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Technology in Education

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### **Annotated Bibliography**

Baran, E., Chuang, H., & Thompson, A. (2011). TPACK: An emerging research and development tool for teacher educators. *Turkish Online Journal of Educational Technology - TOJET*, 10(4), 370-377.

Baran, Chuang, and Thompson, professors, primarily focus on the “second generation”, which pushes more research about the TPACK theory and developing TPACK within educational preparation. This article is written for researchers and faculty members developing teacher education programs. When considering teacher development, Baran et al. advocate that technology needs to be implemented while aligning with the curriculum and strategies. The authors also believe that modeling is pertinent in teacher’s preparation and training with technology. According to research, if a teacher has technology modeled, then the teacher is able to adapt and implement the technology with the curriculum and students later. For example, a teacher adapted PowerPoint from summarization to visual aid to help kindergarten students. The authors highlight “activity-type approach”, another TPACK research-based implementation. Authors also state that more research and development is needed to help assess the teacher’s use of TPACK.

Graham, C. R. (2011). Theoretical considerations for understanding technological pedagogical content knowledge (TPACK). *Computers & Education*, 57(3), 1953-1960. doi: 10.1016/j.compedu.2011.04.010

Graham, an Associate Dean at Brigham Young University's School of Education, believes that the framework, boundaries, and definitions for the elements in TPACK are not well defined. For example, there are 89 TPACK definitions that varied in the reviewed literature. With these unclear and differing definitions, Graham believes researchers will have a hard time measuring a teacher's TPACK success rate. The other issue raised by Graham for researchers was the definition of technology. There are two different types of technology: "transparent" and "emergent". With "transparent" technology, a pencil and book are considered technology; however, "emergent" is digital technologies, such as iPad, Smartboard, etc. Then Graham emphasizes that TPACK might only be considered the assimilation of a technology within a classroom, but most technology is already common in a class and no longer considered technology.

Harris, J. B., & Hofer, M. J. (2011). Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers' curriculum-based, technology-related instructional planning. *Journal of Research on Technology in Education*, 43(3), 211-229.

Harris and Hofer, professors at the College of William and Mary, conducted a study to understand the correlation between instructional planning and TPACK for high school social science teachers. Harris and Hofer suggest culture, socioeconomic status, school organization, and other issues influence TPACK. The study revealed that curriculum, students, time, and resources determine instructional planning. "More authentic assessment" was allowed because of technology use. Students and their learning needs and teaching styles provide flexibility when choosing digital technological options. Harris and Hofer also support the notion that technological activities will vary within different disciplines.

Kereluik, K., Mishra, P., & Koehler, M. J. (2011). On learning to subvert signs: Literacy, technology and the TPACK framework. *California Reader*, 44(2), 12-18.

Kereluik, a graduate student at Michigan State University (M.S.U.), and Mishra and Koehler, professors at M.S.U., wrote this article. This article is written for teachers wanting to integrate technology and gives the teacher practical guidelines to implement technology. Kereluik et al. provides the history of TPACK and its components. These authors emphasize that a lot of technology is not designed with education in mind, so teachers must learn to be creative, use discretion, and re-design the technology to aid the learning process. For example, a teacher could use a blog for students to interact with vocabulary words by using visuals and poems. This effective use of technology allows students of all ages to communicate the vocabulary word into a deeper understanding. In addition, this article emphasizes that technology is always changing, so understanding all of technology is impossible. Therefore, teachers must be literate in technology. In application, the teacher must explore the best technological options that will translate the academic concepts into deeper comprehension for the student.

Linton, J. N. (2012). TPACK as a framework for collaborative inquiry in the learning commons. *Teacher Librarian*, 39(6), 25-29.

Linton, director of teacher education at Lenoir-Rhyne University, emphasizes that libraries need to change in this technology-saturated society. The individuals to read this article would be educators and librarians. Due to the technological shift, libraries need to become "learning commons". Linton proposes that teachers, instructional staff, and librarians should collaborate to enrich the learning process. Schools and administrators should also modify the traditional layout and mindset of a library to an

open discussion area for teachers and librarians to engage students. Linton believes the origin of TPACK originates with the content knowledge possessed by the teacher.

McGrath, J., Karabas, G., & Willis, J. (2011). From TPACK concept to TPACK practice: An analysis of the suitability and usefulness of the concept as a guide in the real world of teacher development. *International Journal of Technology in Teaching & Learning*, 7(1), 1-23.

This article centered on the study of the TPACK application of high school teachers in science and mathematics. Karabas, Director of Grants and Funded Program, and McGrath, Director of Technology at Mt. Vernon City School District collaborated with Willis, faculty member at St. John Fisher College. The audience for this article is researchers. The history and components of TPACK are explained and applied throughout the study and its results. McGrath et al. differentiate between traditional and digital technology. The authors also propose TPACK should not be the sole framework used in teacher development, and the implementation of TPACK will vary for the different pedagogies and academic content areas.

Niess, M. L. (2011). Investigating TPACK: Knowledge growth in teaching with technology. *Journal of Educational Computing Research*, 44(3), 299-317. doi: 10.2190/EC.44.3.c

This article by Dr. Margaret L. Niess, a professor at Oregon State University, is written for designers of teacher educator programs and researchers. Niess believes many teachers are not prepared to interact with technology and lack the technological knowledge, so teachers need workshops to understand the specific technology's benefits and negatives and how the technology enriches the curriculum and learning process. The article also emphasizes the importance of developing an evaluation, which

incorporates self-assessment, for a teacher's understanding and implementation of TPACK in a classroom. Niess stresses the importance and value of teaching experience to develop better discernment for technological uses. As evidence, Niess shared a study of social studies high school teachers who were able to plan the curriculum by adding the technology in the most suitable spots for educational purposes.

Wetzel, K., & Marshall, S. (2012). TPACK goes to sixth grade: Lessons from a middle school teacher in a high-technology-access classroom. *Journal of Digital Learning in Teacher Education*, 28(2), 73-81.

Wetzel, an Arizona State University professor, conducted a qualitative study of TPACK within a middle school language arts classroom. Wetzel's audience is researchers and educators. This article focuses on the importance of student-driven technology with student exploration, while the teacher is flexible and familiar with technological options. Wetzel also emphasizes the importance of an experienced teacher integrating technology better due to good classroom management. In application, an experienced teacher accounts for technology and its uses within the classroom management. Wetzel also points out that teachers being evaluated for TPACK use should not use self-assessment.