-experimental study explored the efficacy of an educational technology course implemented with a design teams approach compared to the same course that utilized a standard instructional approach. The sample included 53 preservice teachers from one university majoring in either Early Childhood Inclusive or

Elementary Inclusive Education. Preservice teachers in the treatment condition worked in design teams to plan technology integrated lessons to solve authentic instructional problems. In the comparison condition, preservice teachers completed instructor-designed assignments in class and planned a technology integrated lesson independently. In comparing the participating preservice teachers' attitudes toward technology, skills, and TPACK, it was found that there were significant differences between the two groups on TPACK when measured with evidence from lesson plans. There were no significant differences when survey data on attitudes toward technology, technology skills, and TPACK were compared; further exploration indicated that both groups significantly improved on these measures over the course of the semester. These results suggested that the design teams approach was appropriate for use in preservice teacher technology education, but additional research is necessary to determine in which contexts and with what specific learning outcomes it is most effective."

Lewis, D. H. (2012). Enhanced one-to-one technology integration through elementary teachers' technological, pedagogical, and content knowledge. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(05), 3547440.

Abstract:
"Although technology, pedagogy, and content are three separate knowledge domains, the interactions of these three domains comprise the technological, pedagogical, and content knowledge framework, thus representing the knowledge that teachers need to integrate technology effectively. The purpose of this qualitative case study was to identify the interactions of teachers' technological, pedagogical, and content knowledge for integrating one-to-one hand-held technology across content areas. Specifically, the researcher focused on teachers' technological pedagogical knowledge; technological content knowledge; and technological, pedagogical, and content knowledge. The researcher also addressed teachers' perceptions of barriers and supports for integrating one-to-one technology within the context of a technology-enhanced environment. Data were collected through interviews and observations from nine elementary classroom teachers. The school's technology resource teacher was interviewed, adding to the data collected from the classroom teachers. The conclusions reached by this study suggest that although teachers identified perceived barriers for integrating one-to-one technology, the technology resource teacher provided model lessons for integrating technology across content areas which provided support for teachers, thus enhancing teachers' technological, pedagogical, and content knowledge within a one-to-one technology-enhanced computing environment."

McGuire, M. S. (2012). Technology as a tool: Uses in differentiated curriculum and instruction for gifted learners. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(06), 3551714.

Abstract:

"This study was conducted to understand how teachers of gifted and talented students perceive their own knowledge of pedagogy, content, and technology based on the Technological Pedagogical Content Knowledge framework (TPACK). The study also asked teachers what technologies they would use in a differentiated curriculum and instructional lesson set and were accompanied by a set of rationale choices for teacher selection uncovering a relationship between teachers' self-perceptions of technology knowledge in content and pedagogy and technology selections within the differentiated lesson set.

A mixed methods approach was used to gather data through a quantitative and qualitative survey. Teachers reported moderate to high self-perceptions within the seven knowledge domains of the TPACK framework. Teachers rated themselves highest in pedagogy and content, yet the addition of technology to these domains lowered teachers' self-perceptions. Overall teachers favored five technology selections in the Differentiated Lesson Set: document camera, Internet, computer, interactive whiteboard, and PowerPoint. The most frequent rationale given for technology choices was the clarification of student understanding. The results of the study indicate a pronounced teacher-directed use of technology in contrast to self-perceptions of knowledge.

The study implies that although teachers of gifted learners are aware of many technologies, they select from a limited scope of choices. Lack of available technology in schools could have been a determinant in teacher decision-making. This reveals the need for teachers to understand how technology skills and standards are connected to principles of differentiation of curriculum and instruction for gifted learners. It is suggested that professional development for teachers of gifted learners include theory-based technology integration that is aligned with the needs of gifted learners and their technological strengths."

Mitchell, M. A. (2012). Professional development for teaching online. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 73*(11), 3514261.

Abstract:
"This study focused on a postsecondary organization in California, which has embarked on a groundbreaking, highly interactive online Master of Arts in Teaching Program. This program provides students with the flexibility and ability to not only share and interact with peers from across the nation but also work with a diverse group of instructors. As some of the faculty members of the institution transition to teaching online, this study assessed their impression of the professional development received and evaluated how the training has affected their self-efficacy to teach online."

Morris, N. (2012). *Learning and teaching with emerging technologies: Preservice pedagogy and classroom realities* (Doctoral dissertation). Retrieved from ProQuest Dissertation Database. (1023388332)

Abstract:

"This study was guided by the following research objectives: (1) investigating the relationship between the teacher education curriculum and field placements; (2) investigating how the technology experiences of teacher candidates in a teacher education program affect their experiences in a field placement experience; and (3) investigating situational, institutional, and/or dispositional variables that influence the integration of instructional technologies by teacher candidates in placements. Thirty-two teacher candidates in a consecutive teacher education program in Ontario completed questionnaires; additional interviews were conducted with four of these individuals. The data suggests that the participants in the required technology class were highly influenced by their faculty instructors' and mentor teachers' uses of technology, and the majority of the participants had very little experience with using technology for pedagogical and constructivist purposes. Technology integration in placements was ultimately dependent on the access and availability of resources, previous experience with available resources, technical support, and funding."

Patabedige, S. W. (2012). *Information communication technology in secondary science education in Sri Lanka*. (Doctoral thesis, Deakin University, Burwood, Australia). Retrieved from http://hdl.handle.net/10536/DRO/DU:30048468

Abstract:
"Sixty-eight pre-service teachers and eight NCOE (National College of Education) lecturers were selected from a cohort of science educators and pre-service teachers were introduced to the Technological, Pedagogical and Content Knowledge (TPACK) model with the objective of investigating the impact of the model as a tool to help pre-service teachers in the effective use of ICT in their teaching. As a part of this research an instrument was developed to measure changes in the technological skills, and the pedagogical and technological knowledge of the pre-service teachers over the period of the research. A small group of 15 pre-service teachers were followed closely as they applied the TPACK model in their teaching. Changes to the technological skills and pedagogical and technological knowledge of the 15 pre-service teachers were monitored.

This study aimed to enhance effective use of ICT in teaching science by pre-service teachers with the intention to promote deeper learning and supporting and enhancing secondary science teaching in Sri Lanka. Videos of the pre-service teachers, teaching with technologies, semi-structured interviews, questionnaires, and classroom observations were employed to collect data about the participants' understandings of the TPACK model and the ramifications of its use on their practice. The minority of the participants were able to implement the three core TPACK elements in their science teaching, though with considerable variability. The research highlighted methodological difficulties in employing ill-defined constructs such as TPACK, and recommends the use of normalization metrics (TPACK score) and a subjective "TPACK index" to facilitate top-level comparisons (TK+PK+ CK) of different instances of TPACK events, whilst recognizing the limitations of such metrics. Despite these limitations, the quantification of the TPACK model helped to identify the particular qualities of the teaching that was being measured. Secondary science pre-service teachers' technological skills varied, and were impacted by their access to and experience with technological resources. The

technological skills of the volunteer focus group were good compared to that of the whole cohort, which was as expected because the volunteers are interested and familiar with the technologies. In this research study, pre- service teachers have shown limited knowledge and experience of pedagogy. Pre-service science teachers' knowledge of technology is initially as based on their own personal experience. Most of the pre-service teachers used ICT in science lessons when they were in school. Pre-service teachers conducted science lessons using ICT with the TPACK model but their understanding in how to integrate the three knowledge domains was limited. This study has contributed to the understanding and implementation of the TPACK model through the development of a TPACK Scale, TPACK integration index, and the TPACK Rubric. These metrics provide descriptors of the thin and thick TPACK models that characterise variations within the model."

Spencer, D. (2012). *"Flipping" educational technology professional development for K-12 educators* (Doctoral dissertation). Retrieved from ProQuest Dissertation Database. (1039129029).

Abstract:
"As the demand for more effective professional development increases in K-12 schools, trainers must adjust their training methods to meet the needs of their teacher learners. Just as lecture-heavy, teacher-centered instruction only meet the learning needs of a small minority of students, "sit and get" professional development rarely results in the teachers gaining the skills and confidence necessary to use technology effectively in their instruction. To resolve the frustrations of teachers related to ineffective professional development, a "Flipped PD" training model was developed based on the learning needs of adult learners, the integration of technological, pedagogical, and content knowledge (TPACK), learning activities, and the Flipped Classroom concept. Under this model, training shifts from a passive, trainer-centered format, to an active, learner-centered format where teachers learn to use technology in their classrooms by first focusing on pedagogical issues, then choosing the options that work best for addressing those issues in their unique situation, and completing "learn-by-doing" projects. Those who participate in "Flipped PD" style trainings tend to have more confidence upon completion that they can use the tools they were trained on in their teaching, as well as believe that the PD was engaging and a good use of their time."

Varguez, R. (2012). Exploring teachers' technological pedagogical content knowledge (TPACK) in an online course: A mixed methods study. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(04), 3546817.

Abstract:
"The constant expansion of Web 2.0 applications available on the World Wide Web and expansion of technology resources has prompted the need to better prepare current and future educators to make more effective use of such resources in their classrooms.

The purpose of this embedded mixed methods case study was to describe the experiences and changes in technology, pedagogy, and content knowledge (TPACK) of a group of 14 American teachers of German as they participated in a one-semester

online course, designed to teach them about how to use and incorporate useful Web 2.0 technologies in their language classrooms. The quantitative portion of the study included results from an online survey where teachers were asked to rate themselves in relationship to their TPACK expertise at the beginning, the end, and year after the culmination of the course. An analysis of data conducted using a matched pairs statistical design showed that there were significant positive changes in most areas from the pre to the post test. A survey conducted a year later, showed that the positive changes tended to remain, and in some cases improve.

The qualitative portion of the study consisted of open-ended questions at the beginning, during, and the end of the course, a thorough analysis of the postings that participants submitted on the discussion board provided within the online course, as well as interviews with a sampling of participants. All interviews were conducted one year after completion of the course, and were transcribed, coded, and grouped into themes. Themes that emerged included the following topics: *Sense of Accomplishment, Leadership, Realization, Student-Centered Instruction,* and *Problem Solving.*"

Wyant, J. D. (2012). A mixed methods analysis of a single-course strategy to integrate technology into PETE. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 74*(02), 3530329.

Abstract:
"Background/Purpose: In recent years increased attention has been placed on physical education teachers' use of instructional technology. To date little research has been disseminated regarding the specific strategies physical education teacher education (PETE) programs are employing to prepare pre-service teacher's to use technology. The purpose of this study was to examine the impact of a domain-specific instructional technology course on advancing change in stages of concern and stages of adoption among pre-service teachers. **Methods:** A mixed methods process involving qualitative (i.e., weekly journal entries and post-course semi-structured interviews) and quantitative (i.e., pre and post course survey) data collection was employed. Participants included 12 undergraduate PETE candidates enrolled at a mid-Atlantic university. Data analysis involved descriptive statistics, inductive analysis, and mixing of qualitative and quantitative data to produce independent case profiles. Data reduction and cross-case synthesis were then used to identify within and across group themes. **Analysis/Results:** Four dominant themes emerged from participant data: (1) Increased Technological and Technological Pedagogical Knowledge; (2) Persistent First- and Second- Order Barriers to Technology Use; (3) Necessity of Experiential and Hands-on Learning; and (4) Variation in Warrant for Technology Use. The four themes included a total of nine sub-themes that illustrate the benefits and limitations of a single-course strategy in facilitating pre-service teacher use of instructional technology. Conclusions: Faced with the challenge of preparing PETE candidates to effectively integrate technology in their teaching, faculty need to implement a combination of strategies to advance technology perceptions and promote its meaningful application in physical education classrooms."

Young, J. R. (2012). Implications for integrating the interactive whiteboard and professional development to expand mathematics teachers' TPACK in an urban middle school. *Dissertation Abstracts International: Section A. Humanities and Social Sciences, 73*(3-A), 944.

Abstract:
"The Federal Government is dedicated to improving student achievement through technology. This dedication is most apparent in the area of federal spending. One explanation for the lack of results in student achievement is that teachers need appropriate training to effectively teach with technology. This study integrates the interactive whiteboard and professional development in order to develop middle school mathematics teachers' Technological Pedagogical Content knowledge (TPACK) in an urban school. Teacher TPACK is measured on a modified version of *Survey of Teacher Knowledge to Teach with Technology*. Student achievement is measured on the Texas Assessment of Knowledge and Skills (TAKS), a standardized mathematics assessment. Teachers in this study receive three weeks of professional development during their team planning periods to help them integrate the Interactive Whiteboard (IWB) into their mathematics instruction. Mean difference effect sizes are used to measure teacher gain in TPACK. Student achievement scores before and after the professional development are analyzed by Multi-way ANOVA after propensity scores are used to match participant students to a separate group of control students for comparison. The results indicate that the professional development increased teacher TPACK and that student achievement is differentiated across ethnicities. Implications for the technology professional development design and IWB integration in urban settings are provided."

5. Recent TPACK-Related Videos

Punya Mishra has edited, collected, and shared several TPACK-related keynotes that he and Matt Koehler have given in recent years. Videos of these talks are available in Punya's blog: punya.educ.msu.edu/research/tpck/tpack-videos/

Lisa Hervey recently uploaded a new video to YouTube (http://youtu.be/7z3aP_Chj6c) that explains how to play "The TPACK Game:" a game first developed in 2007 that helps teachers to explore the interrelationships among the different components of the TPACK construct in practical ways. There are multiple ways that teacher educators have developed to play this professional development game, so we thought it might be helpful to provide an overview here.

Here is Matt Koehler's description of the game:
"In the TPACK Game, you consider how Technology (T), Pedagogy (P), and Content (C) work together by randomly choosing two of the three (C,P, and T), and thinking deeply to find the third that makes them all work together in a pedagogically sound way to teach the content." (http://mkoehler.educ.msu.edu/tpack-101/the-tpack-game/) Matt is one of the co-creators of the game.
Here's a set of instructions for a different version of The TPACK Game:

http://nclti2012ciw.ncdpi.wikispaces.net/TPACK+Game
Here's a group playing this version of the game:
http://youtu.be/cq4LmgDEqnc
Here's Mark Hofer, Teresa Foulger, and Sarah McPherson's version of The TPACK Game, used in an ISTE 2012 conference workshop:
http://iste2012.wmwikis.net/TPACK+Game
Here's Karen Richardson's article about using The TPACK Game with different groups of teachers in different versions and ways:
http://minerclass.wikispaces.com/file/view/TPACK+Game.pdf and
http://leadinginnovation11t.wikispaces.com/file/view/TPACK+game+on.pdf
A brief history of The TPACK Game is included in Punya Mishra's blog here:
http://punya.educ.msu.edu/2010/08/13/tpack-game-the-matt-koehler-version/
And here are TPACK Game instructions in Dutch:
http://www.tpack.nl/uploads/8/0/0/1/8001167/tpack-nl_the_game.pdf

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This video includes Mark Hofer's discussion of the importance of TPACK and how it is used as a foundation of TEI Microsoft's Teacher Education Initiative (http://www.microsoft.com/education/ww/partners-in-learning/Pages/higher-education.aspx):
Svensk, P. (2012, December 4). Mark Hofer – TPACK – TEI DC [Video file]. Retrieved from http://www.youtube.com/watch?v=wsmwITFWmXA

6. Selected TPACK-Related Blog Entry

Cain, W. (2013, January 8). In TPACK, the song does not remain the same [Web log post]. Retrieved from http://ideaplay.org/in-tpack-the-song-does-not-remain-the-same/

7. Other TPACK Updates

Guest editors for the journal *Issues in Teacher Education* have published a call for papers for an upcoming theme issue entitled "STEM Education: Education Teachers for a New World." TPACK is listed as one of several requested topics for special issue articles. The manuscript deadline is March 30, 2013. For more information please see: http://www1.chapman.edu/ITE/public_html/ThemeIssues.html

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, February 28). TPACK newsletter issue #14: February 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 and contribute to 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 (that use three types of data) 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
Mark Hofer,   Co-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