Towards a re-conceptualization of teachers' self-efficacy beliefs: tackling enduring problems with the quantitative research and moving on

Mark Wyatt
University of Portsmouth

Various commentators have argued for years that the study of teachers' self-efficacy beliefs, largely dominated by quantitative research methodologies, has been confused. Contentious issues include the very conceptualization of these beliefs, how they are defined and accessed through research and how the research is used. One of the biggest anomalies is that, despite claiming that these beliefs are task-specific, many quantitative researchers have both assessed them globally and portrayed them as hard to impact. In contrast, some qualitative researchers have emphasized the task-specific nature of these beliefs and their potential for transformation through self-doubt, reflection and learning. This literature review examines these and other contentious issues, focusing on studies published in international peer-reviewed journals in the last few years, looking, through the use of search terms and the surveying of abstracts followed by detailed reading, for evidence of developing understandings and changing research practices. This review highlights continuing misalignment between theory and method in much of the literature, but also identifies promising research directions. Mixed methods and qualitative research designs seem to have the potential to produce insightful findings that can make the study of teachers' self-efficacy beliefs of greater use to teacher educators than has previously been the case.

Keywords: teachers' self-efficacy beliefs; quantitative, qualitative and mixed methods research designs; teacher education

Introduction

Even though teachers' self-efficacy beliefs have been the subject of quantitative research for more 30 years, there is still considerable uncertainty as to what they are, how they are formed and develop, how they can be accessed through research and how the information resulting from such research can be used. While these issues have been addressed in various ways and to differing extents since the late nineties (Bandura 1997; Tschannen-Moran, Woolfolk Hoy, and Hoy 1998; Henson 2002; Wheatley 2002, 2005; Fives 2003; Fives and Alexander 2004; Labone 2004; Kang and Neitzel 2005; Dellinger et al. 2008, Klassen et al. 2011), it has sometimes seemed no obvious end to the confusion is in sight. Indeed, this literature review will

demonstrate that while various researchers working in the quantitative tradition and writing in the last few years have addressed part(s) of the problem (e.g. Siwatu [2011a], who addresses contextual issues), others have tended to side-step some of the various construct, measurement and application dilemmas related to the study of teachers' self-efficacy beliefs. Challenges thrown down by Wheatley (2005) have largely been ignored by most quantitative researchers. Consequently, problems with research into this set of beliefs endure. The current article builds on and extends the seminal work of Wheatley, revisiting concepts that still appear to be misunderstood and looking for evidence of fresh research directions.

Method

The most recent review of the literature on teachers' self-efficacy beliefs (Klassen et al. 2011) adopted a rather different approach to the one that will be taken here. After selecting 218 empirical articles published in international peer-reviewed journals between 1998 and 2009 to compare with 68 articles published in the previous 12-year period, Klassen et al. looked for trends, e.g. to see if the proportion of qualitative and mixed methods studies was increasing, if more studies were being produced outside the USA. In describing the 'state of the field' (p. 38), they make some interesting assertions, e.g. that nearly half the studies published between 1998 and 2009 were "conceptually suspect" (p. 36), offering "misleading conclusions" and suffering from "a kind of definitional entropy" (p. 37), a finding pertinent in light of warnings issued by Tschannen-Moran, Woolfolk Hoy, and Hoy (1998), Henson (2002) and Wheatley (2005). However, in addressing conceptual issues, Klassen et al. (2011) do not appear to go far enough. This may be because they situate their understanding of teachers' self-efficacy beliefs in relation to Tschannen-Moran, Woolfolk Hoy, and Hoy (1998), ignoring important challenges to this conceptualization made by Wheatley (2005).

In contrast to Klassen et al.'s (2011) study, the approach to the literature taken here is focused more on theory (Baumeister and Leary 1997), examining, in relation to key concepts, researchers' theoretical understandings and methodological practices, with reference to empirical findings. In coverage of selected themes (topics not explored include teachers' collective efficacy beliefs [Goddard 2002]), the review aims to be reasonably comprehensive, in that broad tendencies in the literature are identified and discussed with examples provided. However, there is also a focus on the distinctive in a field in which much is commonplace; the literature reviews of many studies in the quantitative tradition are very similar.

My stance to the literature on teachers' self-efficacy beliefs is shaped by an engagement with it for nearly a decade. While developing the literature review of a doctoral dissertation in 2003/4, I was struck by anomalies; Wheatley (2005), when it appeared, made more sense than anything I had hitherto read on conceptual issues relating to teachers' self-efficacy beliefs. I re-engaged continually with the literature during my doctoral research and subsequently while developing qualitative case studies.

To develop this literature review, I (re)reviewed several hundred articles, using library databases (such as ScienceDirect - which is especially valuable in this field, Wiley and JSTOR), the websites of publishers (e.g. Taylor and Francis, SAGE, Emerald) and the Internet search engine: Advanced Google Scholar. I focused on available articles in English that appeared in international peer-reviewed journals, excluding theses and, with very few exceptions, conference papers; there were very few book chapters to consider. My focus on recent research that has engaged with theory was reflected in the choice of terms used (e.g. sources, growth, reflection, doubts, knowledge) and the dates 2005-2012 to search within results generated by 'teacher efficacy' or 'teachers' self-efficacy beliefs'. Once articles of potential interest had been identified, titles and abstracts were surveyed more carefully for relevance. Preliminary skimming was then followed by further searches within results using thematic search terms. Articles that on the basis of their abstracts initially seemed promising but on closer inspection were found to address virtually none of the literature of the last twenty-five years outside narrow subject areas (e.g. Evans 2011) were quickly discarded.

Identifying relevant articles was an iterative process. The *cited by* tool in Advanced Google Scholar was used in an attempt to minimize the risk of anything important being missed. For example, all the resulting 118 and 64 hits for Wheatley (2002) and (2005) respectively that met the criterion of publication in international peer-reviewed journals were read and subjected to closer analysis through rereading, note-taking, categorizing and further questioning. Relevant research published prior to 2005 was also revisited in the light of recent interpretations of it.

However, despite this endeavour, I must acknowledge potential methodological limitations. Studies may have been missed or their significance unappreciated. Unfortunately, literature reviews such as this can fail to locate and process all relevant research. Klassen et al. (2011), for example, identified just two case studies of individual teachers published between 1998 and 2009, though at least one other, Mulholland and Wallace (2001), appears to have met their criteria for inclusion. If, through methodological limitations, I have inadvertently excluded relevant research, I apologize.

The following sections are structured as follows: I first highlight why teachers' self-efficacy beliefs are regarded as so worthy of study. I then address the various problems with quantitative research in this area, considering construct, definitional, measurement and application issues and highlighting the need to embrace research paradigms other than the 'normative' (Cohen, Manion, and Morrison 2007). Drawing upon recent mixed methods and qualitative research, I then outline possible avenues ahead.

The attractiveness of teachers' self-efficacy beliefs to researchers
Teachers' self-efficacy beliefs have been trumpeted by researchers as highly influential in determining success and failure in all facets of education.

Literature reviews in the quantitative tradition have tended to emphasise how powerful these beliefs are (e.g. Caprara et al. 2006; Chan 2008; de Mesquita and Drake 1994; Duffin, French, and Patrick 2012, Guo et al. 2010; Gurvitch and Metzler 2009; Ho and Hau 2004; Knoblauch and Woolfolk Hoy 2008; Ross 1994; Woolfolk, Rosoff, and Hoy 1990). Thus, in reviewing the literature early in the 21st century, Tschannen-Moran and Woolfolk Hoy (2001, 2002), for example, cite numerous studies which suggest the following: highly efficacious teachers tend to try harder, plan better and organize themselves more thoroughly (Allinder 1994); these teachers are more receptive to fresh input and more likely to experiment (Guskey 1988; Stein and Wang 1988); they are more sympathetic to their students (Ashton and Webb 1986) and persist longer with those who are struggling (Gibson and Dembo 1984); they are more enthusiastic (Allinder 1994) and committed to teaching (Coladarci 1992). Their students are more highly motivated (Midgely, Feldlaufer, and Eccles 1989) and achieve more successful learning outcomes (Ashton and Webb 1986).

However, while the findings of these pre-1997 studies may seem to impress in emphasising the power of teachers' self-efficacy beliefs, they are also open to challenge, as Tschannen-Moran and Woolfolk Hoy (2001) acknowledge, despite citing them. Indeed, due to issues of construct validity (discussed below), Bandura (1997) questions the relevance of much of the pre-1997 research purportedly investigating teachers' self-efficacy beliefs. Nevertheless, this pre-1997 research is still cited uncritically by many researchers who contradictorily also claim allegiance to Bandura's (1997) ideas, e.g. Cantrell and Callaway (2008) and Woolfolk Hoy and Burke-Spero (2005). Unfortunately, in their lack of criticality, these authors are only continuing to 'muddy the waters', as Henson (2002) describes such work.

Issues with construct validity

One of the main problems with research into teachers' self-efficacy beliefs is that it has drawn rather un-analytically on two very different and quite incompatible theories that, used together, have provided a weak theoretical foundation, confusing (Henson 2002) and perplexing researchers (Tschannen-Moran, Woolfolk Hoy, and Hoy 1998). While, through the explanations of these authors, this has seemed clear to many people since, some researchers (e.g. Atay 2007; Bruce et al. 2010) continue to conflate the two sets of ideas. Therefore, further explanation should not go amiss.

In fact, this weak theoretical basis of research into teachers' self-efficacy beliefs (Henson 2002) only became apparent to many researchers when Bandura (1997) intervened to provide clarification. Prior to this, much of the research purportedly focusing on teachers' self-efficacy beliefs may actually have been investigating a very different construct: teachers' locus of control (Rotter 1966).

As Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) explain, early research into teachers' self-efficacy beliefs was traditionally based on a conceptualisation centred on two hierarchically organized dimensions:

general teaching efficacy (GTE), referring to a teacher's beliefs about the possibility of teachers in general being able to produce student learning, and personal teaching efficacy (PTE), "referring to the teacher's personal appraisal of his or her own effectiveness as a pedagogue" (Ashton, [1985], as cited in Dörnyei [2001, 159]). According to Tschannen-Moran, Woolfolk Hoy, and Hoy (1998, 206), the origins of this conceptual division can be traced to Armor et al.'s (1976) use of the following questionnaire items (the first since related to GTE, the second to PTE):

1. When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment.
2. If I try really hard, I can get through to even the most difficult or unmotivated students.

As Tschannen-Moran and Woolfolk Hoy (2001) report, the RAND researchers Armor et al. (1976) had been influenced by Rotter's (1966) Social Learning theory and his ideas about internal-external locus of control. So teachers who felt that the influence of the environment overwhelmed the abilities of teachers in general to support students' learning would see the reinforcement of their efforts as external. Their GTE beliefs would thus be low, according to researchers such as Gibson and Dembo (1984), who later developed their own highly influential and much employed 30-item questionnaire expanding on these ideas.

However, as indicated above, Bandura (1997) dismisses such research for lack of relevance to self-efficacy beliefs. As well as highlighting the difference between his theory, first articulated in a 1977 paper, and Rotter's (1966), Bandura (1997, 243) argues: "efficacy to surmount taxing conditions should be measured in terms of teachers' beliefs about their own efficacy to do so rather than about the efficacy of teachers in general", thus rejecting the concept of GTE beliefs. Several empirical studies in the last few years (Ho and Hau 2004; Skaalvik and Skaalvik 2010) have provided evidence that external control (Rotter's concept) is unrelated to teachers' self-efficacy beliefs.

Nevertheless, despite Bandura's (1997) attempts to distance his theory from Rotter's (1966), and despite the support his conceptualization (discussed further below) has received from quantitative researchers into teachers' self-efficacy beliefs (e.g. Henson 2002; Skaalvik and Skaalvik 2010; Tschannen-Moran and Woolfolk Hoy 2001), many of the same researchers (e.g. Liaw 2009; Tschannen-Moran and Johnson 2011) tend to emphasise the importance of the RAND studies (Armor et al. 1976) that took inspiration from Rotter's (1966) ideas. In this climate, research based on earlier conceptualizations of teachers' self-efficacy beliefs (and thus including GTE items) persists (e.g. de la Torre Cruz and Arias 2007; Gencer and Cakiroglu, 2007; Tournaki and Podell, 2005). Therefore, while much contemporary research is based on a clearer understanding of these beliefs than was the case in 1997, some conceptual confusion remains. There are also issues with definition, as I now explain.

Defining teachers' self-efficacy beliefs

For a definition of teachers' self-efficacy beliefs, we need to return to Bandura's Social Cognitive theory (1986), which "is rooted in a view of human agency in which individuals are agents proactively engaged in their own development and can make things happen by their actions" (Pajares 2002, para. 6). Within the context of this theory, self-efficacy beliefs have been defined as: "people's judgements of their capabilities to organize and execute courses of action required to attain designated types of performance" (Bandura 1986, 391). They can be distinguished not just from ideas about the internal-external locus of control (Rotter 1966), but also from broader expectancy for success constructs (Pintrich and Schunk 1996). As Bandura (2001, para. 1) has argued: "The efficacy belief system is not a global trait but a differentiated set of beliefs linked to distinct realms of functioning". Self-efficacy beliefs are goal-directed, task and domain-specific. As Tschannen-Moran, Woolfolk Hoy, and Hoy (1998, 220) explain: "Teachers feel efficacious for teaching particular subjects to certain students in specific settings, and they can be expected to feel more or less efficacious under different circumstances", as aspects of the task or context change.

Various attempts have been made to define teachers' self-efficacy beliefs, applying Bandura's (1986) definition of self-efficacy beliefs in general to the work of this profession. However, some of these definitions do not do justice to the complexities of teaching. Tschannen-Moran and Woolfolk Hoy (2001, 783), for example, define these beliefs as teachers' judgments in their capability "to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated". While this definition deserves credit for recognising that all learners need to be engaged and provided opportunities, unfortunately it also presents teaching primarily in terms of managing behavioural and psychological problems (which could be seen as limiting). Teachers can be defined as "active, thinking decision-makers who make instructional choices by drawing on complex, practically-oriented, personalized and context-sensitive networks of knowledge, thoughts and beliefs" (Borg 2003, 81). Definitions of their self-efficacy beliefs need to reflect the complexities of their work.

There is another issue with Tschannen-Moran and Woolfolk Hoy's (2001) definition, which is that it reflects an agent-ends conceptualization of these beliefs (Skinner 1996), i.e. one focusing on outcomes from the perspective of the teacher. It is also very general, as Dellinger et al. (2008) point out, and therefore incompatible with Bandura's (2001) and Tschannen-Moran, Woolfolk Hoy, and Hoy's (1998) descriptions presented two paragraphs above. It is unclear from Tschannen-Moran and Woolfolk Hoy's (2001) definition what teachers actually do to bring about desired outcomes in student engagement and learning, and yet, as Dellinger et al. (2008) remind us, teachers' self-efficacy beliefs are task-specific. Indeed, these authors define them so: teachers' self-efficacy beliefs are teachers' "individual beliefs in their capabilities to perform specific teaching tasks at a specified level of quality in a specified situation" (Dellinger et al. 2008, 752). This definition, in taking a

perspective contrary to Tschannen-Moran and Woolfolk Hoy's (2001), could be classified as an agent-means definition (Wheatley 2005), i.e. focused on teachers' beliefs about their ability to take actions.

Teachers' reflections on agent-means beliefs (e.g. Can I use this strategy effectively in this specific teaching situation?) are clearly at the heart of any self-assessment of self-efficacy beliefs. However, teachers are also concerned with outcomes, perhaps more so as they gain experience Berliner (1988) suggests while discussing the stages teachers move through in their careers, from novices concerned with their own actions and trying to look the part to experienced teachers focused primarily on learners' needs. Besides retaining its task-specific, agent-means element, Dellinger et al.'s (2008) definition could be extended to include outcomes.

Teachers' work is complex, in facilitating access to knowledge, encouraging learners to develop analytical tools that help them learn on their own, providing a classroom environment conducive to learning and encouraging the social interactions that support learning goals. A recent definition of teachers' self-efficacy beliefs that recognizes this complexity while combining agent-means and agent-ends components is as follows: "teachers' beliefs in their capabilities of supporting learning in various task and context-specific cognitive, metacognitive, affective and social ways" (Wyatt 2010, 603).

Underpinning definitions that take such a stance is the idea that teachers' means-ends beliefs (Wheatley 2005) have a secondary role. These beliefs concern the effectiveness of particular teaching methods in impacting learning outcomes (Does this method really work?). Means-ends beliefs interact with agent-means beliefs in various ways, e.g. teachers may believe a method is effective, despite feeling they cannot use it very well themselves. Alternatively, they may consider themselves expert in using it, but lack confidence in its effectiveness. Much depends on their knowledge from both theoretical and practical perspectives. Beliefs and knowledge are inextricably linked in the mind of the teacher (Verloop, Van Driel, and Meijer 2001).

While agent-means and agent-ends beliefs are combined in some recent definitions of teachers' self-efficacy beliefs used in qualitative research (e.g. Wyatt, 2010; Takahashi 2011), definitions used in quantitative research are very often agent-ends. While Dellinger et al. (2008) question Tschannen-Moran and Woolfolk Hoy's (2001) definition, many researchers have simply followed it (e.g. Cantrell and Callaway 2008; Chacón 2005; Chiang 2008; Gencer and Cakiroglu 2007; Rastegar and Memarpour 2009; Rots et al. 2010; Tournaki and Podell 2005). However, in its lack of task-specificity, Tschannen-Moran and Woolfolk Hoy's (2001) definition owes more to the RAND researchers Armor et al. (1976) and thus Rotter (1966) than it does to Bandura (1997), even though these researchers (Tschannen-Moran and Woolfolk Hoy 2001) seek to draw upon Bandura and not Rotter in their attempts to measure teachers' self-efficacy beliefs, i.e. by eliciting only PTE and not GTE beliefs. This misalignment between definition and measurement can only add to the conceptual confusion.

Key points to consider then include: Does the definition of teachers' self-efficacy beliefs used incorporate a central agent-means component as well as one that is agent-ends? Does it accommodate teachers' conceptualizations of their work, in all its complexity, at different stages in their careers? Is it sufficiently specific? Assuming definitions can be found that meet these criteria (e.g. as in Wyatt 2010; Takahashi 2011), I now consider the formation and processing of teachers' self-efficacy beliefs.

The formation and processing of teachers' self-efficacy beliefs

Bandura (1986) proposed that efficacy and ultimate behaviour are affected by four psychological sources of efficacy building information; enactive mastery experiences (concrete experiences of doing things), vicarious experiences (hearing, seeing or reading about others doing them), verbal persuasion (being told by others interactively how we did/will perform) and physiological arousal (getting this information from our senses). Prior to Tschannen-Moran, Woolfolk Hoy, and Hoy (1998), these sources of efficacy building information had been "all but ignored" in the literature on teachers' self-efficacy beliefs (Henson 2002, 140), but have received more attention since, e.g.; by Mulholland and Wallace (2001), Labone (2004), Poulou (2007), Tschannen-Moran and Woolfolk Hoy (2007), Palmer (2011), Aydin, Demirdöğen, and Tarkin (2012), Chong and Kong (2012). Much of the research, e.g. Tschannen-Moran and Woolfolk Hoy (2007), has focused on which of these sources of efficacy-information are most important to teachers at different stages of their careers.

A point of controversy, however, is that while most quantitative researchers (e.g. Fives, Hamman, and Olivarez 2007; Moafian and Ghanizadah 2009; Tschannen-Moran and Johnson 2011) have followed Bandura's (1986) classification of the sources of teachers' self-efficacy beliefs, several researchers have suggested additional 'sources', although these are not necessarily psychological; nor can they be described as experiences. Poulou (2007), for example, has proposed that personality characteristics such as positive stance and humour, capabilities or skills such as flexibility in teaching choices, motivation such as desire to improve the teaching task and university training relating to the number, frequency and types of courses attended are all sources of teachers' self-efficacy beliefs. Palmer (2011), in the context of science teaching, has proposed that cognitive mastery (i.e. subject matter knowledge) is an important source of teachers' self-efficacy beliefs. These categorizations bring into question how we define 'source' and how we relate teachers' self-efficacy beliefs to other cognitive structures.

If 'sources' of teachers' self-efficacy beliefs are psychological 'experiences' (Bandura 1997), then perhaps the additional 'sources' identified by Poulou (2007) and Palmer (2011) need to be reclassified. Perhaps, rather than being psychological sources of beliefs in themselves, the attitudes, skills and knowledge they relate to influence the way teachers gain experiences and benefit from them. If a teacher is flexible (Poulou 2007), for example, might this influence the way the teacher observes (vicariously), listens to others

(benefiting from verbal persuasion) and sensitively adjusts teaching in a classroom situation according to needs of learners that only become apparent during the lesson (an enactive mastery experience)? Similarly, with well developed subject matter knowledge (Palmer 2011), it seems likely that a classroom teacher may be able to answer questions and provide further clarification with greater confidence; thus, the subject matter knowledge may help the teacher, in this case, both gain practical knowledge (Elbaz 1981) of providing such explanations as well as psychological experiences of enactive mastery. However, is the subject matter knowledge a psychological 'source' in itself? This brings into question the extent to which the various inter-relationships between attitudes, skills and knowledge on the one hand and the psychological sources of teachers' self-efficacy beliefs on the other have been explored. I discuss this further now in relation to cognitive processing (Bandura 1997).

The cognitive processing of information from the psychological sources of teachers' self-efficacy beliefs (enactive mastery, vicarious, verbal persuasion and physiological arousal) has been described by Bandura (1997), Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) and Labone (2004) as a system of filtering, whereby efficacy-building information is selected, weighted and integrated. Some experiences are highlighted in the mind while others are minimized. Thus, what is attended to and in what manner is crucial; so, particular experiences of success or failure in the classroom that may be fleeting or transitory in themselves (e.g. a student momentarily failing to grasp a point or a short activity working particularly well) may not affect teachers' self-efficacy beliefs. They will not affect them if they are ignored (Labone 2004).

Cognitive processing of psychological experience is complex. In the selecting, weighting and integrating of data relating to enactive mastery experiences, global self-beliefs, relating to self-schemata, might be drawn upon. Potentially important, too, are the teachers' perceptions of the difficulty of the particular task and of any unique contextual factors, their sense of how much effort they have expended, the extent to which they are monitoring themselves while reconstructing their experiences and their sense of how they are developing over time. These all influence how psychological experiences are processed (Bandura 1997; Labone 2004).

However, while this explanation may be convincing from a psychological perspective, it does not appear to consider the underlying attitudes, skills and knowledge interacting with psychological sources that concern Poulou (2007) and Palmer (2011). Amongst the few researchers who have addressed cognitive processing (e.g., Tschannen-Moran, Woolfolk Hoy, and Hoy 1998; Henson 2002; Labone 2004), there has been a tendency to emphasize the importance, in efficacy building, of relevant motivational constructs, such as Weiner's (1979) Attribution theory, but to neglect the influence of other types of cognitions. This has led Fives and Alexander to argue:

> Those sources of efficacy information, those experiences, do not lead directly to cognitive processing, but rather contribute to the development of knowledge and beliefs within the teachers' cognitive system. Those knowledge and beliefs then influence how teachers analyse the task and evaluate their own competence, resulting in efficacy beliefs. Thus, we contend that experiences alone do not affect subsequent cognitive processing. Rather, these experiences allow teachers to construct knowledge and belief structures that subsequently influence cognitive processing (2004, 4).

This argument suggests then that, to gain a fuller understanding of teachers' self-efficacy beliefs, we need to consider their knowledge and belief systems. As Pajares (1992, 315) explains, these are highly complex, containing beliefs connected both "to one another and to other cognitive/affective structures, complex and intricate though these connections may be".

Discussing how beliefs interact with knowledge, Pajares suggests: "the potent affective, evaluative and episodic nature of beliefs makes them a filter through which new phenomena are interpreted" (1992, 325). Bandura conceptualises the role of self-efficacy beliefs as fostering action as well as serving as "a filtering mechanism for self-referent information in the self-maintaining process" (1986, 359). Drawing on both Bandura (1986) and Raudenbush, Rowan and Cheong (1992), Fives (2003) describes teachers' self-efficacy beliefs as mediating between knowledge and action, influencing the degree of effort and persistence brought to bear as knowledge is transformed into action.

However, while qualitative studies have started to explore this issue (Wyatt 2011), there is still a lack of quantitative research exploring the processes whereby teachers' self-efficacy beliefs transform knowledge into action; there is lack of such research into cognitive processing. Unfortunately, by labelling attitudes, skills and knowledge as sources of teachers' self-efficacy beliefs, Poulou (2007) and Palmer (2011) do not seem to have advanced our understanding of these processes.

The development of teachers' self-efficacy beliefs

Besides a lack of quantitative research into the formation and processing of teachers' self-efficacy beliefs, there has also been very little such research into how these beliefs develop. In earlier conceptualizations, dominated, as we have seen, by Rotter's (1966) ideas about the internal-external locus of control, teachers' self-efficacy beliefs were generally seen as "an immutable trait" (Ross 1994, 382). This is significant, for, as Pajares (1992) explains, the more central they are, the more stable over time, the less sensitive they are to changes in the context, the more fixed are beliefs. Chacón (2005), in adopting Pajares' analysis of beliefs in general to teachers' self-efficacy beliefs in particular, surprisingly describes the latter as likely to be formed early, self-perpetuating and fixed, without unfortunately explaining why.

If, however, following Bandura (1986), we conceptualize teachers' self-efficacy beliefs as goal-directed, task and domain-specific, this suggests they

are far from being immutable or fixed. Rather, as Fives (2003) argues, these beliefs are likely to be in a state of flux, and open to continual ongoing development, as new experiences are encountered, assuming that teachers, themselves, are open to these experiences.

Despite this reasoning, however, most quantitative researchers, including Bandura (1997), have tended to portray the self-efficacy beliefs of experienced teachers as difficult to influence. Indeed, Bandura has cautioned that positive changes in a teacher's self-efficacy beliefs are only likely to occur in the event of "compelling feedback that forcefully disrupts the pre-existing disbelief" in their capabilities (82). Other researchers have followed this line. Thus, Tschannen-Moran and McMaster (2009, 229) suggest that 'jarring' experiences are necessary to provoke reassessment. Chacón (2005), Chan (2008), Tschannen-Moran and Woolfolk Hoy (2007) and Woolfolk Hoy and Burke-Spero (2005) all suggest that teachers' self-efficacy beliefs are most pliable in early career teachers, while de la Torre Cruz and Arias (2007) argue that changes in the self-efficacy beliefs of experienced teachers are both "difficult to cause" and "very transitory" (644).

Perhaps in part as a consequence of these views, much of the quantitative research that has looked for changes in teachers' self-efficacy beliefs has concentrated on early career teachers (e.g. Chiang 2008; Gurvitch and Metzler 2009; Knoblauch and Woolfolk Hoy 2008). Another consequence is that interventions designed to raise experienced teachers' self-efficacy beliefs (e.g. Ross 1994; Henson 2001) have been few and far between. Nevertheless, positive results have been presented: by Chiang (2008) who argued that reflective practice acted as a catalyst, helping pre-service language teachers reconcile beliefs, understandings and experiences; by Henson (2001) who argued that participation in action research helped in-service teachers overcome challenges in the context of a special needs school; by Palmer (2011) who argued that a professional development programme, including workshops and observations, helped in-service science teachers become more efficacious. Admittedly, these quantitative and mixed methods studies measured teachers' self-efficacy beliefs in fairly global terms (averaging scores on a range of PTE and sometimes GTE belief items). However, qualitative studies focusing on individual teachers and exploring changes in task-specific teachers' self-efficacy beliefs throughout a three-year teacher education programme have also noted growth (Wyatt 2010, 2011).

In conclusion, therefore, in the literature on teachers' self-efficacy beliefs there is still some confusion as to how open to change these beliefs are. This, in turn, seems to reflect different conceptualizations of these beliefs, as well perhaps as different understandings of the ways in which teachers' beliefs are shaped (e.g. through observing teachers in childhood, teaching experience, teacher education). While Richardson (1996) argues that the impact of formal education on teachers' beliefs is limited, large-scale reviews on learning to teach (Wideen, Mayer-Smith, and Moon 1998 – 93 studies) and language teacher cognition (Borg 2003 – 64 studies, some of which related to learning to teach) have suggested otherwise. Borg (2003) concludes that, while

the precise nature of the impact "varied across studies and indeed even amongst different trainees in the same study" (89), most researchers agreed that teacher education made a difference. Wideen, Mayer-Smith, and Moon (1998) share this conclusion, arguing that where support was provided by "program, peers and classroom situations, and where deliberative exploration and reflection were encouraged, we saw the flowering of empowered teachers" (159).

Modelling the growth of teachers' self-efficacy beliefs

A further issue relating to research into the development of teachers' self-efficacy beliefs is how these grow through spiralling cycles. Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) have produced a conceptual model illustrating the cyclical nature of teachers' self-efficacy beliefs growth; this has since been praised as the first comprehensive conceptual model in the field (Labone 2004). However, it has also come under criticism (Wheatley 2002).

At the heart of the model (Tschannen-Moran, Woolfolk Hoy, and Hoy 1998, 228) is its recognition that teachers assess their self-efficacy beliefs while analysing the teaching task and its context in relation to their self-perceptions of competence, i.e., the skills, knowledge, strategies and other cognitive and affective resources available to them in the particular setting. Out of the tension produced by a collision of the various goals and restraints, teachers' self-efficacy judgements for the task at hand are developed, and these are highly context-specific. At this level, the model seems to capture the goal-oriented, task and context-specific nature of teachers' self-efficacy beliefs, as described by Bandura (1986).

However, the model has limitations. Arrows link 'consequences of teacher efficacy' to 'performance' to 'sources of efficacy information (verbal persuasion, vicarious experiences, physiological arousal, enactive mastery experiences)' to 'cognitive processing' to further 'analysis of the teaching task and its context in relation to their self-perceptions of competence' (Tschannen-Moran, Woolfolk Hoy, and Hoy 1998, 228). Thus, the cognitive processing of efficacy-building experiences is depicted as taking place prior to skills, knowledge, strategies and other cognitive and affective resources being considered. There is thus no interaction in this model between the psychological 'sources' of teachers' self-efficacy beliefs and teachers' knowledge and belief systems (Fives and Alexander 2004) (above).

Furthermore, the account of how teachers' self-efficacy beliefs develop through spiralling cycles has been described by Wheatley (2005) as rather unconvincing. Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) argue:

> Greater efficacy leads to greater effort and persistence, which leads to better performance, which in turn leads to greater efficacy. The reverse is also true. Lower efficacy leads to less effort and giving up easily, which leads to poorer teaching outcomes, which then produce decreased efficacy (226).

This argument has some plausibility, as Wheatley (2002, 2005) concedes. If teachers suffer repeated experiences of failure across a range of

tasks, this may damage their self-efficacy beliefs, have serious long-term effects on their self-esteem and lead to negative attitudes. Psychological consequences may include

> an uncomfortable state of cognitive dissonance… [that] can be decreased by largely or entirely avoiding the teaching methods or curriculum content that causes the dissonance… [as well as by] mentally devaluing the importance of the content or the effectiveness of the methods in question (Wheatley 2002, 7).

The result, then, may be a greater tolerance of failure, which is clearly unhealthy. However, Wheatley (2002) also argues that it can be rather simplistic to see all experiences of low self-efficacy in negative terms. On the contrary, experiencing low self-efficacy beliefs can support self-development.

Wheatley (2002) explains that out of the tension produced by an analysis of the teaching task and its context against self-perceptions of competence, self-efficacy doubts of a beneficial nature can arise, these fostering disequilibria, change, reflection and learning. Wheatley criticizes Tschannen-Moran, Woolfolk Hoy, and Hoy's (1998) cyclical model for failing to incorporate the idea "that, at times, doubting one's efficacy might be what helps teachers and teaching the most" (2002, 14). Teachers need to experience doubt, Wheatley affirms, for otherwise how will they reflect and learn? This insight suggests that Tschannen-Moran, Woolfolk Hoy, and Hoy's (1998) model could be developed to account for teacher learning.

Wheatley's (2002, 2005) ideas have gained some empirical support. Settlage et al. (2009), for example, report of pre-service teachers, who:

> despite inexperience with teaching science and limited appreciation for the influence of culture, class, and language on teaching and learning… held extraordinarily high levels of science teaching efficacy prior to their methods course and preserved [these] throughout their student teaching… In effect, their confidence blinded them to the self-doubt that might advance them professionally (119).

Settlage and colleagues (2009) thus argue that self-efficacy doubts in this case would have been beneficial. Also offering support for Wheatley's (2002, 2005) ideas, Wyatt (2011) presents a qualitative case study of an English teacher on an in-service course facing an unfamiliar challenge (adjusting to teaching learners of a very different age group). Self-doubt and reflection help the teacher overcome low self-efficacy beliefs. Wyatt concludes that Tschannen-Moran, Woolfolk Hoy, and Hoy's (1998) model is unable to explain her development.

In contrast, approaching this issue from the perspective that teachers' self-efficacy beliefs are global rather than task-specific, Tschannen-Moran and Johnson (2011) have described Wheatley's (2002) notion that teachers' self-efficacy doubts may be beneficial as 'a puzzle'. Furthermore, other quantitative researchers (Liaw 2009; Moafian and Ghanizedah 2009; Malinen, Savolainen, and Xu 2012) have offered support for Tschannen-Moran,

Woolfolk Hoy, and Hoy's (1998) view that greater efficacy leads to better performance and thus to even greater efficacy and thus to even better performance (untroubled by reflection?). What these researchers could grasp is that teachers can feel efficacious regarding some aspects of their work but not others; self-efficacy doubts, as described by Wheatley (2002), relate to performance on specific tasks, performance that with reflection and learning can be improved.

'Measuring' teachers' self-efficacy beliefs: criticisms from a qualitative perspective

Virtually all research into teachers' self-efficacy beliefs has been dominated by quantitative methodologies, as Labone (2004) reports, with interpretive and critical perspectives largely absent. Indeed, as Wheatley (2005, 749) confirms, these beliefs have "almost always been assessed through teacher self-reports" on Likert-scale items. While these have been used to serve a wider variety of purposes in the past few years, a strong tendency in this line of enquiry has been to use quantitative measures to establish the power of teachers' self-efficacy beliefs. Self-report scores have been correlated with other variables in the tradition of educational psychology. Such methodology has limitations, however, when applied to the study of teachers' self-efficacy beliefs, as I now explain.

The accuracy of self-reported beliefs

The first issue relates to the accuracy of the beliefs elicited through PTE questionnaire items, such as: "To what extent can you use a variety of assessment strategies?" (Tschannen–Moran and Woolfolk Hoy 2001, 800). Teachers may over- or under-estimate their self-efficacy beliefs when responding for a number of reasons. Personal factors, such as 'naïve optimism' (Wheatley 2005), 'defensive pessimism' (Wolters 2003) or the wish to give a socially desirable response (Collins, Shattell, and Thomas 2005), might be influential. Ideal rather than reality-oriented cognitions might be elicited, and as Borg (2006, 280) maintains: "as researchers we must ensure that cognitions expressed theoretically and in relation to ideals are not used as evidence of the practically-oriented cognitions which inform teachers' actual instructional practices".

Unfortunately, however, self-report items on teachers' self-efficacy surveys are frequently taken as sufficient evidence of practically-oriented cognitions. Triangulation (Stake 1995) with observational evidence (e.g. by Guo et al. 2010) only rarely occurs. This lack of triangulation can be problematic. Tschannen-Moran and Woolfolk Hoy (2007), for example, acknowledge that novice teachers are thought to over-estimate their levels of self-confidence when completing surveys, and, indeed, cite Bandura (1997) as saying that it can be healthy to do so. Nevertheless, on the basis of data gathered from an un-triangulated survey, they make certain contestable claims, e.g. that novice teachers, in forming judgements about their self-efficacy, tend to "make a more explicit analysis of the teaching task than

career teachers" (Tschannen-Moran and Woolfolk Hoy 2007, 954). This claim might seem counter-intuitive when research into the complex, cognitive planning processes of experienced teachers (e.g. Johnson 2003) is considered.

Triangulation (Stake 1995) can provide insights. Using mixed methods consisting of in-depth qualitative interviews as well as a survey, Settlage et al. (2009) found that, despite reporting considerable self-confidence, pre-service teachers on a practicum "revealed little practical knowledge about crafting science instruction for diverse student populations… their criteria for successful [science] teaching were student engagement and interest without any mention of growth in children's understanding of science concepts" (115). Unfortunately, therefore, Settlage and colleagues concluded these pre-service teachers possessed "exaggerated self-efficacy incongruous with their abilities" (119). Imagining that self-report self-efficacy statements might consistently represent slight over-estimations, perhaps the ideal scenario (Bandura 1997), might be misleadingly over-optimistic.

The role of underlying cognitions in influencing self-reported beliefs

A second but related issue is that survey items used on their own take no account of underlying cognitions. As Wheatley (2005, 755) explains: "Teachers' content knowledge, pedagogical knowledge and teaching skill are powerful uncontrolled lurking variables in the midst of virtually all teacher efficacy data". To the expert and the novice, for example, 'a variety of assessment strategies' could have different connotations. As teachers develop, they gain a richer, more refined and deeper understanding of their work (Berliner 1988). Yet, such developing underlying cognitions might not be reflected in different numerical scores placed on a teacher efficacy scale. To the novice and the expert, the item might mean very different things.

Teachers' knowledge has rarely been explored in relation to their self-efficacy beliefs. When knowledge (and not practical knowledge [Elbaz 1981]) has been correlated with self-efficacy beliefs treated globally, the following variables have been used: education level (e.g.; MA, BA, Diploma, Undergraduate), explicit learning experiences (e.g.; attendance on a course in special needs education versus non-attendance), and measures of demonstrated knowledge (e.g.; paper and pencil tests) (Fives 2003). Regarding demonstrated subject matter knowledge, for example, Schoon and Boone (1998, 559) found that pre-service elementary science teachers who held 'alternative conceptions' of science, such as: 'Dinosaurs lived at the same time as cavemen' had lower global self-efficacy beliefs in teaching science than others, who knew the right answers. Clearly, identifying the cognitions underlying beliefs can be of use to teacher educators.

Sometimes, self-reported subject matter knowledge has been correlated with self-reported self-efficacy beliefs. Chacón (2005) found that teachers who reported feeling more competent in using English for a variety of purposes (which she relates to subject matter knowledge) also reported feeling more competent in teaching English: an unsurprising finding. However, when she also tried to elicit their classroom practices through getting them to talk about

different scenarios to see if the more efficacious teachers described more communicative, learner-centred practices, to investigate a possible correlation, results were inconclusive. This might, of course, be a consequence of the research methodology used. If observations rather than scenario testing had been employed, this would have provided more direct access to the teachers' classroom practices and practical knowledge; Chacón (2005) acknowledges limitations of relying on self-report data.

Observations have very rarely been used in such research; Guo et al. (2010) provide an exception, but do not triangulate their observational data, focused on the provision of instructional and emotional support for pre-school children, with teachers' cognitions, except for their self-efficacy beliefs, which they survey in a global way. However, qualitative studies (e.g. Wyatt 2010, 2011) have combined observations with other methods (e.g. semi-structured interviews) to investigate the meanings relating to self-efficacy beliefs embedded in teachers' statements and to see how these teachers' reported beliefs are enacted in their practices. Triangulation (Stake 1995) could feature more prominently in other research designs.

Ambiguous wording and uncertain interpretations

A third main issue with eliciting teachers' self-efficacy beliefs through self-report surveys is that the items used are often phrased ambiguously, leaving much to depend on the teacher's interpretation. For example, according to Wheatley (2005), a teacher asked about their self-confidence in responding to difficult questions from students, needs to consider: "does this mean moderately strong confidence for all subjects [taught to the class], or strong confidence for some subjects, but doubts for others?" (752). And what about the students, the context (is the teacher even thinking of a specific context?), the teacher's opinion about the need to deal effectively with difficult questions or the teacher's view of what a difficult question is? There can accordingly be a great deal of uncertainty in interpreting teachers' responses to such items (and a weakness of such methodology is that follow-up questions are absent).

One way in which some quantitative researchers in the last few years have sought to reduce ambiguity is by being more specific about the context. Focusing on the effect different settings might have on teachers' self-efficacy beliefs, Siwatu (2011a), for example, crafted descriptions of urban and suburban schools. Respondents first described their self-efficacy beliefs while visualizing teaching in one of these given contexts, then the other. While these were imaginary contexts, with all the limitations that implies, Siwatu found that beliefs varied according to the context envisioned, with the pre-service teachers much more confident about teaching in the suburban school. In a quantitative study they acknowledge would have been strengthened by the use of interpretive observational and interview methods after Wheatley (2005), Knoblauch and Woolfolk Hoy (2008) found that the type of school (urban, suburban or rural) pre-service teachers were assigned to impacted self-efficacy beliefs, concluding that a challenging environment may stimulate

growth. Qualitative case studies (e.g. Milner and Woolfolk Hoy 2003; Rushton 2003) have also provided insights into the role of context. Considerable over-generalization may occur if context is not considered carefully.

'Measuring' teachers' self-efficacy beliefs: quantitative researchers' concerns

While the criticisms above come largely from the perspective of qualitative research, quantitative researchers have also reported challenges in designing self-report teachers' self-efficacy surveys. These relate to pinpointing the range of teachers' work, deciding on the degree of task-specificity of the self-efficacy beliefs to be investigated and choosing language appropriate for elicitation. Regarding the first of these points, Tschannen-Moran and Woolfolk Hoy (2001) focus on the following areas of teachers' work: instructional strategies, classroom management and student engagement (areas of particular importance, perhaps, to pre-service teachers), while Bandura (n.d.), as cited by Labone (2004), also considers teachers' self-efficacy beliefs in influencing school decision-making, the allocation of resources for teaching, the school climate and working with parents and the community (issues, perhaps, of more importance to in-service professionals); Friedman and Kass (2002) collapse all these categories into two: classroom and school context. Agreeing on what to look for is thus an on-going issue for quantitative researchers, understandably so perhaps given the complex nature of teachers' work and the constant re-conceptualizing of what being a teacher involves (Borg 2006).

The second issue troubling quantitative researchers relates to the degree of task-specificity of the self-efficacy beliefs to be investigated. As Tschannen-Moran and Woolfolk Hoy (2001, 790) explain:

> Although researchers and theorists alike agree that [teachers' self-efficacy] is situation specific, it is less clear what is the appropriate level of specificity for its measure. For example, is efficacy specific to teaching mathematics, or more specific to teaching algebra, or even more specific to teaching quadratic equations?

Elsewhere, Tschannen-Moran, Woolfolk Hoy, and Hoy (1998, 15) warn:

> There is a danger of developing measures that are so specific they lose their predicative power for anything beyond the specific skills and contexts being measured (I am confident I can teach simple subtraction in a rural setting to middle-income second grade boys who do not have specific learning disabilities, as long as my class is smaller than 16 students and good manipulatives are available).

Tschannen-Moran and Woolfolk Hoy's (2001) solution was to develop a survey that could be used by all teachers of all subjects in all contexts. However, instruments designed to measure the self-efficacy beliefs of *science* teachers (though these have often elicited both GTE and PTE beliefs) have

been available since Riggs and Enochs (1990), and recently there has been increasing interest amongst quantitative researchers in other fields to make their surveys more subject-specific. Tschannen-Moran and Johnson (2011), for example, developed a new instrument to assess teachers' self-efficacy beliefs for literacy instruction; Haverback and Parault (2011) produced a similar instrument for teaching reading; Chiang (2008) developed an instrument to assess the self-efficacy beliefs of foreign language teachers. Surveys have also been designed for specific geographical/cultural domains, e.g. teaching in the Hong Kong context (Chan, 2008). However, while this switch towards the specific, also documented in recent reviews by Klassen et al. (2011) and O'Neill and Stephenson (2011), suggests a growing realization that the still much-employed survey developed by Tschannen-Moran and Woolfolk Hoy (2001) may need adapting for some purposes, it is debatable as to whether or not these new domain- and subject-specific instruments are specific enough. Qualitative studies, for example, have focused on the tasks teachers set themselves (Mulholland and Wallace 2001; Wyatt 2010, 2011) rather than on tasks provided for them based on the researchers' pre-conceptions. Grounding task definitions in the teachers' terms is thus one possible research direction.

The third challenge faced by quantitative researchers relates to framing questionnaire items in language appropriate for capturing the forward-looking capability that is central to an understanding of these beliefs (Bandura 1997). As Klassen et al. (2011) explain, many surveys designed to assess teachers' self-efficacy beliefs suffer from poor language choice in terms of modals and tenses, e.g. items are phrased in the past, as in Tournaki and Podell (2005), or use 'will' instead of 'can', as in Azar (2010). In Bandura's (2001) view, such careless word choice invalidates measurement. So, such researchers need to be more careful: 'can' questions should be asked. This also applies to qualitative research. In semi-structured interviews, though, open responses to 'can' questions are likely to contain a variety of language forms that can be analysed; teachers' self-efficacy beliefs may also be inferred from intonation, body language and fluency features (Wyatt 2011), none of which are open to the researcher relying on Likert-scale scores. Given the centrality of these surveys to quantitative research into teachers' self-efficacy beliefs and the prevalent use of "discredited, poorly conceptualized and flawed" items (Klassen et al. 2011, 37) in this line of enquiry, measurement issues are still a major concern. I now consider how the results of surveys into teachers' self-efficacy beliefs have been used.

The use made of self-report surveys into teachers' self-efficacy beliefs
Wheatley (2005) describes the use made of self-report Likert-scale items for assessing teachers' self-efficacy beliefs as follows:

> Items address a range of teaching tasks and situations, and scores are averaged across all subscale items. Typically, the reported scores are global measures of teachers' efficacy beliefs – across all aspects of teaching… Although teacher efficacy is viewed as a continuous variable, teachers are

often described in terms of two groups – those with "positive, high or greater" teacher efficacy, and those with "low, lower or lesser" teacher efficacy… Research almost never focuses on specific efficacy beliefs (e.g. "I can teach fractions effectively") (749).

A key issue Wheatley (2005) addresses here relates to construct. If self-report items are averaged across all aspects of teaching, then the resulting score represents a global rather than a task-specific measure, at odds with the definition of these beliefs presented above. Global self-efficacy (GSE) beliefs relate to a general sense of self-confidence or a general expectancy for success. There seems to be an assumption made by many quantitative researchers that if goal-directed, task- and domain-specific teachers' self-efficacy (TSE) beliefs are added up, this forms a picture of 'efficacy'. However, this is actually of GSE not TSE beliefs. These are clearly very different (Henson et al., 2000), but unfortunately there seems limited awareness of this in the literature on teachers' self-efficacy beliefs. Research exploring the relationship between the two is lacking.

Perhaps, we can put the relationship between TSE and GSE beliefs in context by considering the work of Ames and Ames (1984), who, in attempting to explain teacher motivation, draw upon three main constructs; task mastery (belief in our ability to help learners accomplish goals – teachers' self-efficacy beliefs - TSE), belief in our ability in general (a global construct related to self-confidence - GSE) and moral responsibility orientations (including a concern for student welfare and sense of duty). The relationship between these cognitions needs to be explored. Do high GSE beliefs protect a teacher struggling to overcome low TSE beliefs in certain context-specific areas? Do high TSE beliefs in specific tasks contribute to more positive GSE beliefs? Research is needed.

A related issue is that research into teachers' self-efficacy beliefs is less likely to support democratic teaching and constructivist teacher education, which Wheatley (2005) argues should be its primary goals, if the focus is on averaged GSE scores, with teachers labelled 'low' discriminated against. As Wheatley explains, self-reported GSE beliefs have been used for screening purposes (to weed out prospective teachers deemed unsuitable) and to evaluate teacher education courses. Yet, for such purposes, due to the possibilities of misinterpretation on the various grounds discussed above, the use of self-report surveys on their own can be deeply problematic. There are, therefore, various design issues to consider if research into teachers' self-efficacy beliefs is to be made of greater practical use to teacher educators.

Using research into teachers' self-efficacy beliefs to support teacher education

There is increasing support for Wheatley's (2005) assertion that to support democratic teaching and constructivist teacher education it is necessary to adopt alternative research paradigms including the interpretive and critical (Aydin, Demirdöğen, and Tarkin 2012; Wyatt 2011), employing methods such as "direct observation and dialogic interpretation as opposed to

self-report surveys" (Putney and Broughton 2011, 94). Such qualitative methods are necessary to explore the meanings embedded in teachers' responses to survey items probing their self-efficacy beliefs. They are thus a means of accessing TSE rather than just GSE beliefs.

Let us suppose, for example, a teacher has responded to the following item from Tschannen-Moran and Woolfolk Hoy (2001): "How much can you do to get children to follow classroom rules?" (800). Even if the context is clearly defined (perhaps one specific class in a specific school taught during a teacher education programme), there are the issues of potential ambiguity discussed above (e.g. the teacher might find some children in this class easier to guide towards following the rules than others), possible inaccuracy (e.g. due to naïve optimism) as well as uncertainty regarding underlying cognitions (e.g. levels of practical knowledge).

There is a further issue of interpretation, which is whether the teacher analyses the survey item from a perspective that is agent-ends, agent-means or means-ends or through a combination of these. So, if a teacher has scored herself low on this item, Wheatley (2005) asks, do these "efficacy doubts roughly mean: 'It doesn't work,' or 'It works, but I can't do it,' or 'I can't do it, but it doesn't work anyway, so why learn it?'" (750). A way to explore the teacher's interpretation would be through semi-structured interview.

In this particular case, if the reason for the teacher's efficacy doubts were because she believed she could not do it (agent-means beliefs), teacher education strategies could focus on providing practical hands-on support (e.g. input on classroom management techniques tailored to her context and/or micro-teaching that would provide mastery experiences). If, conversely, her doubts were agent-ends but based on a positive agent-means component (i.e., she felt she could do it but was unsure if it worked), then vicarious experiences gained from carefully focused observations of experienced teachers helping their own learners to follow classroom rules and interactive, verbally persuasive, experiences of talking to these teachers might help. Alternatively, if investigation revealed that her doubts were of such a powerful means-ends nature (It doesn't work!) as to discourage her from trying, these might be supported through input on child psychology aimed at deepening her knowledge and giving her fresh insights (Perhaps it can work!). The teacher education strategy chosen would depend therefore on the nature of the self-efficacy doubt. Of course, to gain such understandings of a teacher's TSE beliefs and doubts, research that includes a qualitative semi-structured interview element is required (Wheatley 2005); 'why' questions are crucial.

Recent developments in research into teachers' self-efficacy beliefs

A positive recent development in research into teachers' self-efficacy beliefs is the emergence of mixed methods studies that include a meaningful qualitative component (e.g. Aydin, Demirdöğen, and Tarkin 2012; Siwatu 2007, 2011b). These differ from nominally mixed methods studies, e.g.

Cheung (2008) that has just one open questionnaire item, subjects responses to content analysis and presents no qualitative data.

In Aydin, Demirdöğen, and Tarkin's (2012) study, qualitative and quantitative methods were combined in the following way. Firstly, a Turkish version (Capa, Cakiroglu, and Sarikaya 2005) of Tschannen-Moran and Woolfolf Hoy's (2001) survey was used at the beginning of a practicum with 26 pre-service Chemistry teachers. This allowed the researchers to identify those whose GSE beliefs, on the basis of averaged scores, were respectively low, medium and high, enabling them to select two from each category to follow qualitatively. Semi-structured interviews were then used, both at the beginning and end of the practicum, to probe self-efficacy beliefs regarding classroom management, student engagement and instructional strategies. This allowed the researchers to identify which specific experiences seemed to have prompted growth, providing insights into the relative impact of different components of the teacher education programme and therefore supporting course evaluation and design processes. On the basis of their findings, the researchers identified the need for an extensive micro-teaching component in their teacher education courses and for the careful selection of learner-centred mentoring teachers in schools.

Siwatu's (2007, 2011b) study also featured a mixed methods design. Quantitative data were first collected from 192 pre-service Midwestern American teachers through a survey that elicited their culturally responsive teachers' self-efficacy beliefs through items such as: "I am able to identify the diverse needs of my students" (2011b, 362). Analysis revealed the teachers were least efficacious on two items: in using phrases from the native language to both greet English language learners and then praise them for their accomplishments. As Siwatu (2007, 1097) reports, these particular item-specific responses were "the most important findings". They were investigated further in the qualitative phase, when eight teachers (four who had scored high in the survey and four who had scored low) were interviewed, revealing underlying cognitions. Understanding why the teachers felt in the way they did prompted Siwatu to revisit the literature on the value to the learners of the teaching strategies the teachers were avoiding and to suggest teacher education processes. The efficacy-building intervention Siwatu suggests includes readings and lectures around the specific topic, an assignment and a trainer's demonstration lesson related to it, followed by lesson planning, micro-teaching to peers, self-assessment, reflection and feedback.

These studies demonstrate, therefore, that mixed methods research into teachers' self-efficacy beliefs can potentially lead to useful outcomes. If researchers focus on particular item-specific responses, as in Siwatu's (2007, 2011b) study, there is a suggestion this can lead into spiralling action research cycles. Eliciting teachers' self-efficacy beliefs, therefore, need not be a large-scale abstract exercise undertaken by a remote university professor. It can be a formative, small-scale, localized process used to support professional development in specific teacher education contexts.

Mixed methods studies such as the above would seem to have particular relevance to quantitative researchers seeking to extend their work. Various qualitative studies (e.g. Chong and Kong 2012; Takahashi 2011; Wyatt 2010, 2011) published in the last few years also contain practical considerations for teacher educators. In Wyatt's (2010) study, for example, observational and interview data suggested that a teacher was not very efficacious or very competent in organizing a particular type of classroom activity (a low agent-means TSE belief). There was a practical implication regarding the teacher education programme; "he may have needed more hands-on practice in managing groupwork activities, which suggests more micro-teaching in methodology modules" (611). Conversely, a teacher in Wyatt (2008) appears to have been over-efficacious in his use of a teaching strategy of questionable pedagogical value. Powerful means-ends beliefs in the value of this strategy needed challenging; self-efficacy doubts (Wheatley 2002) needed to be induced, which had implications for teacher education strategies. More consciousness-raising was required, together with restructuring of input.

Conclusions

These various recent studies demonstrate therefore that since Wheatley's (2005) call for teachers' self-efficacy beliefs to be reconceptualized, there has been some progress. These studies highlight the practical value to teacher educators of eliciting task-specific TSE beliefs and they suggest how this can be achieved through the use of mixed methods and qualitative research. To further demonstrate this, I take a recent quantitative study as an example and suggest how it could have been extended into a mixed methods design.

As noted above, Tschannen-Moran and Johnson (2011) were interested in teachers' self-efficacy beliefs for literacy instruction. They surveyed 648 American elementary and middle school teachers, developing and testing subject-specific items to use with other instruments. Of the 22 survey items they retained to explain GSE beliefs for literacy instruction, they found the greatest variance in response to the following questions: "'To what extent can you use a student's oral reading mistakes as a strategy to teach effective reading strategies?' and 'How much can you motivate students who show low interest in reading?'" (756). Interestingly, versions of the latter item have been scored in various surveys (e.g. Chiang 2008) in ways that suggest teachers in different contexts may lack efficacy in motivating students who show low interest in their subject.

Tschannen-Moran and Johnson (2011), of course, do not comment on this. Coming from the twin perspectives that self-efficacy doubts are 'a puzzle', as they have not grasped that these are task-specific (Wheatley 2002), and that GSE beliefs "become fairly stable and resistant to change once set" (752), they are interested in the similarities in responses to survey items rather than the differences, in measuring a so-called global construct of teachers' self-efficacy beliefs for literacy instruction. This allows them to make

recommendations (of a very general kind) regarding the teacher education of *future* teachers: perhaps include a children's literature course (the researchers acknowledge they cannot be more specific than that) and encourage book clubs.

So, how could their research have been more useful through the inclusion of a qualitative element in a mixed methods design? As in the studies of Aydin, Demirdöğen, and Tarkin (2012) and Siwatu (2007, 2011b), the initial, very thorough, carefully designed and piloted survey could have led into purposive sampling, with teachers identified on the basis of their responses to individual items invited to participate in a qualitative phase.

A careful interrogation of the quantitative data would support this sampling. Which items were scored high on and which low? Are there any patterns worth exploring? If some teachers scored themselves as particularly highly efficacious on the item: 'To what extent can you use a student's oral reading mistakes as a strategy to teach effective reading strategies?' (Tschannen-Moran and Johnson 2011, 752), why might this have been the case? And how does it relate to their teaching? Is the teacher using techniques to support reading skills (e.g. as discussed by Cameron 2001) that involve sensitivity to feelings, careful diagnosis and interactive support in a one-to-one situation or is the teacher using dreary, demotivating reading aloud around the class techniques (e.g. as discussed by Nuttall 1996)? Classroom observations and interviews would reveal more. If the teacher is over-efficacious in the use of inadequate techniques (as in Wyatt [2008], also with regard to reading strategies), why might this be? Is it due to agent-means, means-ends or agent-ends beliefs and which teacher education strategies might be most effective in supporting change, i.e., in this particular case, in inducing beneficial self-efficacy doubts (Wheatley 2002) that might lead to reflection? With the other scenario suggested above, supporting a teacher to overcome low self-efficacy beliefs in motivating learners uninterested in reading, very different teacher education strategies might be required. If these in-service teachers are not currently on courses, as in Tschannen-Moran and Johnson's (2011) study, they can nevertheless be invited to workshops and can benefit from mentoring.

So, to conclude then, I am arguing that quantitative data-gathering through the use of carefully constructed surveys can be a useful first stage in a mixed methods study. In-depth qualitative data are also required, though, to provide the insights that can make research into teachers' self-efficacy beliefs of real use to teacher educators.

For this to happen, there may need to be a change of thinking in the research community, amongst quantitative researchers who have sometimes failed to align their understandings of teachers' self-efficacy beliefs, the definitions they use, their instruments and the uses to which they put their data. There needs to be a broader understanding that teachers' self-efficacy beliefs are task-specific beliefs, connected to other beliefs in complex ways but worth exploring in their own right, and that doubt and reflection are central to an understanding of how these beliefs change and grow.

It follows, therefore, that research produced in the last few years that builds on Wheatley's (2005) pioneering work should be given closer consideration by quantitative researchers when they come to making decisions about research design and methodology. Though, as noted above, research in the field of teachers' self-efficacy beliefs has been bedevilled by confusion, there are now emerging insights to draw upon and fresh directions ahead for those who choose to take them.

References

Allinder, R.M. 1994. The relationship between efficacy and the instructional practices of special education teachers and consultants. *Teacher Education and Special Education* 17: 86-95.

Ames, C., and R. Ames. 1984. Systems of student and teacher motivation: Towards a qualitative definition. *Journal of Educational Psychology* 76, no. 4: 535-556.

Armor, D., P. Conroy-Oseguera, M. Cox, N. King, L. McDonnell, A. Pascal, et al. 1976. *Analysis of the school preferred reading programs in selected Los Angeles minority schools*. Report No. R-2007-LAUSD. Santa Monica: Rand Corporation.

Ashton, P.T., and R.B. Webb. 1986. *Making a difference: Teachers' sense of efficacy and student achievement.* New York: Longman.

Atay, D. 2007. Beginning teacher efficacy and the practicum in an EFL context. *Teacher Development* 11, no. 2: 203-219.

Aydin, S., B. Demirdöğen, and A. Tarkin. 2012. Are they efficacious? Exploring pre-service teachers' teaching efficacy beliefs during the practicum. *The Asia-Pacific Education Researcher* 21, no. 1: 203-213.

Azar, A. 2010. In-service and pre-service secondary science teachers' self-efficacy beliefs about science teaching. *Educational Research and Reviews* 5, no. 4: 175-188.

Bandura, A. 1986. *Social foundations of thought and action: A social cognitive theory*. New York: Prentice-Hall.

Bandura, A. 1997. *Self-efficacy: The exercise of control*. New York: Freeman.

Bandura, A. 2001. *Guide for constructing self-efficacy scales*. http://www.emory.edu/EDUCATION/mfp

Baumeister, R.F., and M.R. Leary. 1997. Writing narrative literature reviews. *Review of General Psychology* 1, no. 3: 311-320.

Berliner, D.C. 1988. *The development of expertise in pedagogy.* Washington: AACTE Publications.

Borg, S. 2003. Teacher cognition in language teaching. *language teaching* 36, no. 2: 81-109.

Borg, S. 2006. *Teacher cognition and language education: Research and practice.* London: Continuum.

Bruce, C.D., I. Esmonde, J. Ross, L. Dookie, and R. Beatty. 2010. The effects of sustained classroom-embedded teacher professional learning on teacher

efficacy and related student achievement. *Teaching and Teacher Education* 26, no. 8: 1598-1608.

Cameron, L. 2001. *Teaching languages to young learners.* Cambridge: CUP.

Cantrell, S.C., and P. Callaway. 2008. High and low implementers of content literacy instruction: Portraits of teacher efficacy. *Teaching and Teacher Education* 24, no. 7: 1739-1750.

Capa, Y., J. Cakiroglu, and H. Sarikaya. 2005. The development and validation of a Turkish version of the teachers' sense of efficacy scale. *Education and Science* 30: 74-81.

Caprara, G.V., C. Barbaranelli, P. Steca, and P.S. Malone. 2006. Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology* 44, no. 6: 473-490.

Chacón, C.T. 2005. Teachers' perceived efficacy among English as a foreign language teachers in middle schools in Venezuela. *Teaching and Teacher Education* 21, no. 3: 257-272.

Chan, D.W. 2008. General, collective and domain-specific teacher self-efficacy among Chinese prospective and in-service teachers in Hong Kong. *Teaching and Teacher Education* 24, no. 4: 1057-1069.

Cheung, H.Y. 2008. Teacher efficacy: A comparative study of Hong Kong and Shanghai primary in-service teachers. *The Australian Educational Researcher* 35, no. 1: 103-123.

Chiang, M.H. 2008. Effects of fieldwork experience on empowering prospective foreign language teachers. *Teaching and Teacher Education* 24, no. 5: 1270-1287.

Chong, W.H., and C.A. Kong. 2012. Teacher collaborative learning and teacher self-efficacy: The case of lesson study. *The Journal of Experimental Education* 80, no. 3: 263-283.

Cohen, L., L. Manion, and K. Morrison. 2007. *Research methods in education* (6th ed.). London: RoutledgeFalmer.

Coladarci, T. 1992. Teachers' sense of efficacy and commitment to teaching. *Journal of Experimental Education* 60: 323-337.

Collins, M., M. Shattell, and S.P. Thomas. 2005. An exploration of problematic interviewee behaviors in qualitative research. *Western Journal of Nursing Research* 27: 188-199.

Dellinger, A.B., J.J. Bobbett, D.F. Olivier, and C.D. Ellett. 2008. Measuring teachers' self-efficacy beliefs: Development and use of the TEBS-Self. *Teaching and Teacher Education* 24, no. 3: 751-766.

de la Torre Cruz, M.J., and P.F.C. Arias. 2007. Comparative analysis of expectancies of efficacy in in-service and prospective teachers. *Teaching and Teacher Education* 23, no. 5: 641-652.

de Mesquita, P.D., and J.C. Drake. 1994. Educational reform and the self-efficacy beliefs of teachers implementing nongraded primary school programs. *Teaching and Teacher Education* 10, no. 3: 291-302.

Dörnyei, Z. 2001. *Teaching and researching motivation.* Harlow, UK: Pearson Education.

Duffin, L.C., B.F. French, and H. Patrick. 2012. The teachers' sense of efficacy scale: Confirming the factor structure with beginning pre-service teachers. *Teaching and Teacher Education* 28, no. 6: 827-834.

Elbaz, F. 1981. The teacher's 'practical knowledge': A report of a case study. *Curriculum Inquiry* 11: 43-71.

Evans, B.R. 2011. Content knowledge, attitudes and self-efficacy in the mathematics New York City teaching fellows (NYCTF) program. *School Science and Mathematics* 111, no. 5: 225-235.

Fives, H. 2003. What is teacher efficacy and how does it relate to teachers' knowledge? Paper presented at the American Educational Research Association Annual Conference, Chicago.

Fives, H., and P.A. Alexander. 2004. Modelling teachers' efficacy, knowledge, and pedagogical beliefs. Paper presented at the annual meeting of the American Psychological Association, Honolulu.

Fives, H., D. Hamman, and A. Olivarez. 2007. Does burnout begin with student-teaching? Analysing efficacy, burnout and support during the student-teaching seminar. *Teaching and Teacher Education* 23, no. 6: 916-934.

Friedman, I.A., and E. Kass. 2002. Teacher self-efficacy: a classroom-organization conceptualization. *Teaching and Teacher Education* 18, no. 6: 675-686.

Gencer, A.S., and J. Cakiroglu. 2007. Turkish preservice science teachers' efficacy beliefs regarding science teaching and their beliefs about classroom management. *Teaching and Teacher Education* 23, no. 5: 664-675.

Gibson, S., and M. Dembo. 1984. Teacher efficacy: A construct validation. *Journal of Educational Psychology* 76, no. 4: 569-582.

Goddard, R. 2002. A theoretical and empirical analysis of the measurement of collective efficacy: The development of a short form. *Educational and Psychological Measurement* 62: 97-110.

Guo, Y., S.B. Piasta, L.M. Justice, and J.N. Kaderavek. 2010. Relations among preschool teachers' self-efficacy, classroom quality and children's language and literacy gains. *Teaching and Teacher Education* 26, no. 4: 1094-1103.

Gurvitch, R., and M.W. Metzler. 2009. The effects of laboratory-based and field-based practicum experience on pre-service teachers' self-efficacy. *Teaching and Teacher Education* 25, no. 3: 437-443.

Guskey, T.R. 1988. Teacher efficacy, self-concept, and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education* 4, no. 1: 63-69.

Haverback, H.R., and S.J. Parault. 2011. High efficacy and the preservice reading teacher: A comparative study. *Teaching and Teacher Education* 27, no. 4: 703-711.

Henson, R.K., D.T. Bennett, S.F. Sienty, and S.M. Chambers. 2000. The relationship between means-end task analysis and context specific and global self-efficacy in emergency certification teachers: Exploring a new

model of teacher efficacy. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Henson, R.K. 2001. The effects of participation in teacher research on teacher efficacy. *Teaching and Teacher Education* 17, no. 7: 819-836.

Henson, R.K. 2002. From adolescent angst to adulthood: Substantive implications and measurement dilemmas in the development of teacher efficacy research. *Educational Psychologist* 37, no. 3: 137-150.

Ho, I.T., and K.T. Hau. 2004. Australian and Chinese teacher efficacy: similarities and differences in personal instruction, discipline, guidance efficacy and beliefs in external determinants. *Teaching and Teacher Education* 20, no. 3: 313-323.

Johnson, K. 2003. *Designing language teaching tasks.* Basingstoke: Palgrave.

Kang, S.J., and C. Neitzel. 2005. Teacher efficacy research from an agentic view. *Academic Exchange Quarterly* 9, no. 4: 219-223.

Klassen, R.M., V.M.C. Tze, S.M. Betts, and K.A. Gordon. 2011. Teacher efficacy research 1998-2009: Signs of progress or unfulfilled promise? *Educational Psychology Review* 23: 21-43.

Knoblauch, D., and A. Woolfolk Hoy. 2008. "Maybe I can teach *those* kids." The influence of contextual factors on student teachers' efficacy beliefs. *Teaching and Teacher Education* 24, no. 1: 166-179.

Labone, E. 2004. Teacher efficacy: maturing the construct through research in alternative paradigms. *Teaching and Teacher Education* 20, no. 4: 341-359.

Liaw, E.C. 2009. Teacher efficacy of pre-service teachers in Taiwan: The influence of classroom teaching and group discussions. *Teaching and Teacher Education* 25, no. 1: 176-180.

Malinen, O., H. Savolainen, and J. Xu. 2012. Beijing in-service teachers' self-efficacy and attitudes towards inclusive education. *Teaching and Teacher Education* 28: 526-534.

Midgely, C., H. Feldlaufer, and J. Eccles. 1989. Change in teacher efficacy and student self- and task-related beliefs in mathematics during the transition to junior high school. *Journal of Educational Psychology* 81: 247-258.

Milner, H.R., and A. Woolfolk Hoy. 2003. A case study of an African American teacher's self-efficacy, stereotype threat, and persistence. *Teaching and Teacher Education* 19, no. 2: 263-276.

Moafian, F., and A. Ghanizadah. 2009. The relationship between Iranian EFL teachers' emotional intelligence and their self-efficacy in language institutes. *System* 37, no. 4: 708-718.

Mulholland, J., and J. Wallace. 2001. Teacher induction and elementary science teaching: enhancing self-efficacy. *Teaching and Teacher Education* 17, no. 2: 243-261.

Nuttall, C. 1996. *Teaching reading skills in a foreign language* (2nd ed.) Oxford: Heinemann.

O'Neill, S.J., and J. Stephenson. 2011. The measurement of classroom management self-efficacy: a review of measurement instrument development and influences. *Educational Psychology* 31, no. 3: 261-299.

Pajares, F.M. 1992. Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research* 62, no. 3: 307-332.

Pajares, F.M. 2002. *Overview of social cognitive theory and of self-efficacy.* http://www.emory.edu/EDUCATION/mfp/eff

Palmer, D. 2011. Sources of efficacy information in an inservice program for elementary teachers. *Science Education* 95, no. 4: 577-600.

Pintrich, P.R., and D.H. Schunk. 1996. *Motivation in education: Theory, research and applications.* New Jersey: Prentice Hall.

Poulou, M. 2007. Personal teaching efficacy and its sources: Student teachers' perceptions. *Educational Psychology* 27, no. 2: 191-218.

Putney, L.G., and S.H. Broughton. 2011. Developing collective classroom efficacy: The teacher's role as community organizer. *Journal of Teacher Education* 62, no. 1: 93-105.

Rastegar, M., and S. Memarpour. 2009. The relationship between emotional intelligence and self-efficacy among Iranian EFL teachers. *System* 37, no. 4: 700-707.

Raudenbush, S.W., B. Rowan, and Y.F. Cheong. 1992. Contextual effects on the self-perceived efficacy of high school teachers. *Sociology of Education* 65, no. 2: 150-167.

Richardson, V. 1996. The role of attitudes and beliefs in learning to teach. In *Handbook of Research on Teacher Education.* 2nd ed., ed. J. Sikula, T.J. Buttery & E. Guyton, 102-119. New York: Macmillan.

Riggs, I., and L. Enochs. 1990. Toward the development of an elementary teacher's science teaching efficacy belief instrument. *Science Education* 74: 625-638.

Ross, J.A. 1994. The impact of an inservice to promote cooperative learning on the stability of teacher efficacy. *Teaching and Teacher Education* 10, no. 4: 381-394.

Rots, I., A. Aelterman, G. Devos, and P. Vlerick. 2010. Teacher education and the choice to enter the teaching profession: A prospective study. *Teaching and Teacher Education* 26, no. 8: 1619-1629.

Rotter, J. 1966. Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs* 80: 1-28.

Rushton, S.P. 2003. Two preservice teachers' growth in self-efficacy while teaching in an inner-city school. *The Urban Review* 35, no. 3: 167-189.

Schoon, K.J., and W.J. Boone. 1998. Self-efficacy and alternative conceptions of science of preservice elementary teachers. *Science Education* 82: 553-568.

Settlage, J., S.A. Southerland, L.K. Smith, and R. Ceglie. 2009. Constructing a doubt-free teaching self: Self-efficacy, teacher identity and science instruction within diverse settings. *Journal of Research in Science Teaching* 46, no. 1: 102-125.

Siwatu, K.O. 2007. Preservice teachers' culturally responsive teaching self-efficacy and outcome expectancy. *Teaching and Teacher Education* 23, no. 7: 1086-1101.

Siwatu, K.O. 2011a. Preservice teachers' sense of preparedness and self-efficacy to teach in America's urban and suburban schools: Does context matter? *Teaching and Teacher Education* 27, no. 2: 357-365.

Siwatu, K.O. 2011b. Preservice teachers' culturally responsive teaching self-efficacy-forming experiences: A mixed methods study. *The Journal of Educational Research* 104, no. 5: 360-369.

Skaalvik, E.M., and S. Skaalvik. 2010. Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education* 26, no. 4: 1059-1069.

Skinner, E.A. 1996. A guide to constructs of control. *Journal of Personality and Social Psychology* 71: 549-570.

Stake, R.E. 1995. *The art of case study research.* Thousand Oaks, California: Sage.

Stein, M.K. and M.C. Wang. 1988. Teacher development and school improvement: The process of teacher change. *Teaching and Teacher Education* 4, no. 2: 171-187.

Takahashi, S. 2011. Co-constructing efficacy: A "communities of practice" perspective on teachers' efficacy. *Teaching and Teacher Education* 27, no. 4: 732-741.

Tournaki, N., and D.M. Podell. 2005. The impact of student characteristics and teacher efficacy on teachers' predictions of student success. *Teaching and Teacher Education* 21, no. 3: 299-314.

Tschannen-Moran, M., and D. Johnson. 2011. Exploring literacy teachers' self-efficacy beliefs: Potential sources at play. *Teaching and Teacher Education* 27, no. 4: 751-761.

Tschannen-Moran, M., and P. McMaster. 2009. Sources of self-efficacy: Four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The Elementary School Journal* 110, no. 2: 228-245.

Tschannen-Moran, M., and A. Woolfolk Hoy. 2001. Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education* 17, no. 7: 783-805.

Tschannen-Moran, M., and A. Woolfolk Hoy. 2002. The influence of resources and support on teachers' efficacy beliefs. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Tschannen-Moran, M., and A. Woolfolk Hoy. 2007. The different antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education* 23, no. 6: 944-956.

Tschannen-Moran, M., A. Woolfolk Hoy, and W.K. Hoy. 1998. Teacher efficacy: Its meaning and measure. *Review of Educational Research* 68: 202-248.

Verloop, N., J. Van Driel, and P.C. Meijer. 2001. Teacher knowledge and the knowledge base of teaching. *International Journal of Educational Research* 35, no. 5: 441-461.

Weiner, B. 1979. A theory of motivation for some classroom experiences. *Journal of Educational Psychology* 71: 3-25.

Wheatley, K.F. 2002. The potential benefits of teacher efficacy doubts for educational reform. *Teaching and Teacher Education* 18, no. 1: 5-22.

Wheatley, K.F. 2005. The case for reconceptualizing teacher efficacy research. *Teaching and Teacher Education* 21, no. 7: 747-766.

Wideen, M., J. Mayer-Smith, and B. Moon. 1998. A critical analysis of the research on learning to teach: Making the case for an ecological perspective on inquiry. *Review of Educational Research* 68, no. 2: 130-178.

Wolters, C.A. 2003. Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Educational Psychologist* 38, no. 4: 189-205

Woolfolk, A.E., B. Rosoff, and W.K. Hoy. 1990. Teachers' sense of efficacy and their beliefs about managing students. *Teaching and Teacher Education* 6, no. 2: 137-148.

Woolfolk Hoy, A., and R. Burke-Spero. 2005. Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and Teacher Education* 21, no. 4: 343-356.

Wyatt, M. 2008. Growth in practical knowledge and teachers' self-efficacy during an in-service BA (TESOL) programme. Unpublished PhD diss., School of Education, University of Leeds, UK.

Wyatt, M. 2010. An English teacher's developing self-efficacy beliefs in using groupwork. *System* 38, no. 4: 603-613.

Wyatt, M. 2011. Overcoming low self-efficacy beliefs in teaching English to young learners. *International Journal of Qualitative Studies in Education* Doi:10.1080/09518398.2011.605082