Teaching and Teacher Education 26 (2010) 1598–1608

Contents lists available at ScienceDirect

Teaching and Teacher Education

journal homepage: www.elsevier.com/locate/tate

The effects of sustained classroom-embedded teacher professional learning on teacher efficacy and related student achievement

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ARTICLE INFO

Article history:
Received 27 January 2010
Received in revised form
19 April 2010
Accepted 4 June 2010

Keywords:
Professional learning
Teacher efficacy
Mathematics achievement

ABSTRACT

This paper reports on the impact of a classroom-embedded professional learning (PL) program for mathematics teaching in two contrasting districts in Canada, and investigates the relationship between teacher efficacy and student achievement. Before the PL, District A had lower teacher efficacy and student achievement than District B, but after the PL, this situation was reversed. Qualitative analysis revealed that the two districts reported learning very different things from the PL opportunity. The complexities of context, prior learning experiences, goal setting, and persistence of participants all factored into what and how teachers learned.

1. Background

A large-scale professional learning program launched by the Ontario Ministry of Education in Canada aimed to strengthen school district capacity to enhance mathematics teaching and learning in Kindergarten to Grade 6 (ages 4–12). Key elements of the initiative included classroom-embedded mathematics professional learning, facilitation of school and district level professional learning networks, and peer coaching.

The professional learning model involved two facilitators working with groups of classroom teachers, and a vertical slice of support staff in 15 district school boards (12 English and 3 French language) in the province of Ontario, Canada. The professional learning model focused on: a) mathematics communication in the classroom; b) teaching and learning mathematics through problem solving using a 3-part lesson format (a lesson format that has three parts: an activation/minds-on segment; a development/middle segment that is problem based; and a consolidation/end segment); c) co-teaching of problem-solving lessons in classrooms; and d) collaborative analysis of student work samples. The facilitators participated in co-teaching with the participants and in classroom observations of planned lessons. The emphasis on quality mathematics teaching through standards-based mathematics teaching and learning strategies and content (see Principles and Standards for School Mathematics, National Council of Teachers of Mathematics (NCTM), 2000) were of key import. In alignment with Fenstermacher and Richardson (2005), the professional learning model emphasized "quality teaching":

> Quality teaching, we argue here, consists of both good and successful teaching.
> By good teaching we mean that the content taught accords with disciplinary standards of adequacy and completeness, and that the methods employed are age appropriate, morally defensible, and undertaken with the intention of enhancing the learner's competence with respect to the content studied…By successful teaching we mean that the learner actually acquires, to some reasonable and acceptable level of proficiency, what the teacher is engaged in teaching. (p. 191)

As part of this program, we examined the effects of the professional learning activity on teacher efficacy and student achievement. Subsequent analysis revealed interesting differences from district to district and led to a deeper investigation of the teaching and professional development practices of these districts and the related impacts of teacher efficacy and professional learning opportunities on student achievement. Essentially, we found that (i) inflated teacher efficacy based on invalid self-appraisal can be disabling. It impedes teachers' abilities to benefit from professional learning opportunities; (ii) teacher efficacy is a mediator, not a cause. That is, teacher efficacy does not directly create higher achievement. It operates indirectly by influencing teachers' goal setting and persistence. If other conditions are not

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doi:10.1016/j.tate.2010.06.011

present, teacher efficacy alone will have minimal impact; (iii) the key enabling condition in this study emerged from teachers' prior professional learning experience: it affected their goal setting (creating a felt need for change); it provided them with a conceptual foundation for recognizing how the professional learning content was of value to them (e.g., that they needed to meet curriculum expectations not textbook requirements); it equipped them with added capacity for collaborative learning.

2. Literature review

In this paper, we will explore the relationships between classroom-embedded teacher professional learning, teacher efficacy, and student achievement. Together, they offer a coherent framework for understanding the potential effects of *authentic teacher learning opportunities* (Webster-Wright, 2009).

2.1. Authentic teacher professional learning opportunities

In order to better understand the theoretical orientation and participant activity of the professional learning model in this study, we would like to distinguish professional learning (PL) from professional development (PD) because we see them as being distinct both in theory and in practice. We concur with Webster-Wright's (2009) review of over 200 studies on PD and PL that "professionals learn from experience and that learning is ongoing through active engagement in practice" (p. 723). However, the vast majority of educational PD programs have separated the learning opportunities from natural contexts and from practice. For example, PD sessions at the District level occur where teachers from various schools are brought together in a central location, are given a 'workshop' or are taught about a particular teaching or learning strategy. The underlying implication/assumption is that the teachers are deficient in some ways and require "topping up" on the latest pedagogical strategies that the teachers will then translate to their classrooms and implement with success. This traditional model extracts teaching professionals from their key professional learning environments (the school and classroom), and assumes that other experts know best what content and kinds of PD teachers need.

In contrast, we conceptualize teacher professional learning as embedded in the classroom context and constructed through experience and practice in sustained iterative cycles of goal setting/planning, practicing, and reflecting (see Kolb, 1984; Sankaran, Dick, Passfield, & Swepson, 2001). In other words, the whole social context of the classroom becomes the primary *and legitimate* site of teacher professional learning on an ongoing basis. We were interested in understanding PL opportunities that were clearly grounded in classroom practice using iterative cycles of teacher planning, practice, and reflection, and we wanted to know how these opportunities impacted both teacher efficacy and student achievement.

As part of this model of professional learning, we also consider the importance of teacher collaboration. Traditionally, teaching is understood to be a "uniquely isolated profession" (Hindin, Morocco, Mott, & Aguilar, 2007), yet teacher collaboration is identified by some researchers and educators (see Puchner & Taylor, 2006 for example) to be one of the most important features of school culture in order to foster teacher learning, satisfaction and effectiveness. However, collaboration that is driven by deep, personal and enduring interest and motivation (Wallace, 1999) is challenging to achieve. The level of trust and risk-taking required that moves teaching from isolated activity to the public sphere of professional learning communities (Fullan, 2007) should not be underestimated:

> … deprivatizing teaching will be much harder than anyone thought. Deprivatizing teaching changes culture and practice so that teachers observe other teachers, are observed by others, and participate in informed and telling debate on the quality and effectiveness of their instruction. I am not naive here. I realize that in punitive and otherwise misguided accountability regimes, teachers are ill-advised to open their classroom doors. But the research also reveals that even when conditions are more favorable, when implementation strategies are highly supportive, that many teachers subtly or in other ways play the privatization card (Fullan, Hill, & Crevola, 2006, pp. 2–8). Changing this deeply rooted norm of privacy is tough because such a change requires tremendous sophistication as well as some risk taking by teachers and other leaders. (p. 36)

2.2. Teacher efficacy

Teacher efficacy is a social cognitive theory founded by Albert Bandura (1993, 1997). Essentially, teacher efficacy is the teacher's self-assessment of his or her ability to support student learning. Teachers with high teacher efficacy believe that they can positively impact student achievement despite a possible range of perceived challenging circumstances (such as low socio-economic status of the students or a lack of resources). Teachers with low efficacy believe that they have a limited ability to influence student learning and achievement. A teacher with low efficacy believes that the locus of control is well beyond his or herself and there is little he or she can do to enhance student learning. Research in the area of teacher efficacy has produced an extensive body of literature (Bandura, 1986, 1997; Bruce & Ross, 2008; Gibson & Dembo, 1984; Goddard, Hoy, & Woolfolk Hoy, 2004; Ross, 1998; Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran, Wolfolk Hoy, & Hoy, 1998) that demonstrates how teachers with high efficacy are more likely to persist to meet teaching goals when faced with obstacles; are more likely to experiment with effective yet challenging instructional strategies such as student-directed methods (Riggs & Enochs, 1990) and authentic assessments (Vitali, 1993); and are more likely to experiment and take risks in the classroom (Allinder, 1994). Teacher self-confidence to implement challenging strategies in the near future determines how effectively a teacher will actually employ these same strategies (Shachar & Shmuelevitz, 1997).

The four main sources of teacher efficacy information for teachers, according to efficacy research are: mastery experiences (direct teaching experiences that are challenging but highly successful); vicarious experiences (watching peers of similar ability levels teach challenging ideas with high success); physiological and emotional states (feelings of success and confidence); and social and verbal persuasion (receiving positive feedback from students, peers and superiors). Of these four sources of efficacy, mastery experiences are considered to have the most powerful influence on teacher efficacy (Bandura, 1997; Tschannen-Moran et al., 1998). Successes raise the expectation that a task can and will be mastered (Schunk, 1996; (Britner & Pajares, 2001) and failures lower expectations. Increasing confidence is the result of mastery experiences combined with classroom events that demonstrate the impact of the instructional strategies used. In other words, the teaching context matters: "[I]n making an efficacy judgment, a consideration of the teaching task and its context is required" (Tschannen-Moran, 1998, p. 228). Vicarious experience has been found to also be a powerful source of efficacy information (Bandura, 1997). In the case of vicarious experience, it is important to underline that the observing teachers are watching someone similar to themselves (and in a similar context) implementing a highly successful teaching moment.