Chapter 21

Target Inquiry: A Case for Quality Professional Development

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ABSTRACT

Researchers have identified several features of effective teacher professional development. Yet, there is little research on long-term Professional Development (PD) programs that provides information on the impact of such programs on in-service teacher experiences and practice during long-term PD. A qualitative case-study approach was used to investigate the impact of the Target Inquiry (TI), a long-term PD program, on change in teacher practice and the factors that support or impede these changes. The TI program is for science teachers who wish to earn a Master of Education focused on advanced content or to complete a 15-credit certificate program. Bell & Gilbert's model of teacher development and Spillane's model of teacher enactment of reforms were used as frameworks to examine change. Teachers reported that participating in long-term PD, when combined with the necessary tools, resources, and strategies empowered them to embrace an inquiry-based practice.

INTRODUCTION

Effective science instruction requires a robust understanding of scientific process (Achieve, 2013; NRC, 1996). This can be achieved by providing opportunities for students to learn science like scientists would by focusing on science skills that enable students to develop a deep appreciation for scientific theories, models, and explanations of natural phenomena (Chinn & Malhotra, 2002). The traditional nature of most teacher education programs fails to help teachers develop such an appreciation and understanding.
of science (Hodson, 1992), thereby resulting in a lack of student-centered, inquiry-based instructional practices in science classrooms across the country (Smith, 2013). One way to address this is by engaging teachers in a high quality, long-term professional development (PD) program.

Producing sustained change in teacher practice is a challenge, particularly with respect to inquiry-based instruction, as scientific inquiry is multi-faceted, and there is no single approach to inquiry-based instruction (Yezierski & Herrington, 2013). Furthermore, in-service teachers who did not experience inquiry-based instruction during their academic and teaching preparation, and thus have a limited understanding of inquiry-based teaching methods, are resistant to changing their practice (Wallce, & Kang, 2004; Yerrick, Parke & Nugent, 1997). This challenge cannot be effectively addressed by typical short-term PD experiences, as they often lack cohesion and continuity, focus on prescriptive teaching methods, and fail to provide adequate support for teachers (Lustick, 2011). This type of sustained instructional reform necessitates coherent, long-term PD aimed at changing teachers’ understanding and beliefs about teaching and learning in alignment with current research-based instructional reforms, and supporting teachers in developing their understanding and implementation of constructivist, student-centered, inquiry-based practice (Capps & Crawford, 2013; Dori & Herscovitz, 2005; Pitsoe & Maila, 2012; Postholm, 2012; Sarquis, 2001). Critical features of such PD include: (a) adequate time for teacher learning; (b) support beyond PD; (c) opportunities for teachers to participate in authentic inquiry-based experiences during PD; (d) chances to develop and implement standards based curriculum and materials; (e) time to reflect on one’s practice; and (f) emphasis on advancing teacher content knowledge (Freeman, Marx, & Cimellaro, 2004; Nasser & Shabti, 2013).

Despite a large body of research identifying the critical features of effective PD models, there is a gap in the literature concerning how specific long-term PD models impact change in teacher practice. There is a need for more evidence-based research in this area, specifically for long-term PD models, regarding how such models support the current reforms in science teacher education (Desimone, Porter, Garet, Yoon & Birman, 2003; Smith, Hofner, Gillespie, Solomon & Rowe, 2003; Van Driel, Beijaard, & Verloop, 2001). Our study addresses this gap by examining how teachers’ instructional practice and their ideas about teaching and learning changed over the course of a coherent, long-term, inquiry-focused PD program, and by identifying elements, both within and external to the program, that supported or inhibited such changes. The research from this study can be replicated in other teacher preparation programs at undergraduate or graduate levels as a way to reinforce inquiry-based PD and learning. The research questions that guided this study are:

1. How does the classroom practice of teachers change as they progress through the Target Inquiry (TI) program?
2. What factors support or impede change in teacher practice?

BACKGROUND

Researchers who have focused on teacher PD have either highlighted the benefits of engaging teachers in long-term, coherent PD or have recommended that teachers participate in a long-term, inquiry-centered PD to reform their classroom practice (Diaconu, Radigan, Milijana, & Nichol, 2011). Long-term PD can be effective in enhancing teacher subject-matter knowledge in science as well as transforming teacher beliefs and understanding of inquiry (Kennedy, 1998; Hawley & Vali, 1999; Marshall, 2008; Sarquis &