



The construct validity and predictive validity of a self-efficacy measure for student teachers in competence-based education

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ARTICLE INFO

Article history:

Received 12 December 2012

Received in revised form 13 May 2013

Accepted 15 May 2013

Keywords:

Student evaluation
Student teacher self-efficacy measure
Competence-based education
Evaluation methods

ABSTRACT

This study intends to investigate the validity of a self-efficacy measure which is developed for predictive and diagnostic purposes concerning student teachers in competence-based education. CFA results delivered converging evidence for the multidimensionality of the student teacher self-efficacy construct and the bi-factor model as underlying structure, reflecting a teacher competence framework. Factor loadings of the bifactor model evidenced the theoretical assumption that incipient student teachers enter the programme with a global undifferentiated sense of teacher self-efficacy, having teaching experiences a further differentiation takes place to a partly differentiated sense of teacher self-efficacy. Logistic regression analysis revealed that the measure succeeds in predicting students' first-year outcomes and delivered evidence for the diagnostic value of the scale.

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Introduction

At present, institutes for teacher education put effort in supporting their student teachers in developing the knowledge, skills and competences required of them. In the development of these competences, researchers in educational settings are increasingly drawing attention to the role student perceptions and beliefs play in the learning process. In particular self-efficacy, as a key element of social cognitive theory, appears to be a significant variable in student learning and development (see e.g., [Pajares, 2006](#); or for a review, see [Van Dinther, Dochy, & Segers, 2011](#)). Concerning the educational field, considerable research has been conducted with regard to the relevance of teacher self-efficacy and the development of teacher self-efficacy measures ([Tschannen-Moran & Woolfolk Hoy, 2001](#); [Woolfolk Hoy & Davis, 2006](#)). However, existing teacher self-efficacy measures are mostly concerned with graduated teachers working in the educational field, lacking the optimal level of task and context specificity because they do not take into account student teacher competence development and student teacher self-efficacy development.

According to [Bandura \(1997\)](#) and [Woolfolk Hoy and Burke-Spero \(2005\)](#), teacher self-efficacy may be most malleable during teacher preparation and the first years of teaching. However, teacher educational institutes pay scarce attention to student teacher self-efficacy and research to explore the development of student teacher self-efficacy is limited.

Taking into account students' incipient developmental stage of teacher competences and teacher self-efficacy, this study intends to investigate the construct validity and predictive validity of a self-efficacy measure which is developed for predictive and diagnostic purposes for first year student teachers in competence-based education.

Teachers' sense of efficacy

As a key element of social cognitive theory, self-efficacy appears to be a significant variable in diverse domains of human functioning ([Pajares, 1996](#); [Schunk, 1995, 2003](#)). Self-efficacy refers to 'beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments' ([Bandura, 1997](#), p. 3). Within the educational field, the meaning and measure of teachers' sense of efficacy has been the focus of many research studies. Teacher self-efficacy is usually defined as 'the extent to which the teacher believes he or she has the capacity to affect student performance' ([Berman, McLaughlin, Bass, Pauly, & Zellman, 1977](#), p. 137) or as 'their belief in their ability to have a positive effect on student learning' ([Ashton, 1985](#), p. 142).

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The notion that teachers' beliefs about their capabilities as teachers are of consequence, dates from [Rotter's social learning theory \(1966\)](#). According to this conceptual base, teachers' sense of efficacy was viewed as the extent to which teachers believe whether the reinforcement of their teaching activities lies within their own control (internal) or outside their control and within the influence of the environment (external).

The second conceptual base originated from [Bandura's work \(1977\)](#) and identified teacher self-efficacy as a type of self-efficacy among several other types. The meaning of teacher self-efficacy as a type of self-efficacy regarding student achievement and motivation has been investigated in several studies ([Woolfolk Hoy & Davis, 2006](#)). Several researchers found significant relations between teacher sense of efficacy and student achievement. We mention some examples. [Ashton and Webb \(1986\)](#) demonstrated that students generally learn more from teachers with a high sense of efficacy than from teachers with a low sense of efficacy. Other researchers showed that students guided by high self-efficacious teachers achieved higher in subjects such as mathematics ([Muijs & Reynolds, 2001](#); [Ross, 1992, 1998](#)) and reading ([Ross, 1992, 1998](#)) than did students guided by low self-efficacious teachers. Others connected teacher self-efficacy with student motivation ([Midgley, Feldlaufer, & Eccles, 1989](#)) and students' interest in and attitude towards school ([Woolfolk, Rosoff, & Hoy, 1990](#)). Referencing teacher behaviour, research has pointed out that teachers with a high sense of self-efficacy differ from those with low sense of self-efficacy in their teaching behaviour regarding issues such as classroom management, instruction, teacher feedback. Researchers as [Chacon \(2005\)](#), [Woolfolk and Hoy \(1990\)](#) and [Woolfolk et al. \(1990\)](#) suggest that teacher efficacy is related to teacher classroom management. High efficacy teachers incline to less controlling and more humanistic behaviour in handling their students. High efficacious teachers apt to divide the class for small group instruction and direct teaching ([Gibson & Dembo, 1984](#); [Muijs & Reynolds, 2001](#)), spend more time in interactive instruction ([Smylie, 1988](#)), demonstrate higher levels of planning and organisation ([Allinder, 1994](#)), and demonstrate more enthusiasm in their teaching ([Allinder, 1994](#); [Guskey, 1984](#)) than do their low efficacious colleagues. [Ashton, Webb, and Doda \(1983\)](#) found significant relations between teacher self-efficacy and interactions between teacher and students, and student accomplishments. High efficacy teachers focused more on high standards, instruction, student task behaviour and a supportive climate, than do low efficacy teachers. [Gibson and Dembo \(1984\)](#) and [Dembo and Gibson \(1985\)](#) investigated the influence of teacher efficacy on academic focus and teacher feedback. Their results revealed that high efficacy teachers were more effective in leading students to correct responses by means of questioning than were low efficacy teachers. High efficacious teachers are less critical to and spent more time in working with and monitoring students who exhibited learning difficulties ([Ashton & Webb, 1986](#); [Gibson & Dembo, 1984](#)), those teachers perceive all students as teachable ([Soodak & Podell, 1993, 1996](#)).

Considering this substantial amount of research findings, pointing to the central role of teacher self-efficacy plays in teaching competence and teacher effectiveness, it seems relevant for teacher educational institutes to pay attention to students' developing self-efficacy within the learning process.

Measuring teachers' sense of efficacy

During the last three decades several researchers have attempted to measure teacher self-efficacy, resulting in short, general measures as well as long, detailed ones. Although the study of teacher self-efficacy started with RAND researchers' notion, dating from Rotter's social learning theory; in particular the

conceptual base originating from [Bandura's social cognitive theory \(1977, 1997\)](#) gave rise to the development of several teacher self-efficacy measures.

According to this Bandura tradition, the [Gibson and Dembo \(1984\)](#) Teacher Efficacy Scale (TES) is the most used instrument. They developed a two-factor instrument, to measure two constructs of social cognitive theory, self-efficacy and outcome expectancy. One factor, conceptualized as Personal Teaching Efficacy, refers to self-efficacy. The second factor, conceptualized as General Teaching Efficacy, refers to outcome expectancy, which is the individual's appraisal of the likely consequences of executed actions. However, continued research on this two-factor instrument revealed inconsistencies and factor loadings appeared to be not always consistent across studies (see e.g., [Anderson, Greene, & Loewen, 1988](#); [Hoy & Woodfolk, 1993](#); [Soodak & Podell, 1993](#)). At first, factor analyses confirmed the two-factor instrument. Later on, in continued research building on Gibson and Dembo's two-factor solution, researchers introduced other factor solutions. [Woolfolk and Hoy \(1990\)](#) maintained Gibson and Dembo's General Teaching Efficacy dimension but broke the Personal Teaching Efficacy dimension into two factors, namely teacher's sense of personal accountability concerning positive and negative student learning outcomes. [Soodak and Podell \(1996\)](#) also argued for a three-factorial solution but proposed an alternative interpretation of the two factors that, according to [Woolfolk and Hoy \(1990\)](#), comprise Personal Teaching Efficacy. Results of their principal components analysis revealed that these two factors were not differentiated by positive and negative student learning outcomes but by Bandura's self-efficacy and outcome expectations. In addition to this [Emmer and Hickman \(1991\)](#) argued that the Personal Teaching Efficacy dimension reflects two different efficacy beliefs, teaching and classroom management. Results of their principal component analysis confirmed this three-factor solution. [Lin and Gorrell \(1998\)](#) mentioned a four-factor solution and labelled the factors as: professional knowledge, effective teaching, guiding difficult children and home environment. However, they gave no a priori theoretical arguments that make this four-factor solution plausible. [Brouwers and Tomic \(2003\)](#) noticed that most researchers who studied the factorial validity of the TES only used the statistical technique principal components analysis, which provides no information about the overall fit of the factorial models. They tested different factorial models as proposed by several above-mentioned researchers on theoretical grounds. The results of their confirmatory factor analyses delivered evidence for a four-factor model that significantly fitted the data better than the other model, although its fit did not reach the recommended criterion of adequately fitted models. They mentioned the following reasons why the TES did not demonstrate an adequate factorial model fit. Firstly, the item content in both subscales reflects two different constructs, namely knowing how to teach and being confident about teaching. Secondly, the General Teaching Efficacy subscale reflects different reference points, some items refer to teachers in general and other items refer to the individual teacher. [Deemer and Minke \(1999\)](#) extensively examined the TES and found that the items of the Personal Teacher Efficacy Scale were valid indicators of teaching efficacy, however they questioned the validity of the General Teaching Efficacy Scale. Removing item wording confounds, they argued for a one-factor solution, indicating a global Personal Teacher Efficacy dimension.

Considering the above-mentioned teacher self-efficacy measurement research, the underlying structure of teacher efficacy measures resulted in different factor solutions. Some researchers argued for the one-factor solution ([Deemer & Minke, 1999](#)). In a one-factor model the covariance among items is explained by one common factor ([Reise, Morizot, & Hays, 2007](#)). The one-factor model suggests that in the perception of teachers a global

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