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Investigation of PeerWise Technology Implementation to Promote Pedagogical Content Knowledge of Physics Teacher-Candidates: From Theory to Practice

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Questioning is a key physics teaching skill. It relies on teachers' Pedagogical Content Knowledge (PCK) (Shulman, 1986) and willingness to engage students in inquiry. A number of technology-enhanced pedagogies that promote conceptual science questions' use have been developed lately (Keller et al., 2007). One of the most common is Peer Instruction (Lasry, 2008; Mazur, 1997; Milner-Bolotin, 2004). It engages students in responding to conceptual multiple-choice questions using clickers, such as the distribution of students' responses can be immediately displayed. Then the students are engaged in peer discussions, followed by the repeated vote on the same question (Kalman, Milner-Bolotin, & Antimirova, 2010). The success of this pedagogy depends on the use of pedagogically effective questions that elicit student conceptual difficulties (Beatty et al., 2008; Lee, Ding, Reay, & Bao, 2011). This study aims to investigate the development of conceptual question design skills in physics Teacher-Candidates and the impact of this process on teacher-candidates' PCK through the implementation of PeerWise collaborative design tool (Bates & Calloway, 2013; Denny, Luxton-Reilly, & Simon, 2009; Milner-Bolotin, 2014) during the 13-week long Physics Methods course.

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