

The Past, Present, and Most Importantly the Future of TPACK

(2-hour symposium)

Symposium Leaders:

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Abstract: The Technological Pedagogical Content Knowledge (TPACK) framework has been instrumental in guiding educators and researchers in the effective integration of technology into teaching. As approach the release of the 3rd Edition of the TPACK Handbook, it is imperative to reflect on the journey of TPACK, its derivatives, and its future trajectory. This symposium seeks to bring together a diverse group of authors who have delved deep into various facets of TPACK, from its historical evolution to its application in contemporary educational settings.

The collective works to be presented underscore the significance of TPACK in the rapidly changing educational landscape, influenced by technological advancements such as artificial intelligence, the unique challenges of early childhood education, and the global contexts of teaching. By examining the historical accretion of TPACK, its influence on pedagogical knowledge in the AI era, its reconceptualization for early childhood, its contextual applications in diverse global settings, and its role in faculty and K12 teacher development, this symposium promises a comprehensive exploration of TPACK's multifaceted impact.

We believe that this symposium will offer invaluable insights to educators, researchers, and policymakers attending SITE2024, fostering a deeper understanding of TPACK's role in shaping future educational practices.

We look forward to the opportunity to share these collective works with the SITE2024 community.

First Hour: 10:15 AM – 11:15 AM

Historical Evolution and Broadening Horizons of TPACK

1. Examining TP(A)CK's Accretion: A Brief History of its Derivatives

- Presenter: Judi Harris, William & Mary School of Education
- *Abstract:* More than 100 different derivatives and reinterpretations of TP(A)CK have been published since the earliest explanations of the framework appeared between 2001 and 2006. This accretion appears to be a fundamental mechanism in some educational scholarship. TP(A)CK's derivatives have appended, operationalized, and redefined the framework's components over time. Analysis of the 100+ TP(A)CK derivatives published to date has yielded five types of changes that have been advocated. Each of these five types of adaptations will be explained in this presentation.

2. An Exploration of Methods for Developing K12 Teachers' TPACK

- Presenters: Daniel Murlam, University of South Dakota; Yi Jin, Kennesaw State University; Teresa Foulger, Arizona State University; Liz Ebersole, Seattle Pacific University; Jon Clausen, Ball State University
- *Abstract:* The TPACK framework is a crucial concept in education. This presentation delves into concerns about the alignment of K-12 professional development models with TPACK constructs, offering a comprehensive review and exploration of professional development models for technology integration among in-service teachers.

3. **TPACK in Early Childhood: Elevating Developmental Specificity, Affective and Contextual Knowledge**
 - Presenters: Ilene R. Berson and Michael J. Berson, University of South Florida
 - *Abstract:* The TPACK framework requires reconceptualization for Early Childhood Education. This presentation centers on refining TPACK to resonate more deeply with ECE's intrinsic priorities. We address the critical need for a heightened focus on the affective and relational aspects, emphasizing the vital role of emotional and social connections in young learners' experiences.
4. **Implications of the TPACK Framework for Developing Computationally Literate Preservice Teachers**
 - Presenters: Chrystalla Mouza, University of Illinois Urbana-Champaign and Michael Karlin, California State University Dominguez Hills
 - *Abstract:* The purpose of this presentation is to discuss the implications of the TPACK framework for developing computationally literate preservice teachers with the knowledge and skills needed to integrate computer science with disciplinary content and pedagogy. We will characterize the demands on preservice teachers' knowledge for using emerging technologies required to support CS integration in K-12 curricula, discuss promising instructional strategies that help preservice teachers acquire knowledge and skills required for CS integration, and provide directions for future research and implications of this work for teacher education.

Second Hour: 11:30 AM – 12:30 PM

TPACK in the Era of Artificial Intelligence and Global Contexts

1. **Influence of AI on Pedagogical Knowledge**
 - Presenter: Mia Kim Williams, University of Wyoming
 - *Abstract:* With the rise of artificial intelligence (AI), research applying the TPACK framework highlights the dynamic nature of teacher knowledge transformation in an era of technology integration. This presentation explores teachers' development of pedagogical knowledge when integrating AI-powered tools.
2. **Applying TPACK Principles to Design Learning Modules for Faculty AI Literacy**
 - Presenters: Jeremy Dickerson, University of North Carolina, Wilmington and Todd Cherner, University of North Carolina, Chapel Hill
 - *Abstract:* Over the past year, the use of AI technologies by students has impacted higher education. This session will include reflections on the implementation of TPACK principles as they relate to the design and development of new learning modules on artificial intelligence literacy for university faculty.
3. **TPACK's Contextual Knowledge: Exploring EFL Teachers' Technological Pedagogical Practices in Iran, Libya, Syria, Tunisia, and Yemen**
 - Presenters: Ali Garib, Iowa State University & Rice University and Denise Crawford, Iowa State University
 - *Abstract:* Instructional contexts can impact teachers' practices. This chapter examines EFL teachers' selected technologies for implementing Technology-Assisted Project-Based Language Learning in various countries, providing an overview of the teachers' technological pedagogical contextual knowledge guided by TPACK's XK framework.

4. **Implementing Technological Pedagogical Content Knowledge Amid Uncertain Conditions: Advancements in Comprehending Contextual Factors**

- Presenter: Charoula Angeli, University of Cyprus
- *Abstract:* Amidst the global transition to remote learning prompted by the COVID-19 pandemic, this paper delves into the enriched understanding of contextual factors that influence the enactment of TPACK. This research has profound implications for future preparedness, emphasizing the need for flexible TPACK frameworks that account for contextual variability.

Presentation Abstracts:

Examining TP(A)CK's Accretion: A Brief History of its Derivatives

Judi Harris, William & Mary School of Education

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More than 100 different derivatives and reinterpretations of TP(A)CK have been published since the earliest explanations of the framework appeared between 2001 and 2006. This accretion—which in nature is a process by which matter grows and changes over time—appears to be a similarly fundamental mechanism in some educational scholarship. TP(A)CK's derivatives have appended, operationalized and redefined the framework's components over time, increasing its depth, breadth and specific applicability.

Analysis of the 100+ TP(A)CK derivatives published to date has yielded five types of changes that have been advocated: those that add, operationalize, redefine, respecify, and/or retheorize part(s) or all of the original framework (TPCK or TPACK). Each of these five types of adaptations, along with the approximate sequence of their emergence, will be explained, exemplified and interpreted in the proposed presentation. Categorized and annotated information for the complete collection of TP(A)CK derivatives is available online at <https://tinyurl.com/SITE2024TPACKDerivatives>.

An Exploration of Methods for Developing K12 Teachers' TPACK

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The Technological Pedagogical Content Knowledge (TPACK) framework is a crucial concept in education, representing the knowledge teachers require to effectively incorporate technology into their subject-specific teaching. Since its emergence in the early 2000s, researchers have extensively analyzed, expanded, adapted, and applied the TPACK framework in their scholarly work. A Google Scholar search conducted in August 2023 identified approximately 55,800 publications referencing TPACK in just over two decades. This substantial scholarly output underscores the framework's significance in teacher education. However, questions arise concerning the alignment of K-12 professional development models with TPACK constructs, as well as the impact on teachers' TPACK development and instructional practices when TPACK is not intentionally integrated into these models. This presentation delves into these concerns, offering a comprehensive review and exploration of professional development models for technology integration among in-service teachers, shedding light on the importance of TPACK in contemporary educational practices.

**TPACK in Early Childhood:
Elevating Developmental Specificity, Affective and ConteXtual Knowledge**

Ilene R. Berson and Michael J. Berson, University of South Florida
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The TPACK framework, instrumental in guiding technology integration in teaching, requires reconceptualization for the unique context of Early Childhood Education (ECE). This presentation centers on refining TPACK to resonate more deeply with ECE's intrinsic priorities. We address the critical need for a heightened focus on the affective and relational aspects, emphasizing the vital role of emotional and social connections in young learners' experiences. Drawing upon digital play pedagogies, we will explore how technology can be integrated to foster inquiry-based learning, ignite creativity, and invoke wonder. The discourse on 'deschoolification' leads us to reconsider content knowledge, highlighting the necessity of play-centric pedagogies over rigid curricular structures. Further, the presentation underscores the significance of ConteXtual Knowledge (XK) in ECE, promoting instruction that recognizes the diverse backgrounds of young learners and encourages family-engaged practices. Together, these adaptations offer a more comprehensive TPACK for the early childhood landscape.

**Implications of the TPACK Framework
for Developing Computationally Literate Preservice Teachers**

Chrystalla Mouza, University of Illinois Urbana-Champaign
Michael Karlin, California State University Dominguez Hills
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The purpose of this presentation is to discuss the implications of the TPACK framework for developing computationally literate preservice teachers with the knowledge and skills needed to integrate computer science with disciplinary content and pedagogy. We will first characterize the demands on preservice teachers' knowledge for using emerging technologies required to support CS integration in K-12 curricula. Subsequently, we will discuss promising instructional strategies that help preservice teachers acquire knowledge and skills required for CS integration including stand-alone educational technology courses, computationally integrated methods courses, computer science modules, etc. We will end with directions for future research and implications for teacher education.

Influence of AI on Pedagogical Knowledge

Mia Kim Williams, University of Wyoming
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With the rise of artificial intelligence (AI) and the unknown possibilities surrounding its evolution, contrasting reactions from educators promoted different implementation of opportunities and constraints concerning the technology. However, research applying the TPACK framework highlights the dynamic nature of teacher knowledge transformation in an era of technology integration across classrooms, grade levels, and contexts. A university sponsored project explores teachers' development of pedagogical knowledge when teachers experiment with emergent technologies and integrate them creatively to promote deep learning. Examples from K12 and Higher Education illustrate some of the experiences of those aspiring to integrate AI-powered tools and the impact it has on pedagogical practices. Alternately, constraints surrounding AI-powered tools and immerging policies are considered in the conversation. Highlights and lessons learned from teachers will be shared and session participants will be encouraged to discuss how emergent technology integration in learning contexts does or does not influence the P in TPACK.

Applying TPACK Principles to Design Learning Modules for Faculty AI Literacy.

Jeremy Dickerson, University of North Carolina, Wilmington

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Over the past year, the use of artificial intelligence (AI) technologies by students has profoundly impacted higher education. Faculty have been forced to consider how AI tools affect their instruction in ways (and at a pace) many never imagined possible. The range of AI experience and knowledge of faculty ranges from novice to expert. This variance has reverberated in the courses they teach, as well as the instructional and technological support they need to navigate this challenge. This session will include information and reflections on the implementation of TPACK principles as they relate to the design and development of new learning modules on artificial intelligence literacy for university faculty. Specifically, how the TPACK framework was intentionally used to guide the questions which drove the project, as well as the learning artifacts which were created by a team of instructional designers and technologists.

TPACK's Contextual Knowledge: Exploring EFL Teachers' Technological Pedagogical Practices in Iran, Libya, Syria, Tunisia, and Yemen

Ali Garib, Iowa State University & Rice University

Denise Schmidt-Crawford, Iowa State University

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Instructional contexts can impact teachers' practices, shaping their decisions using certain technologies or enforcing specific classroom activities. Exploring the influence of instructional contexts on teachers' technological pedagogical choices accentuates teachers' constraints integrating technology in their classrooms. This chapter examines EFL teachers' selected technologies for implementing Technology-Assisted Project-Based Language Learning in Iran, Libya, Syria, Tunisia, and Yemen, providing an overview of the teachers' technological pedagogical contextual knowledge guided by TPACK's XK framework. Using questionnaires, classroom observations, and interviews, this study uncovers unique practices of technology integration influenced by the teachers' contexts. The findings highlight the contribution of TPACK's XK in understanding teachers' technology integration, specifically using artificial intelligence. These findings underscore how XK operates as a foundational framework for comprehending the interplay between AI technologies, pedagogical practices, and the unique contextual factors that influence their integration. The chapter concludes with TPACK's importance in the AI era and proposes a framework extension.

Implementing Technological Pedagogical Content Knowledge Amid Uncertain Conditions: Advancements in Comprehending Contextual Factors

Charoula Angeli, University of Cyprus

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Amidst the global transition to remote learning prompted by the unprecedented COVID-19 pandemic, this paper delves into the enriched understanding of contextual factors that profoundly influence the enactment of Technological Pedagogical Content Knowledge (TPACK). Drawing insights from 30 school teachers, this study reveals the pivotal role of context in integrating technology, pedagogy, and content. The study utilizes a comprehensive data collection approach, encompassing semi-structured interviews, virtual lesson observations, and reviews of instructional materials and policies. Key findings highlight the multifaceted nature of contextual factors such as: (a) Technological Context, (b) Pedagogical Adaptation, (c) Contextual Content Delivery, (d) Socio-Economic and Political Influences, (e) Institutional Dynamics, and (f) Emotional and Psychological Aspects. This research has profound implications for future preparedness, emphasizing the need for flexible TPACK frameworks that account for contextual variability and promote equitable practices. As we navigate the evolving educational landscape, a nuanced appreciation of these contextual factors becomes essential for the holistic evolution of the TPACK framework in diverse global settings, fostering resilient and adaptable education systems.