

Public Abstract

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Title:A Study of Teacher Knowledge as Secondary Mathematics Teachers Use a New Technology

Professional organizations (e.g., NCTM and NCSM) and educational leaders advocate for increased use of technology in high school mathematics. Educational researchers find that teachers' beliefs and knowledge influence use of technology and student learning (e.g., Hall & Hord, 1987, 1991; Mitchell, Bailey, & Monroe, 2007; Niess, 2005; Zbiek, Heid, Blume, & Dick, 2007; Zbiek & Hollebrands, 2008). Yet, we lack research examining what knowledge teachers need to effectively use specific technologies or how teachers enact this knowledge. Additionally, the conceptualization of teacher knowledge related to using technology in mathematics is at the early stages. Thus, the purpose of this qualitative case study was to investigate and analyze what knowledge secondary teachers draw upon as they enact a new technology (i.e., the TI-nspire calculator) in mathematics classrooms. Analysis of the data revealed: (1) Teaching with and reflecting on the use of the TI-nspire helps teachers to develop PCK with the TI-nspire. (2) Teachers may develop specific components of their pedagogical content knowledge with technology before others, and (3) teachers consider the TI-nspire a "discovery-based" mathematics learning tool and believe students investigate and learn mathematics on the handhelds when they structure learning environments to support the nature of this type of instruction. The research findings can inform the design and implementation of teacher preparation and professional development programs and ultimately improve the teaching and learning of mathematics.