

## Chapter 53

# Engaging a Workbench Dialectic Inquiry Model in an Online Master's Degree Program: TPACK Development Through Communities of Inquiry

**Henry Gillow-Wiles**

*Southern Oregon University, USA*

**Margaret L. Niess**

 <https://orcid.org/0000-0002-1673-0978>

*Oregon State University, USA*

### **ABSTRACT**

*This cross-case descriptive study suggests a model for designing online courses that supports TPACK development through communities of inquiry. Borrowing from the world of science research literature, a workbench dialectic inquiry model was engaged in designing a small group-large group dynamic. Mimicking scientists at the workbench, the participants formed relationships in small groups to develop ideas about TPACK, presented their ideas to the larger, whole-class group, then returned to the small groups to integrate feedback. This dynamic group interaction structure provided the participants with the space to develop their TPACK thinking in ways that supported the transition to cognitive discourse. Analysis of the forum postings revealed the complexity of the participant interaction and suggested that facilitating student community engagement supported the development of their TPACK. Course design details are provided. Further research directions might include applying the workbench dialectic inquiry model in other educational contexts and with larger student populations.*

DOI: 10.4018/978-1-6684-7540-9.ch053

## **INTRODUCTION**

The nature of an online environment creates limitations to the interactions students depend on to navigate the tasks associated with learning. Critiques of online education often focus on issues of reduced student satisfaction, perceived isolation, and inability to form the supporting relationships often found in face-to-face learning experiences (Jaggars, 2014; Valenzuela, Fisher, Whale, & Adapa, 2013). Literature provides insight into the development of a variety of pedagogies and strategies where community building is facilitated through leveraging different technologies. Real-time, interactive technologies such as instant messaging applications and streaming video applications have been utilized to provide a semblance of immediacy, where students are able to form relationships and collaborate in learning communities (Kim, Glassman, Meredith, & Morris, 2015). Other research has investigated how text-based, asynchronous technologies, such as forums, can provide an environment where students are able to form communities of inquiry where they might engage in meaningful discussions and build their knowledge (Kovanović, Gašević, Joksimović, Hatala, & Adesope, 2015; Niess & Gillow-Wiles, 2013).

Regardless of the technologies used, one recurring theme throughout the literature is the need for instructors to be proactive in how they facilitate the formation and development of online learning communities (Akyol & Garrison, 2008; Cho, 2011; Garrison & Akyol, 2013; Garrison, Anderson, & Archer, 2001; Hew, 2015; Niess & Gillow-Wiles, 2013; Rubin, Fernandes, & Avgerinou, 2012; Swan & Shih, 2005; Tucker, Willis, Blocher, & de Montes, 2002). Leaving students to fend for themselves in forming relationships often results in a continuation of students' perceptions of isolation and lack of connections with other students and the instructor (Phirangee, Epp, & Hewitt, 2016; Jackson, Jones, & Rodriguez, 2010).

Targeted, structured course design is essential for students to transcend the sparse online learning environment and realize the strengths and opportunities available in a digitally mediated context (Costley, 2016). Purposeful course design providing students with opportunities to engage with other students and the instructor in creating their knowledge gives students a sense of place and belonging that increases their satisfaction and their success (McDaniels, Pfund, & Barnicle, 2016). One potentially useful model for designing courses that support student engagement is the dialectical model of inquiry found in the science community, referred to as a 'workbench model'. This model suggests potential insights for online course structures and activities supporting students in both the creation of communities of inquiry and in the creation of an individual and shared knowledge. These communities of inquiry might also provide the motivation, communication, and structure necessary to sustain individual inquiry (Magnusson, Palincsar, & Templin, 2004).

The weaknesses and drawbacks of situating learning in an online environment create a need for a supported, instructor-created learning trajectory where social presence is established to facilitate cognitive presence (Chiu, Hsu, & Wang, 2006). The structure provided by the workbench dialectic model potentially provides a framework for students to engage in the kind of organic interactions that develop social presence while serving as a pathway to transition social conversations into cognitive discourse.

One student population currently needing access to online learning is for teachers to extend their learning beyond their pre-service teacher preparation programs. The explosion of digital technologies as educational tools requires that teachers implement pedagogical strategies in vastly different ways than how they learned their content. These new instructional tasks call for a teacher knowledge more advanced than simply understanding the subject matter content. It calls for teachers who have a knowledge that integrates their content with new pedagogies and new technologies (Koehler & Mishra, 2006). This

21 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/engaging-a-workbench-dialectic-inquiry-model-in-an-online-masters-degree-program/312770](http://www.igi-global.com/chapter/engaging-a-workbench-dialectic-inquiry-model-in-an-online-masters-degree-program/312770)

## Related Content

---

### A Framework for Distance Education Effectiveness: An Illustration Using a Business Statistics Course

Murali Shanker and Michael Y. Hu (2008). *Handbook of Distance Learning for Real-Time and Asynchronous Information Technology Education* (pp. 99-113).

[www.irma-international.org/chapter/framework-distance-education-effectiveness/19401](http://www.irma-international.org/chapter/framework-distance-education-effectiveness/19401)

### Innovation of the Teaching Mode of History Courses in Colleges and Universities Based on Digital Technology

Dianfeng Li and Hongchang Jing (2023). *International Journal of Web-Based Learning and Teaching Technologies* (pp. 1-12).

[www.irma-international.org/article/innovation-of-the-teaching-mode-of-history-courses-in-colleges-and-universities-based-on-digital-technology/320246](http://www.irma-international.org/article/innovation-of-the-teaching-mode-of-history-courses-in-colleges-and-universities-based-on-digital-technology/320246)

### WeBCEIS - A Scenario for Integrating Web-Based Education into Classical Education

Muge Klein, Daniel Sommer and Wolfried Stucky (2003). *Web-Based Education: Learning from Experience* (pp. 398-414).

[www.irma-international.org/chapter/webceis-scenario-integrating-web-based/31313](http://www.irma-international.org/chapter/webceis-scenario-integrating-web-based/31313)

### Developing and Supporting Mathematics Teacher Educators Through Virtual Collaborations

Dittika Gupta, Mark S. Montgomery, Colleen M. Eddy, Crystal Anne Kalinec-Craig, Karisma Morton, Keely Hulme and Fardowsa Mahdi (2021). *Shifting to Online Learning Through Faculty Collaborative Support* (pp. 279-293).

[www.irma-international.org/chapter/developing-and-supporting-mathematics-teacher-educators-through-virtual-collaborations/279946](http://www.irma-international.org/chapter/developing-and-supporting-mathematics-teacher-educators-through-virtual-collaborations/279946)

### Computer-Supported Collaborative Work and Learning: A Meta-Analytic Examination of Key Moderators in Experimental GSS Research

John Lim, Yin Ping Yang and Yingqin Zhong (2007). *International Journal of Web-Based Learning and Teaching Technologies* (pp. 40-71).

[www.irma-international.org/article/computer-supported-collaborative-work-learning/2993](http://www.irma-international.org/article/computer-supported-collaborative-work-learning/2993)