

# Personal Teaching Efficacy and Its Sources: Student teachers' perceptions

Maria Poulou\*

*University of Patras, Greece*

Teachers' confidence in their ability to perform the actions that lead to student learning is one of the few individual characteristics that predicts teacher practice and student outcomes. Teachers and especially student teachers need strong efficacy beliefs in order to continue teaching during in-service education. The current study explores the factors that precede student teachers' beliefs of teaching efficacy and determine their conviction that they can influence instructional strategies, classroom management, and students' engagement. In the study 198 fourth-year students from two primary education departments in Greece completed a Teacher Efficacy Sources Inventory and a Teachers' Sense of Efficacy Scale. It was found that self-perceptions of teaching competence, personal characteristics, and motivation for teaching were contributory factors to teaching efficacy. The search for this type of information from student teachers is based on the assumption that feedback from students comprises a substantive factor in relation to the evaluation and improvement of teacher training programmes.

## Introduction

Among the mechanisms of agency, none is more central or pervasive than beliefs of personal efficacy. Unless people believe they can produce desired effects by their actions, they have little incentive to act. Efficacy belief therefore is a major basis of action. (Bandura, 1997, p. 3)

Researchers in psychology and education have based their conceptions of teacher efficacy on the theoretical framework of self-efficacy developed by Bandura (1977). Bandura proposed two types of expectations that affect the choice of activities and the effort people expend to reach certain outcomes: outcome expectancy, which is defined as a person's estimation that a given behaviour will lead to certain outcomes, and efficacy expectation, which is the conviction that one can successfully execute the behaviour required to produce the outcomes. Therefore, individuals can acknowledge that a course of action will produce certain outcomes, but if they have

---

\*PO Box 400 69, 12 310 Agia Barbara, Athens, Greece. Email: mariapoulou@yahoo.com

serious doubts about their ability to perform the action, then such information will influence their behaviour. The degree of people's conviction in their own effectiveness is not only likely to affect how much effort they will expend and how long they will persist in adverse circumstances; it is also likely to affect whether they will initiate a coping behaviour. Bandura (1982, 1986) postulated that convergent evidence from divergent domains and procedures supports the notion that perceived self-efficacy functions as an influential mechanism in human activity.

Extending Bandura's reasoning to the educational setting, Ashton (1985) and Ashton et al. (1982) suggested that teachers' outcome expectations about the consequences of teaching are reflected in a dimension which they labelled "teaching efficacy" (outcome expectation, in Bandura's terms); by contrast, a teacher's judgments of his or her ability to execute particular courses of action and to bring about desired goals are reflected in a dimension they called "personal teaching efficacy" (efficacy expectation, in Bandura's terms). Soodak and Podell (1996) asserted that teacher efficacy comprises three uncorrelated factors, namely "personal efficacy", "outcome efficacy", and "teaching efficacy". Personal efficacy pertains to a teacher's belief that she or he possesses teaching skills; outcome efficacy refers to the belief that when the teacher implements these skills, these will lead to desirable student outcomes; and teaching efficacy is viewed as the belief that teaching can overcome the effects of outside influences.

Teachers' confidence in their ability to perform the actions that lead to student learning is one of the few individual characteristics that reliably predicts teacher practice and student outcomes (Ross, 1994; Woolfolk & Hoy, 1990). A plethora of studies have related teachers' sense of efficacy to student achievement (Ashton & Webb, 1986; Ross, 1992), motivation (Midgley, Feldlaufer, & Eccles, 1989), and sense of efficacy (Anderson, Greene, & Loewen, 1988). Teachers' sense of efficacy has also been related to teacher behaviour in the classroom (Ghaith & Yaghi, 1997; Guskey, 1988; Milner, 2002), their ideology about the control of pupils (Woolfolk & Hoy, 1990), enthusiasm for teaching (Allinder, 1994; Ashton, 1984; Ashton et al., 1982), level of stress experienced in teaching (Smylie, 1988), burnout (Brouwers & Tomic, 2000), quality of teaching (Raudenbush, Bhumirat, & Kamali, 1992), commitment to teaching (Coladarci, 1992), school context (Goddard & Goddard, 2001), and commitment to the profession (Burley, Hall, Villeme, & Brockmeier, 1991; Milner, 2002). Teachers with higher levels of self-efficacy were less critical of students when they made errors (Ashton & Webb, 1986), less inclined to refer a difficult student to special education (Meijer & Foster, 1988; Podell & Soodak, 1993; Soodak & Podell, 1994), and more willing to support and cope with students' emotional and behavioural difficulties (Poulou & Norwich, 2002). In addition, pre-service teachers' sense of efficacy has been related to their personal theories (Harrison, Moore, & Ryan 1996) and teaching practice (Clement, 1999; Kushner, 1993; Poulou & Spinthourakis, 2002; Smith, 2000).

Bandura (1986, 1997) argued that self-knowledge about one's efficacy, whether accurate or faulty, is based on four sources of information. The first source is enactive attainments, which provide the most influential source of efficacy information

because they are based on authentic mastery experiences. Successes raise efficacy appraisals, whereas repeated failures lower them, especially if the failures occur early in the course of events. The extent to which people will alter their perceived efficacy through performance experiences depends upon their preconceptions of their capabilities, the perceived difficulty of the tasks, the amount of effort they expend, the amount of external aid they receive, the circumstances under which they perform, the pattern of their successes and failures, and the way these enactive experiences are cognitively organized and constructed. Enactive mastery produces stronger and more generalized efficacy beliefs than those which rely solely on vicarious experiences or verbal instruction.

The second source of information is vicarious experiences, which partly influence self-efficacy appraisals through modelled attainments. Thus, modelling serves as an effective tool for promoting a sense of personal efficacy. This is especially true for activities in which there are no absolute measures of adequacy and individuals must assess their ability through comparisons with others. People compare themselves to particular associates in similar situations. Surpassing associates or competitors raises self-perceptions of efficacy in observers, whereas performing worse lowers them.

The third source of information is verbal persuasion, which is used to try to make people believe that they possess the capabilities which will enable them to achieve what they seek. The degree of persuasion, however, depends on the credibility, trustworthiness, and expertise of the persuader. Verbal persuasion alone may be limited in creating lasting efficacy beliefs, but it can reinforce self-change if the positive appraisal is based on realistic terms. Beyond direct persuasion, other social factors can be equally important. For teachers, for example, the responses of their students could consist of a form of social persuasion (Mulholland & Wallace, 2001). Thus, types of social persuasion such as verbal feedback, encouragement, praise, norms of persistence, and achievement can induce a supportive social environment, whereas lack of feedback and criticism from colleagues and students can create an unsupportive environment (Milner & Hoy, 2003).

The fourth and final source of information is the physiological state, on which people rely partly to make judgments about their capabilities. Physiological indicators of efficacy play an influential role in activities requiring physical strength and stamina. The information conveyed by physiological or affective states is not a predictor of personal efficacy by itself. Rather, such information affects efficacy beliefs through the mediation of cognitive processes (cognitive appraisal of the sources of activation, its intensity, the circumstances under which the activation takes place, etc.). Therefore, in forming their efficacy judgments, people have to deal with different sources of efficacy-relevant information, and at the same time they have to integrate efficacy information and convey it to a number of cognitive, motivational, affective, or decisional processes.

Research on the factor structure of the sources of self-efficacy suggests that there may be a model of two clusters, one which reflects direct personal experience (past performance, emotional arousal, and social persuasion), and another which reflects

indirect experience (vicarious learning or modelling) (Anderson & Betz, 2001; Lent, Lopez, & Bieschke, 1991). In fact, Tschannen-Moran, Hoy, and Hoy (1998) recommended a unified teaching efficacy model. According to this model, which is in complete accord with Bandura's (1986, 1997) socio-cognitive theory, the most basic factors that influence efficacy beliefs are the analysis of social attribution and the interpretation of four information sources on efficacy: mastery experience, physical readiness, experience through observation, and verbal persuasion. Teachers do not feel equally capable with respect to all teaching situations. Teaching efficacy can vary depending on the characteristics of the teaching context (Tschannen-Moran et al., 1998; Van den Berg, 2002). Teachers feel capable of teaching specific subjects to specific students in specific teaching contexts, and it is expected that they will feel more or less able under differing conditions. Consequently, in terms of the evaluation of teaching efficacy, we need to include the teaching task, the teaching context, and the weaknesses as well as the qualifications of the teacher with respect to the required task. On the other hand, in the assessment of personal teaching efficacy beliefs, teachers take into consideration personal abilities, such as skills, knowledge, strategies, and characteristics of their personality in conjunction with their personal weaknesses in terms of the specific teaching context. The interaction of these two factors (the teaching task and teaching ability) leads to an assessment of the self-efficacy of the teaching task.

Tschannen-Moran and Hoy (2002) assessed one aspect of Tschannen-Moran et al.'s (1998) model, namely the extent to which teachers' assessments of key resources and supports in their teaching contexts contribute to their efficacy judgments. The results of their study suggested that availability of resources, as well as support from parents, are related to teachers' sense of efficacy. Novice teachers, in particular, assessed elements of the teaching task and perceived support in making efficacy judgments, a finding consistent with Bandura's (1986, 1997) theory, which suggests that self-efficacy is malleable early in learning and that support in the first years of teaching could be critical to the development of teacher efficacy. Tschannen-Moran and Hoy further contend that it is of both theoretical and practical importance to understand the sources of information that teachers utilize in making judgments about their sense of efficacy. The results of their study pointed to a need for additional research into important sources of efficacy beliefs and how these beliefs are formulated, in order to better train and equip teachers for their complex tasks. Ross, Cousins, and Gadalla's (1996) study shifted the research interest to within-teacher factors, such as feelings of past success, feelings of being well-prepared, and student engagement, as potential predictors of teaching efficacy. Anderson and Betz (2001) also argued that little research has focused on the sources of self-efficacy, in contrast to the amount of research on correlates or outcomes of self-efficacy.

In respect of student teachers, it has been argued that efficacy beliefs play a definite role in obtaining and interpreting the knowledge offered in teacher training programmes. These beliefs have a greater effect on the way prospective teachers organize their teaching acts than knowledge, and are stronger indicators for predicting

their teaching behaviour (Pajares, 1992). In fact, increased teaching efficacy is linked to an increase in alternative teaching ideas without, however, proving a cause-and-effect relationship (Thomas & Pedersen, 1998). Whereas the importance of student teachers' efficacy beliefs is fully acknowledged, there is a lack in the literature of a tailor-made instrument for measuring student teachers' sense of teaching efficacy. A student teacher efficacy measure which reflects student teachers' perspectives rather than researchers' perspectives on pedagogical skills, communication with pupils, pupils' instructional participation, classroom management, teaching success, or teaching commitment could serve for the study of student teacher efficacy (Yeung & Watkins, 2000). Based on the significance of teaching efficacy, a need arises for the investigation of the factors that influence student teachers' perceptions of teaching efficacy as well.

The current study aimed to explore the factors that precede student teachers' perceptions of their teaching efficacy and affect their convictions that they can influence their pupils and schools. More specifically, it explored (a) student teachers' perceptions of the sources of personal teaching efficacy, (b) student teachers' efficacy beliefs for instructional strategies, classroom management, and student engagement, and (c) the relationship between the sources of personal teaching efficacy and efficacy beliefs for instructional strategies, classroom management, and student engagement.

## Method

### *Teaching Efficacy Sources Inventory*

*Interviews.* As postulated by Henson (2002), the study of teacher efficacy beliefs requires qualitative research. In his words, "to fully understand the relationships between the sources of efficacy information, the meaning teachers attach to this information, and any ultimate change in their efficacy beliefs, in-depth study of teachers is necessary" (p. 147). Based on this assertion, 32 student teachers (4 male and 28 female) were interviewed. The interviews lasted 30–45 minutes and took place at the researcher's office. Students were asked open questions regarding the degree of teaching efficacy they anticipated experiencing in their own classrooms, the factors which influenced that degree of teaching efficacy, the factors for which student teachers had high and low feelings of efficacy, and, finally, the factors which would promote their sense of teaching efficacy.

*Content validity of the Teaching Efficacy Sources Inventory.* In a second step, the analysis of the interview transcripts resulted in the formulation of statements listed in the Teaching Efficacy Sources Inventory, providing evidence for its content validity. Care was taken to ensure that alternative statements followed each question, to allow the expression of all shades of opinion. Following its construction, the inventory was administered to the students interviewed to ensure that the opinions expressed in the interviews were represented.

*Reliability of the Teaching Efficacy Sources Inventory.* The reliability of the Teaching Efficacy Sources Inventory was examined with the test–retest reliability method. At the second administration, which took place 5 weeks after the first administration, subjects were asked to rate their answers to the same questions which they had completed at the first administration. In this step 22 questionnaires were administered to 3 male (13.6%) and 19 female (86.4%) student teachers. Two aspects of reliability were calculated for the Teaching Efficacy Sources Inventory: the stability of each item, using a related group  $t$  test, and the consistency of differences between individual items, using Pearson coefficients. Mean scores, standard deviations,  $t$  tests, and Pearson coefficients at both measurements were computed separately for each item in the inventory.

Table 1 shows the score for the 30 items comprising the sources of teaching efficacy. As Table 1 shows, student teachers' ratings of the sources of teaching efficacy presented no significant change in the mean scores on the inventory items from Time 1 to Time 2 (none of the  $t$  test values were significant at  $p \leq .05$ ), with two exceptions: the items "Teaching experience in difficult classes or schools during the teaching practice (minority, multicultural, special schools, etc.)" and "Feelings of fatigue following your teaching sessions as an indication of lack of ability or disappointment". These items, however, had significant Pearson coefficients, and therefore they were not excluded from the inventory. According to the same table, Pearson values were significant and ranged from .31 to .77. Three items were found with non-significant correlations: "successful teaching sessions during teaching practice", "comparison of your teaching with the model teaching you observed during teaching practice", and "recovery from negative feelings during your teaching sessions". These items were not excluded from the inventory, since their non-significant  $t$ -test values indicated consistency in student teachers' ratings. Also these items were mentioned by almost all the prospective teachers interviewed.

#### *Teaching Efficacy Instrument: Teachers' Sense of Efficacy Scale*

The Teachers' Sense of Efficacy Scale (TSES) was used to measure student teachers' efficacy beliefs.<sup>1</sup> A brief review of teaching efficacy measurements follows, to justify the implementation of the TSES in our study. Rand researchers based on Rotter's (1966) locus of control first measured teacher efficacy using two items, in which teachers indicated whether students' motivation and performance lay within their control (Armor et al., 1976). Many subsequent attempts were made to delineate the construct of teacher efficacy, either based on the attribution theory trend (Guskey, 1981; Rose & Medway, 1981), or on Bandura's self-efficacy theory trend (Ashton et al., 1982; Emmer & Hickman, 1991; Gibson & Dembo, 1984; Soodak & Podell, 1996). In the confusion about how to best measure teacher efficacy, Bandura (1997) responded with his own Teacher Self-Efficacy Scale. This measure provided a coherent picture of teachers' efficacy beliefs, without being too narrow or too specific. However, reliability and validity information about the measure have not been available (Tschannen-Moran & Hoy, 2001).



Table 1. Mean scores, standard deviations, *t* tests, and Pearson coefficients on student teachers' ratings on the Teaching Efficacy Sources Inventory, at the first and second administrations (*N* = 22)

Inventory items	Mean (Time 1)	SD (Time 1)	Mean (Time 2)	SD (Time 2)	<i>t</i> test	Pearson coefficient
<b>Personality characteristics</b>						
Personal style/idiosyncrasy	4.22	0.75	4.36	0.72	-0.90	.53**
Trust in self	4.18	0.85	4.22	0.68	-0.29	.57**
Positive stance/humour	4.31	0.71	4.36	0.72	-0.37	.68**
Originality/creativity	4.04	0.89	3.81	0.79	1.74	.74**
Talent for teaching	3.59	1.09	3.77	1.06	-1.16	.77**
Direct communication with pupils	4.45	0.67	4.31	0.77	0.90	.52**
<b>Capabilities/skills</b>						
Ability to perceive pupils' needs	3.90	0.75	4.00	0.43	-0.69	.58**
Organization and schedule of teaching activities	4.09	0.75	3.95	0.78	0.82	.49*
Flexibility in teaching choices	3.59	0.90	3.86	0.71	-1.66	.57**
Ability to control classroom	3.95	0.72	3.68	0.64	-1.82	.47*
<b>Motivation</b>						
Personal interest/motives	4.27	0.76	4.31	0.64	-0.37	.68**
Personal effort (study, concern about topics of teaching effectiveness)	4.36	0.65	4.45	0.50	-8.10	.62**
Desire to improve the teaching task	4.36	0.58	4.50	0.67	-1.14	.60**
Love for pupils which enhances efforts towards effective teaching	4.54	0.67	4.50	0.67	0.32	.52**
<b>Enactive mastery with social/verbal persuasion</b>						
The prospect of immediate appointment to schools induces an interest in professional development	4.00	1.23	4.00	1.06	0.00	.72**
Teaching experience in primary schools during the teaching practice	4.50	0.80	4.54	0.50	-0.37	.69**
Teaching experience in difficult classes or schools during teaching practice (minority, multicultural, special schools, etc.)	3.65	1.30	4.10	1.11	-2.26*	.74**
Successful teaching sessions during teaching practice	4.18	0.85	4.18	0.73	0.00	.32
Pupils' enthusiasm about your teaching sessions, during teaching practice	4.04	0.72	4.00	0.75	0.32	.61**
Feedback from colleagues who attend your teaching sessions	3.22	0.97	3.40	0.73	-1.28	.73**

Table 1. (continued)

Inventory items	Mean (Time 1)	SD (Time 1)	Mean (Time 2)	SD (Time 2)	t test	Pearson coefficient
<i>Vicarious experiences</i>						
Comparison of your teaching with that of your colleagues	3.77	0.97	3.90	0.92	-0.82	.66**
Comparison of your teaching with that of in-service teachers you observe during teaching practice	3.81	1.13	3.27	1.03	2.23	.44*
Comparison of your teaching with the model teaching you observe during teaching practice	3.40	1.14	3.36	0.95	0.18	.38
Comparison of your teaching with that of your tutors at university	2.54	1.22	2.63	1.21	-0.49	.74**
<i>Physiological/affective state</i>						
Feelings of stress or anxiety during your teaching sessions	3.22	1.41	3.13	1.55	0.33	.63**
Feelings of fatigue following your teaching sessions as an indication of lack of ability or disappointment	2.31	1.04	2.95	1.25	-2.62*	.52**
Recovery of negative feelings during your teaching sessions	2.86	1.24	3.09	1.01	-0.79	.31
<i>University training</i>						
Type of courses offered during teacher training programmes (compulsory or optional)	3.27	1.16	3.31	1.21	-0.22	.68**
Number of courses offered during teacher training programmes	3.36	1.00	3.59	1.18	-1.31	.73**
Frequency of course attendance during teacher training programmes	3.22	1.19	3.54	1.22	-1.67	.72**

\* $p \leq .05$ ; \*\* $p \leq .01$ .



More recent attempts have conceived of the construct of teacher efficacy, either by incorporating the student social relations factor (Rich, Lev, & Fisher, 1996), the classroom-school conceptualization of teacher self-efficacy (Friedman & Kass, 2002), or cultural factors (Ho & Hau, 2004). These measures, though, did not address the classroom-related aspects of teaching (classroom management, teaching strategies, etc.), which teachers daily confront and deal with within their classroom barriers and which probably have an effect on their teaching efficacy beliefs. The Teachers' Sense of Efficacy Scale addressed three such dimensions of efficacy: efficacy for instructional strategies, classroom management, and student engagement, and represented the richness of teachers' work and the requirements of good teaching. The Teachers' Sense of Efficacy Scale emerged from a review by Tschannen-Moran and Hoy (2001) of the major measures that have been used to capture the construct of teacher efficacy. It acknowledges the need to both broaden and deepen our understanding about the construct of teacher efficacy and provides a preliminary step to explore dimensions of efficacy that facilitate educational reform (Labone, 2004).

The items of the TSES (24 items in the long and 12 items in the short version) were assessed along a 9-point continuum with anchors at 1 (nothing), 3 (very little), 5 (some influence), 7 (quite a bit), and 9 (a great deal). The overall reliability of the instrument ( $\alpha = .94$ ), as well as the reliability scores for each scale (.91 for instruction, .90 for management, and .87 for engagement), were high, while the examination of construct validity of TSES, by assessing its correlation with other existing measures of teaching efficacy, suggests that the new measurement successfully addresses the construct of efficacy (Tschannen-Moran & Hoy, 2001). The TSES, in the longer form, was translated into Greek. In order to examine the translation's validity, linguistic parallelism was checked by independent back-translation. Moreover, a change in the number of options for student teachers to choose from was considered appropriate, since student teachers felt more comfortable with the revised version of the instrument. The 9-point continuum in the original version of TSES became a 5-point continuum from 1 (not at all) to 5 (a great deal).

*Reliability of the Teachers' Sense of Efficacy Scale.* As for the Teaching Efficacy Sources Inventory, two aspects of reliability were calculated for the Teachers' Sense of Efficacy Scale: the stability of each item, using a related group  $t$  test, and the consistency of differences between individual items, using Pearson coefficients. Mean scores, standard deviations,  $t$  tests, and Pearson coefficients at both times of measurement were computed separately for each item of the scale. The conditions under which the reliability control of TSES took place were similar to the Teaching Efficacy Sources Inventory reliability control, described in the previous section.

Table 2 presents the score of the items in the instructional strategies, classroom management, and student engagement efficacy scale. The mean scores at Time 1 and Time 2 revealed that student teachers' ratings of their teaching efficacy did not present any significant difference ( $t$ -test values were non-significant at  $p \leq .05$ ), with two

Table 2. Mean scores, standard deviations, *t* tests, and Pearson coefficients on student teachers' ratings on the Teachers' Sense of Efficacy Scale (TSES), at the first and second administrations (*N* = 22)

Scale item	Mean (Time 1)	SD (Time 1)	Mean (Time 2)	SD (Time 2)	<i>t</i> test	Pearson coefficient
<b>Efficacy for instructional strategies</b>						
To what extent can you use a variety of assessment strategies?	3.45	0.91	3.68	0.71	-1.74	.74**
To what extent can you provide an alternative explanation or example when students are confused?	3.90	0.75	4.00	0.69	-1.00	.82**
To what extent can you craft good questions for your students?	3.81	0.85	3.86	0.63	-0.27	.47*
How well can you implement alternative strategies in your classroom?	3.59	0.90	3.54	0.85	0.27	.60**
How well can you respond to difficult questions from your students?	3.81	0.85	3.90	0.61	-0.69	.69**
How much can you do to adjust your lessons to the proper level of individual students?	3.27	0.76	3.59	0.85	-2.08	.61**
To what extent can you gauge student comprehension of what you have taught?	4.18	0.66	4.27	0.70	-0.81	.70**
How well can you provide appropriate challenges for very capable students?	3.18	0.79	3.13	0.71	0.32	.62**
<b>Efficacy for classroom management</b>						
How much can you do to control disruptive behaviour in the classroom?	3.54	0.73	3.54	0.80	0.00	.68**
How much can you do to get children to follow classroom rules?	3.68	0.77	3.86	0.56	-1.44	.65**
How much can you do to calm a student who is disruptive or noisy?	3.50	0.85	3.59	0.59	-0.69	.70**
How well can you establish a classroom management system with each group of students?	3.81	0.73	3.59	0.95	1.04	.29
How well can you keep a few problem students from ruining an entire lesson?	3.54	0.80	3.68	0.83	-0.82	.55**
How well can you respond to defiant students?	3.54	0.80	3.68	0.71	-0.90	.56**
To what extent can you make your expectation clear about student behaviour?	3.95	0.89	4.18	0.66	-1.22	.41*
How well can you establish routines to keep activities running smoothly?	3.18	1.25	4.13	0.94	-4.10**	.54**

Table 2. (Continued)

Scale item	Mean (Time 1)	SD (Time 1)	Mean (Time 2)	SD (Time 2)	t test	Pearson coefficient
Efficacy for student engagement						
How much can you do to get students to believe they can do well in schoolwork?	4.04	0.84	4.04	0.57	0.00	.58**
How much can you do to help your students value learning?	3.63	0.78	3.90	0.81	-2.32*	.76**
How much can you do to motivate students who show low interest in schoolwork?	3.54	0.85	3.59	0.79	-0.27	.55**
How much can you assist families in helping their children do well in school?	3.66	1.11	3.76	1.13	-0.62	.80**
How much can you do to improve the understanding of a student who is failing?	3.68	0.64	3.77	0.52	-1.44	.89**
How much can you do to help your students think critically?	4.00	0.69	4.00	0.69	0.00	.60**
How much can you do to foster student creativity?	4.09	0.68	4.09	0.75	0.00	.63**
How much can you do to get through to the most difficult students?	3.63	0.84	3.54	0.67	0.56	.53**

\* $p \leq .05$ ; \*\* $p \leq .01$ .

exceptions: the items “How well can you establish routines to keep activities running smoothly?” and “How much can you do to help your students value learning?”. These items, however, were not excluded from the TSES measurement, since they had significant Pearson coefficients. Pearson coefficients were significant and ranged from .41 to .89 in all but one item (“How well can you establish a classroom management system with each group of students?”), which nevertheless received consistent student responses, according to the insignificant *t*-test value indicated.

### *Participants*

Both instruments, the Teaching Efficacy Sources Inventory and the Teachers’ Sense of Efficacy Scale, were administered to 198 students in primary education departments (165 from the primary education department of Thrace University and 33 from the primary education department of Thessaly University), of whom 168 were female (84.8%) and 30 were male (15.2%). All of the students were in the 4th and last year of their teaching studies and had successfully completed their teaching practice in primary schools. Teaching practice during this year requires student teachers to teach for 6 weeks in public primary schools. It was hypothesized by the researchers that student teachers’ perceptions of teaching efficacy would be more realistic following the experience of teaching practice in school settings.

### **Results**

Initially, a principal components factor analysis was conducted, to explore whether there were underlying factors of teaching efficacy sources that could be identified. Using an orthogonal solution and varimax rotation for extracted factors with eigenvalues greater than 1.0, and cut-off loading of 0.40, 7 factors accounting for 62.7% of the total variance were extracted from the data set. The items with their loadings are shown in Table 3.

#### *Student Teachers’ Perceptions of the Sources of Personal Teaching Efficacy*

Table 4 presents the results of the analysis of 198 student teachers concerning the sources of their teaching efficacy, in the general categories of motivation, personality characteristics, capabilities/skills, teacher training, enactive mastery combined with social/verbal persuasion, vicarious experiences, and physiological/affective state. The means of the items in each category indicate that student teachers’ motivation to improve their teaching efficacy received the highest ratings as a source of teaching efficacy. Student teachers’ personality characteristics, and enactive mastery with social/verbal persuasion, also received high mean scores as likely sources of teaching efficacy, while vicarious experiences and physiological/affective states received the lowest scores as sources of teaching efficacy.

Table 5 presents the mean scores and standard deviations of each item in the Teacher Efficacy Sources Inventory. From looking at Table 5, one can assume that

Table 3. Loadings of teaching efficacy sources on varimax rotated factors ( $N = 198$ ). The cut-off loading used in the principal component factor analysis was 0.40

Teaching efficacy source	Loading
Personality characteristics	0.67
Personal style/idiosyncrasy	0.61
Trust in self	0.80
Positive stance/humour	0.56
Originality/creativity	0.42
Talent for teaching	0.64
Direct communication with pupils	
Capabilities/skills	
Ability to perceive pupils' needs	0.60
Organization and schedule of teaching activities	0.66
Flexibility in teaching choices	0.69
Ability to control classroom	0.59
Motivation	
Personal interest/motives	0.52
Personal effort (study, concern about topics of teaching effectiveness)	0.62
Desire to improve the teaching task	0.79
Love for pupils which enhances efforts towards effective teaching	0.66
Enactive mastery with social/verbal persuasion	
The prospect of immediate appointment to schools induces an interest in professional development	0.58
Teaching experience in primary schools during teaching practice	0.75
Teaching experience in difficult classes or schools during teaching practice (minority, multicultural, special schools, etc.)	0.75
Successful teaching sessions during teaching practice	0.58
Pupils' enthusiasm about your teaching sessions, during teaching practice	0.39
Feedback from colleagues who attend your teaching sessions	0.43

Table 3. (Continued)

Teaching efficacy source	Loading
Vicarious experiences	
Comparison of your teaching with that of your colleagues	0.66
Comparison of your teaching with that of in-service teachers you observe during teaching practice	0.81
Comparison of your teaching with the model teaching you observe during teaching practice	0.79
Comparison of your teaching with that of your tutors at university	0.63
Physiological/affective state	
Feelings of stress or anxiety during your teaching sessions	0.73
Feelings of fatigue following your teaching sessions as an indication of lack of ability or disappointment	0.80
Recovery of negative feelings during your teaching sessions	0.72
University training	
Type of courses offered during teacher training programmes (compulsory or optional)	0.80
Number of courses offered during teacher training programmes	0.79
Frequency of course attendance during teacher training programmes	0.77

Table 4. Mean scores, standard deviations, and alpha coefficients on student teachers' ratings on the Teaching Efficacy Sources Inventory and the Teachers' Sense of Efficacy Scale ( $N = 198$ )

Item	Mean	SD	Alpha	No. of items
From Teaching Efficacy Sources Inventory				
Motivation	4.24	0.57	.78	4
Personality characteristics	3.88	0.58	.79	6
Enactive mastery with social/verbal persuasion	3.74	0.65	.79	6
Capabilities/skills	3.68	0.58	.73	4
Teacher training	3.31	0.83	.76	3
Vicarious experiences	3.21	0.81	.78	4
Physiological/affective state	2.86	0.93	.72	3
From Teachers' Sense of Efficacy Scale				
Efficacy for instructional strategies	3.54	0.50	.78	8
Efficacy for classroom management	3.54	0.55	.82	8
Efficacy for student engagement	3.62	0.50	.78	8

the most highly rated sources of teaching efficacy were “Love for pupils which enhances efforts towards effective teaching” (mean = 4.47,  $SD = 0.74$ ), “Desire to improve the teaching task” (mean = 4.29,  $SD = 0.75$ ), “Direct communication with pupils” (mean = 4.18,  $SD = 0.70$ ), and “Positive stance/humour” (mean = 4.14,  $SD = 0.78$ ); that is, sources that are mainly inherent in prospective teachers' motivation and capabilities or skills. On the other hand, items such as “Comparison of your teaching with that of your tutors in the university” (mean = 2.88,  $SD = 1.11$ ), “Recovery of negative feelings during your teaching sessions” (mean = 2.89,  $SD = 1.08$ ), and “Feelings of fatigue following your teaching sessions as an indication of lack of ability or disappointment” (mean = 2.73,  $SD = 1.15$ )—that is, sources related to vicarious experiences or physiological/affective states—received the lowest ratings as potential sources of prospective teachers' efficacy.

*Student Teachers' Efficacy Beliefs for Instructional Strategies, Classroom Management, and Student Engagement*

*Discriminant validity of the Teachers' Sense of Efficacy Scale.* The discriminant validity of scales can be tested using confirmatory factor analysis procedures by testing a number of factor structures. To assess the factor structure of the Greek version of the Teachers' Sense of Efficacy Scale, a confirmatory factor analysis was performed, using the partial disaggregation procedure (Bagozzi & Heatherton, 1994). Because the results of exploratory factor analysis suggested that each of the three hypothesized factors had a unidimensional underlying structure, a random parcelling strategy was used (Bandalos, 2002; Little, Cunningham, Shahar, & Widaman, 2002). Thus, Teachers' Sense of Efficacy Scale items were randomly parcelled into groups of two, resulting in 4 parcels assessing efficacy in instructional practices, 4 parcels



Table 5. Mean scores and standard deviations on student teachers' ratings on the items of the Teaching Efficacy Sources Inventory ( $N = 198$ )

Item	Mean	SD
Personality characteristics		
Direct communication with pupils	4.18	0.70
Positive stance/humour	4.14	0.78
Personal style/idiosyncrasy	3.89	0.81
Trust in self	3.78	0.93
Originality/creativity	3.68	0.85
Talent for teaching	3.48	0.89
Capabilities/skills		
Organization and schedule of teaching activities	3.86	0.79
Ability to perceive pupils' needs	3.79	0.72
Flexibility in teaching choices	3.56	0.78
Ability to control classroom	3.45	0.84
Motivation		
Love for pupils which enhances efforts towards effective teaching	4.47	0.74
Desire to improve the teaching task	4.29	0.75
Personal effort (study, concern about topics of teaching effectiveness)	4.07	0.81
Personal interest/motives	4.02	0.73
Enactive mastery with social/verbal persuasion		
Teaching experience in primary schools during teaching practice	3.98	0.86
The prospect of immediate appointment to schools induces an interest in professional development	3.89	1.00
Pupils' enthusiasm in your teaching sessions, during teaching practice	3.84	0.79
Successful teaching sessions during teaching practice	3.76	0.78
Teaching experience in difficult classes or schools during the teaching practice (minority, multicultural, special schools, etc.)	3.69	1.08
Feedback from your colleagues who attend your teaching sessions	3.18	1.01
Vicarious experiences		
Comparisons of your teaching with that of your colleagues	3.40	1.01
Comparisons of your teaching with that of in-service teachers you observe during teaching practice	3.28	0.99
Comparison of your teaching with the model teaching you observe during teaching practice	3.26	1.04
Comparison of your teaching with that of your tutors at university	2.88	1.11
Physiological/affective state		
Feelings of stress or anxiety during your teaching sessions	2.99	1.27
Feelings of fatigue following your teaching sessions as an indication of lack of ability or disappointment	2.73	1.15
Recovery of negative feelings during your teaching sessions	2.89	1.08
University training		
Frequency of course attendance during teacher training programmes	3.44	1.04
Type of courses offered during teacher training programmes (compulsory or optional)	3.24	1.05
Number of courses offered during teacher training programmes	3.21	0.99

assessing efficacy in classroom management, and 4 parcels assessing efficacy in student engagement. Following the suggestions of Hu and Bentler (1999), three indices were used to examine model goodness-of-fit: the Comparative Fit Index (with a cut-off value of .95), the root mean square error of approximation (RMSEA, with a cut-off value of .06), and the standardized root mean square residual (SRMR, with a cut-off value of .08). The results indicated that the 3-factor solution was a good fit to the data (CFI = .96, RMSEA = .06, SRMR = .06).

In order to further examine the 3-factor solution, a chi-square analysis was conducted comparing it with a single-factor model of general teacher efficacy which has been proposed in the literature (Tschannen-Moran & Hoy, 2001). The results showed that the 3-factor solution was a significantly better fit than the single-factor model (difference in  $\chi^2(1) = 181.59, p < 0.001$ ). For the 3-factor model, all standardized path coefficients were found to be statistically significant, with values ranging from 0.67 to 0.80 for the parcels assessing efficacy in instructional practices, from 0.45 to 0.83 for the parcels assessing efficacy in classroom management, and from 0.64 to 0.78 for the parcels assessing efficacy in student engagement. The 3 latent factors were found to be correlated. Specifically, efficacy in instructional practices was correlated with efficacy in classroom management ( $r = .69$ ) and with efficacy in student engagement ( $r = .64$ ), while efficacy in classroom management was correlated with efficacy in student engagement ( $r = .49$ ).

Table 6 presents the means of the items included in each dimension of the TSES. It reveals that student teachers' efficacy ratings of their students' engagement received the highest scores, whereas students' efficacy ratings of instructional strategies and classroom management received similar scores. Analytically, concerning efficacy perceptions for instructional strategies, student teachers gave higher ratings to their ability to "gauge student comprehension of what they have taught" (mean = 4.11,  $SD = 0.77$ ), and to "provide an alternative explanation or example when students are confused" (mean = 4.05,  $SD = 0.72$ ), whereas they gave lower ratings to their ability "to provide appropriate challenges for very capable students" (mean = 2.98,  $SD = 1.00$ ). Concerning student teachers' ratings of their efficacy for classroom management, they reported higher ratings of their ability to "make expectation clear about student behavior" (mean = 3.90,  $SD = 0.87$ ) and to "establish routines to keep activities running smoothly" (mean = 3.78,  $SD = 0.83$ ), and lower ratings of their ability to "establish a classroom management system with each group of students" (mean = 3.27,  $SD = 0.87$ ). Finally, in terms of their efficacy for student engagement, student teachers felt they were better at "getting students to believe they can do well in schoolwork" (mean = 3.90,  $SD = 0.78$ ) and "fostering student creativity" (mean = 3.84,  $SD = 0.71$ ), and less good at "assisting families in helping their children do well in school" (mean = 3.23,  $SD = 1.03$ ).

There now follows an exploration of the potential relationships between student teachers' perceptions of the sources of teaching efficacy and perceptions of their teaching efficacy, in order to provide an integrating model which will predict efficacy beliefs. As a first step, the relations of sources of teaching efficacy and efficacy for instructional strategies, classroom management, and student engagement were

Table 6. Mean scores and standard deviations on student teachers' ratings on the items of the Teachers' Sense of Efficacy Scale ( $N = 198$ )

Item	Mean	SD
<b>Efficacy for instructional strategies</b>		
To what extent can you use a variety of assessment strategies?	3.35	0.68
To what extent can you provide an alternative explanation or example when students are confused?	4.05	0.72
To what extent can you craft good questions for your students?	3.61	0.74
How well can you implement alternative strategies in your classroom?	3.39	0.73
How well can you respond to difficult questions from your students?	3.62	0.73
How much can you do to adjust your lessons to the proper level of individual students?	3.20	0.95
To what extent can you gauge student comprehension of what you have taught?	4.11	0.77
How well can you provide appropriate challenges for very capable students?	2.98	1.00
<b>Efficacy for classroom management</b>		
How much can you do to control disruptive behaviour in the classroom?	3.47	0.82
How much can you do to get children to follow classroom rules?	3.67	0.75
How much can you do to calm a student who is disruptive or noisy?	3.45	0.80
How well can you establish a classroom management system with each group of students?	3.27	0.87
How well can you keep a few problem students from ruining an entire lesson?	3.31	0.82
How well can you respond to defiant students?	3.51	0.77
To what extent can you make your expectation clear about student behaviour?	3.90	0.87
How well can you establish routines to keep activities running smoothly?	3.78	0.83
<b>Efficacy for student engagement</b>		
How much can you do to get students to believe they can do well in schoolwork?	3.90	0.78
How much can you do to help your students value learning?	3.68	0.73
How much can you do to motivate students who show low interest in schoolwork?	3.53	0.76
How much can you assist families in helping their children do well in school?	3.23	1.03
How much can you do to improve the understanding of a student who is failing?	3.56	0.70
How much can you do to help your students think critically?	3.74	0.72
How much can you do to foster student creativity?	3.84	0.71
How much can you do to get through to the most difficult students?	3.50	0.79

investigated with Pearson correlations (Table 7). Table 7 shows significant correlations among the sources of teaching efficacy and the teaching efficacy ratings, in a range from  $r = .14$  to  $r = .60$ . One exception was met in the physiological/affective state as a source of teaching efficacy, which did not appear to correlate with efficacy for instructional strategies and classroom management. It is quite difficult, though, to conclude anything definite from these scores, since the sources of teaching efficacy were related.

In order to further investigate the sources of teaching efficacy that could influence the perceptions of teaching efficacy, multiple regression analysis was conducted,

Table 7. Pearson correlations for sources of teaching efficacy and efficacy for instructional strategies, classroom management, and student engagement ( $N = 198$ )

	1	2	3	4	5	6	7	8	9	10
1. Personality characteristics	–									
2. Capabilities/skills	.60**	–								
3. Motivation	.57**	.48**	–							
4. Enactive mastery with social/verbal persuasion	.51**	.57**	.55**	–						
5. Vicarious experience	.35**	.39**	.36**	.50**	–					
6. Physiological/affective state	.00	.17*	.09	.23**	.27**	–				
7. University training	.30**	.27**	.15*	.24**	.28**	.14	–			
8. Instructional strategies	.50**	.42**	.37**	.36**	.22**	-.00	.36**	–		
9. Classroom management	.42**	.46**	.32**	.35**	.26**	.00	.27**	.58**	–	
10. Student engagement	.57**	.55**	.50**	.49**	.30**	.15*	.24**	.50**	.45**	–

\* $p \leq .05$ ; \*\* $p \leq .01$ .

with the variables which correlated significantly with each dependent variable treated as independent variables. The stepwise regression method was selected, since this is the best compromise between finding an “optimal” equation for predicting future relationships and finding an equation that predicts the maximum variance for the specific data set (Howell, 1997).

When efficacy for instructional strategies served as the dependent variable, personality characteristics and capabilities turned out to be the significant predictors ( $\beta = .35$  and  $\beta = .16$ , respectively; see Table 8). Personality characteristics and capabilities were again the only predictors when efficacy for classroom management was the dependent variable ( $\beta = .20$  and  $\beta = .33$ ). When efficacy for student engagement was the dependent variable, personality characteristics, capabilities, and motivation served as the significant predictors ( $\beta = .29$ ,  $\beta = .27$ , and  $\beta = .22$ , respectively). Therefore, student teachers’ perceptions of their teaching efficacy in instructional strategies and classroom management was predicted by their perceptions of their personality characteristics and teaching competencies, while their perceptions of efficacy in student engagement were predicted by their perceptions of the influential factors above in conjunction with their motivation for teaching.

Furthermore, when regression analysis was repeated with control for capabilities, personality characteristics, and motivation for teaching, enactive mastery in conjunction with social/verbal persuasion and university training predicted efficacy for instructional strategies ( $\beta = .29$  and  $\beta = .25$ , respectively) and classroom management ( $\beta = .30$  and  $\beta = .19$ , respectively), while only enactive mastery in conjunction with social/verbal persuasion predicted efficacy for student engagement ( $\beta = .49$ ). Accordingly, when regression analysis was repeated with the four efficacy sources in Bandura’s (1986, 1997) terms (enactive mastery in conjunction with social/verbal persuasion, vicarious experience, and physiological/affective state), it turned out that enactive mastery in conjunction with social/verbal persuasion predicted efficacy perceptions of

Table 8. Beta regression coefficients and multiple *R* for sources of teaching efficacy as predictors of efficacy for instructional strategies, classroom management, and student engagement

Source	Outcome measures		
	Instructional strategies	Classroom management	Student engagement
Personality characteristics	0.35**	0.20**	0.29**
Capabilities/skills	0.16*	0.33**	0.27**
Motivation	0.09	0.05	0.22**
Enactive mastery with social/verbal persuasion	0.06	0.09	0.11
Vicarious experience	-0.03	0.03	0.02
Physiological/affective state	-0.09	-0.06	0.07
University training	0.18**	0.12	0.03
Multiple <i>R</i>	0.55	0.47	0.65

\* $p \leq .05$ ; \*\* $p \leq .01$ .

instructional strategies, classroom management, and student engagement ( $\beta = .36$ ,  $\beta = .35$ , and  $\beta = .49$ , respectively).

## **Discussion**

The current study consisted of an attempt to explore student teachers' efficacy beliefs, as well as the factors influencing these beliefs. The search for this information was based on the assumption that feedback from the student teachers comprises a substantive factor in terms of the evaluation and improvement of teacher training programmes. The identification of student teachers' potential sources of teaching efficacy by teacher educators is a prerequisite for further cultivation of these sources. Strong student teacher efficacy beliefs are in turn linked to high pupil achievement and desirable teacher characteristics (Mulholland & Wallace, 2001).

The study revealed that student teachers emphasized their personal motivation, especially their affection for pupils and their desire to improve their teaching performance. These findings are in line with those of Woolfolk and Hoy (1990), who found that teaching efficacy was related to beliefs about control and motivation among student teachers. Student teachers' personality characteristics, such as direct communication with pupils and positive stance/humour, and capabilities or skills such as organization of teaching activities and ability to perceive pupils' needs, were highly rated sources of teaching efficacy. University training was an important source of teaching efficacy when referring to the frequency of course attendance and the type and number of courses offered during teacher training programmes. Along similar lines, Yeung and Watkins (2000), in their study of student teachers, concluded that the development of teaching efficacy was partly attributed to the students' capability and confidence in dealing with daily matters of teaching practice. These researchers also concluded that teaching practice plays a significant role in the formation of student teachers' teaching efficacy.

Regarding Bandura's (1997) sources of teaching efficacy, enactive mastery and specifically teaching experience in primary schools during teaching practice was also found to be a highly rated source of teaching efficacy. This finding echoes Bandura's and other researchers' (Mulholland & Wallace, 2001; Pajares, 1997) assertions that performance is a particularly important source of information. As to social/verbal persuasion, our study revealed that pupils' enthusiasm during students' teaching sessions strongly influenced perceptions of teaching efficacy, in congruence with previous research (Milner & Hoy, 2003; Mulholland & Wallace, 2001). Milner and Hoy, exploring the sources of efficacy that encouraged one teacher's persistence in an unsupportive environment, found that the teacher often reflected on reaffirming mastery experiences, such as students' enthusiasm for her teaching. Ross et al. (1996), in their study on the influence of teachers' feelings of past success, feelings of being well-prepared, and perceptions of student engagement on teacher efficacy, concluded that only teachers' perceptions of student engagement were a significant predictor of teacher efficacy. We also found that the feedback derived from

colleagues was perceived as a less likely source of teaching efficacy, in agreement with Yeung and Watkins' (2000) work.

Vicarious experiences did not receive high ratings as potential sources of teaching efficacy from the student teachers in our study. Anderson and Betz (2001) arrived at similar results. In their study, vicarious learning did not contribute incrementally to the prediction of self-efficacy, after the direct sources of efficacy information had been entered. Rather, the direct sources of self-efficacy were those predicting the measures of self-efficacy. Finally, physiological and affective states were found to be the least influential source of teaching efficacy, in congruence with Bandura's and Mulholland and Wallace's (2001) contentions that affective and physiological states do not appear as important as other sources of teaching efficacy.

In addition, this first attempt to employ the Teachers' Sense of Efficacy Scale (TSES) with Greek student teachers revealed that they perceived themselves as better at engaging students in schoolwork than at implementing instructional or classroom management strategies. Research on Western and Asian in-service teachers, in contrast to this, suggested that efficacy for instructional and classroom management are the two basic domains of personal teaching efficacy, whereas the ability to engage students in the learning process is a concern mainly of Western teachers (Ho & Hau, 2004; Tschannen-Moran & Hoy, 2001). This difference in efficacy perceptions between in-service teachers and the pre-service teachers of the current study could be attributed to the latter group's lack of teaching experience. Acquisition of teaching experience could shift in-service teachers' concerns to more practical matters, such as instructional and classroom management. This difference could also be attributed to the closeness in age of student teachers to their pupils, which facilitates pupils' cooperation and engagement in the learning process.

Although the sources of teaching efficacy were significantly correlated with efficacy perceptions for instructional and classroom management strategies and student engagement, student perceptions of their personality characteristics and capabilities were only found to predict teaching efficacy, such that the more student teachers perceived themselves as possessing specific personality characteristics and teaching capabilities, the more they felt efficacious in implementing instructional and discipline strategies and involving pupils in the learning process. In addition, personality characteristics in conjunction with capabilities and motivation were the only predictors of efficacy for student engagement. In fact, within motivational theory, there is a great deal of debate about the causal relationship between motivational constructs, such as personal interest, utility/importance and affect, and self-efficacy (Linnenbrink & Pintrich, 2003). Research on self-efficacy and motivation suggest that there are two perspectives: the "interest-first" perspective, according to which personal interest develops expertise and therefore self-efficacy beliefs, and the perspective suggested by Bandura (1997), according to which the sense of efficacy about an activity enhances the interest and value of the activity. Although the current study did not provide evidence for causal relationships, it reconfirmed the predictive role of motivation in teaching efficacy. Another finding of the study was that despite the significant correlations between Bandura's sources of teaching efficacy and TSES



measurement, these were not found to predict student teachers' perceptions of teaching efficacy. This might be due to the intercorrelations between the sources of teaching efficacy.

On the whole, the above findings highlight the importance of student teachers' personality traits, capabilities, and motivation as potential sources of teaching efficacy. The emphasis on these sources of personal teaching efficacy concurs with Bandura's (1997) assertion that "changes in perceived efficacy result from cognitive processing of the diagnostic information that performances convey about capability rather than the performances per se" (p. 81). Moreover, it might imply the existence of a broader construct comprising general aspects of teaching competence, serving as a potential source of teaching efficacy in respect to student teachers, similar to "effectance motivation", which includes perceived capabilities for influencing important aspects of one's life (Schunk & Pajares, 2001), or "self-concept". This last reflects more general beliefs of competence (Linnenbrink & Pintrich, 2003) than self-efficacy, which refers to specific and situational judgments of capabilities.

The importance of mastery experiences in self-efficacy enhancement was further supported by student teachers' responses on the prerequisite factors for promoting their teaching efficacy. They mainly focused on teaching experiences in schools during their teaching practice. In respect to this, Henson (2001) argued that perceptions of efficacy may be more easily influenced during the formative years of pre-service education, thus highlighting the significant role of teacher educators in the formulation of teacher training programmes. Teacher education programmes have to provide opportunities for mastery experiences and social feedback for student teachers (Ashton, 1984; Gordon & Debus, 2002). Teacher educators cannot instil feelings of teaching efficacy into student teachers. They may be able, though, to assist student teachers to strengthen their efficacy perceptions, or achieve "calibration" in Linnenbrink and Pintrich's (2003) terms (that is, the match between the individual's self-efficacy judgments and their actual performances and accomplishments), by helping them reinterpret the efficacy information provided by their teaching experiences. Attributions play an essential role at this point. If a success is attributed to internal or controllable causes such as ability or effort, then self-efficacy is enhanced (Bandura, 1993). Bandura (1997) suggests that positive changes to self-efficacy come about only through pre-emptive pressing feedback, which dissolves pre-existing negative beliefs about one's abilities. Transferring this assumption to our study, teacher educators could diminish student teachers' negative beliefs about their capabilities, skills, and personality characteristics. At the same time, they could promote the positive and realistic aspects of students' teaching character and enrich their pedagogical knowledge and teaching competence, through the organization of training courses adapted to students teachers' needs. Ross et al. (1996) suggested the creation of school-university teams to help teachers acquire self-knowledge about their teaching efficacy and identify the conditions that further promote or threaten increased feelings of efficacy.

The current study limited its scope to the exploration of the sources of one dimension of teaching efficacy, namely personal teaching efficacy, and measured the 3

dimensions of teaching efficacy presented in the TSES instrument: instructional strategies, classroom management, and student engagement. Future research should encompass additional dimensions of teaching efficacy, in order to reflect the multidimensionality and complexity of the teaching framework. In addition, this study was restricted to predictive relationships and therefore cannot yield any causal associations between the sources of teaching efficacy and teaching efficacy. It is also possible that there might be meaningful relationships between efficacy beliefs in a bidirectional way. A potential reciprocal relationship between sources and teaching efficacy could be a promising area of study.

The limitations of technical measurements, such as the 5-point Likert-type scale used in the Greek version of the TSES instead of the 9-point scale used in the original version, or the low-reliability items in the Teaching Efficacy Sources Inventory, should not be disregarded. The data were based on 4th-year student teachers from two Greek pedagogical departments, and therefore caution is needed in generalizing the present results to student teachers. Further research could examine the potential sources of teaching efficacy for the in-service teacher population. Finally, this study used self-reported instruments to measure sources of efficacy and teaching efficacy beliefs, and thus shares the weaknesses of self-report studies. It is likely that participants overestimated or underestimated the sources of teaching efficacy and their abilities to perform classroom activities.

Notwithstanding these caveats, it is commonly accepted that teachers' sense of efficacy is a critical construct in understanding their decision-making. In methodological terms, research on teacher efficacy relies largely on quantitative analysis. The use of quantitative measures, however, may not fully delineate the factors contributing to student teachers' efficacy beliefs. The current study, by employing interviews as one of its data collection techniques, responded to Milner and Hoy's (2003) call for qualitative inquiry about teacher self-efficacy, and further revealed sources of student teachers' efficacy beliefs not found in previous measurement inventories, such as personality traits, capabilities, and skills in relation to teaching and motivation for teaching. Besides the suggestion of a Teaching Efficacy Sources Inventory, the study attempted to employ, for the first time in the Greek context, the Teachers' Sense of Efficacy Scale. Although the TSES was used as a criterion measurement of teaching efficacy, not previously standardized to the Greek teacher population, it appeared to be a reliable and valid measurement of Greek student teachers' efficacy perceptions.

In theoretical terms, the current study identified potential mechanisms that contribute to differences in teaching efficacy beliefs. Self-perception of teaching competence was found to be a contributory factor to the efficacy of instruction, classroom management, and students' engagement in the learning process. This is in line with Tschannen-Moran et al.'s (1998) model, in which perceptions of teaching competence contribute to judgments of teacher efficacy and serve as a predictor of future capability. In assessing self-perceptions of teaching competence, teachers make judgments about their personal capabilities, skills, knowledge, personality traits, and personal weaknesses in particular teaching contexts. Our study further

revealed specific personality traits, capabilities, and skills which are related to teaching practice and help dictate efficacy beliefs. Although the study used Bandura's four sources of efficacy judgments, it also emphasized the importance of personal characteristics, teaching competences, and motivation as influential sources of teaching efficacy. The exploration of the sources of teaching efficacy in turn emphasizes teacher educators' roles in the enhancement of student teachers' efficacy perceptions. The early development of belief in a high level of ones' own teaching efficacy is important for student teachers, for two reasons: first, beginning teachers need strong efficacy beliefs in order to continue teaching during in-service education (Mulholland & Wallace, 2001), and secondly, teachers who are more satisfied in their chosen profession are also more highly empowered (Edwards, Green, & Lyons, 2002).

## Note

1. Because the instrument was developed at Ohio State University, it is sometimes referred to as the Ohio State Teacher Efficacy Scale (OSTES).

## References

- Allinder, R. (1994). The relationship between efficacy and the instructional practices of special education teachers and consultants. *Teacher Education and Special Education, 17*, 86–95.
- Anderson, R., Greene, M., & Loewen, P. (1988). Relationships among teachers' and students' thinking skills, sense of efficacy and student achievement. *Alberta Journal of Educational Research, 34*(2), 148–165.
- Anderson, S., & Betz, N. (2001). Sources of social self-efficacy expectations: Their measurement and relation to career development. *Journal of Vocational Behaviour, 58*, 98–117.
- Armor, D., Conroy-Oseguera, P., Cox, M., King, N., McDonnell, L., Pascal, A., Pauly, E., & Zellman, G. (1976). *Analysis of the school-preferred reading programs in selected Los Angeles minority schools*. (ERIC Document Reproduction Service No. 130243)
- Ashton, P. (1984). Teacher efficacy: A motivational paradigm for effective teacher education. *Journal of Teacher Education, 35*(5), 28–32.
- Ashton, P. (1985). Motivation and the teachers' sense of efficacy. In C. Ames (Ed.), *Research on motivation in education (Vol. 2)*. San Diego, CA: Academic Press.
- Ashton, P., & Webb, R. (1986). *Making a difference: Teachers' sense of efficacy and student achievement*. New York: Longman.
- Ashton, P. et al. (1982). *Measurement problems in the study of teachers' sense of efficacy*. Paper presented at the annual meeting of the American Educational Research Association. New York.
- Bagozzi, R. P., & Heatherton, T. F. (1994). A general approach to representing multifaceted personality constructs: Application to state self-esteem. *Structural Equation Modeling, 1*, 35–67.
- Bandalos, D. L. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling, 9*, 78–102.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review, 84*(2), 191–215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122–147.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 28(2), 117–148.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Brouwers, A., & Tomic, W. (2000). A longitudinal study of teacher burnout and perceived self-efficacy in classroom management. *Teaching and Teacher Education*, 16, 239–253.
- Burley, W., Hall, B., Villeme, M., & Brockmeier, L. (1991). *A path analysis of the mediating role of efficacy in first-year teachers' experiences, reactions and plans*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.
- Clement, M. (1999). Reducing the stress of student teaching. *Contemporary Education*, 70(4), 20–27.
- Coladarci, T. (1992). Teachers' sense of efficacy and commitment to teaching. *Journal of Experimental Education*, 60(4), 323–337.
- Edwards, J., Green, K., & Lyons, C. (2002). Personal empowerment, efficacy and environmental characteristics. *Journal of Educational Administration*, 40(1), 67–86.
- Emmer, E., & Hickman, J. (1991). Teacher efficacy in classroom management and discipline. *Educational and Psychological Measurement*, 51, 755–765.
- Friedman, I., & Kass, E. (2002). Teacher self-efficacy: A classroom-organization conceptualization. *Teaching and Teacher Education*, 28, 675–686.
- Ghaith, G., & Yaghi, H. (1997). Relationships among experience, teacher efficacy and attitudes towards the implementation of instructional innovation. *Teaching and Teacher Education*, 14, 451–458.
- Gibson, S., & Dembo, M. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76(4), 569–582.
- Goddard, R., & Goddard, Y. (2001). A multilevel analysis of the relationship between teacher and collective efficacy in urban schools. *Teaching and Teacher Education*, 17, 807–818.
- Gordon, C., & Debus, R. (2002). Developing deep learning approaches and personal teaching efficacy within a pre-service teacher education context. *British Journal of Educational Psychology*, 72, 483–511.
- Guskey, T. R. (1981). Measurement of responsibility teachers assume of academic successes and failures in the classroom. *Journal of Teacher Education*, 32, 44–51.
- Guskey, T. (1988). Teacher efficacy, self-concept and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education*, 4, 63–69.
- Harrison, P., Moore, P., & Ryen, J. (1996). College students' self-insight and common implicit theories in ratings of teaching effectiveness. *Journal of Educational Psychology*, 88(4), 775–782.
- Henson, R. (2001). The effects of participation in teacher research on teacher efficacy. *Teaching and Teacher Education*, 17, 819–836.
- Henson, R. (2002). From adolescent angst to adulthood: Substantive implications and measurement dilemmas in the development of teachers' efficacy research. *Educational Psychologist*, 37(3), 137–150.
- Ho, I., & Hau, K. T. (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, 313–323.
- Howell, D. (1997). *Statistical methods for psychology*. Duxbury Press.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55.
- Kushner, S. N. (1993). *Teacher efficacy and pre-service teachers: A construct validation*. (ERIC Document Reproduction Service No. ED356265)
- Labone, E. (2004). Teacher efficacy: Maturing the construct through research in alternative paradigms. *Teaching and Teacher Education*, 20, 341–459.
- Lent, R., Lopez, F., & Bieschke, K. (1991). Mathematics self-efficacy: Sources and relation to science-based career choice. *Journal of Counselling Psychology*, 38, 424–430.
- Linnenbrink, E., & Pintrich, P. (2003). The role of self-efficacy beliefs in student engagement and learning in the classroom. *Reading and Writing Quarterly*, 19, 119–137.

- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9, 151–173.
- Meijer, C., & Foster, S. (1988). The effect of teacher self-efficacy on referral chance. *Journal of Special Education*, 22, 378–385.
- Midgley, C., Feldlaufer, H., & Eccles, J. (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. (2002). A case study of an experienced teacher's self-efficacy and persistence through crisis situations: Theoretical and practical considerations. *High School Journal*, 86, 28–35.
- Milner, H., & Hoy, A. (2003). A case study of an African American teacher's self-efficacy, stereotype threat and persistence. *Teaching and Teacher Education*, 19, 263–276.
- Mulholland, J., & Wallace, J. (2001). Teacher induction and elementary science teaching: Enhancing self-efficacy. *Teaching and Teacher Education*, 17, 243–261.
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307–332.
- Pajares, M. F. (1997). Current directions in self-efficacy research. In M. Maehr & P. Pintrich (Eds.), *Advances in motivation and achievement*. London: JAI Press.
- Podell, D., & Soodak, L. (1993). Teacher efficacy and bias in special education referrals. *Journal of Educational Research*, 86(4), 247–253.
- Poulou, M., & Norwich, B. (2002). Teachers' cognitive, affective and behavioural responses to children with emotional and behavioural difficulties: A model of decision making. *British Educational Research Journal*, 28(1), 111–138.
- Poulou, M., & Spinthourakis, J. A. (2002). *Student teachers' perceptions of their teaching efficacy*. Paper presented at the European Conference on Educational Research, Lisbon. Retrieved from <http://www.leeds.ac.uk/educol/documents/00002355.htm>
- Raudenbush, S., Bhumirat, C., & Kamali, M. (1992). Predictors and consequences of primary teachers' sense of efficacy and students' perceptions of teaching quality in Thailand. *International Journal of Educational Research*, 17(2), 165–177.
- Rich, Y., Lev, S., & Fisher, S. (1996). Extending the concept and assessment of teacher efficacy. *Educational and Psychological Measurement*, 56(6), 1015–1025.
- Rose, J., & Medway, F. (1981). Measurement of teachers' beliefs in their control over student outcome. *Journal of Educational Research*, 74, 185–190.
- Ross, J. (1992). Teacher efficacy and the effect of coaching on student achievement. *Canadian Journal of Education*, 17(1), 51–65.
- Ross, J. (1994). *Beliefs that make a difference: The origins and impacts of teacher efficacy*. Paper presented at the annual meeting of the Canadian Society for the Study of Education, Calgary.
- Ross, J., Cousins, J., & Gadalla, T. (1996). Within-teacher predictors of teacher efficacy. *Teaching and Teacher Education*, 12(4), 385–400.
- Rotter, J. (1966). Generalised expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1–28.
- Schunk, D., & Pajares, F. (2001). The development of academic self-efficacy. In A. Wigfield & J. Eccles (Eds.), *Development of achievement motivation*. San Diego, CA: Academic Press.
- Smith, B. (2000). Emerging themes in problems experienced by student teachers: A framework for analysis. *College Student Journal*, 34(4), 633–642.
- Smylie, M. (1988). The enhancement function of staff development: Organizational and psychological antecedents to individual teacher change. *American Educational Research Journal*, 25(1), 1–30.
- Soodak, L., & Podell, D. (1994). Teachers' thinking about difficult-to-teach students. *Journal of Educational Research*, 88(1), 44–51.
- Soodak, L., & Podell, D. (1996). Teacher efficacy: toward the understanding of a multi-faceted construct. *Teaching and Teacher Education*, 12(4), 401–411.

- Thomas, J., & Pedersen, J. (1998). *Draw-a-science-teacher test: A visualization of beliefs and self-efficacy*. Retrieved from <http://www2.tlct.ttu.edu/thomas/conference%20paper/aets%2098/aets.htm>
- Tschannen-Moran, M., & Hoy, A. (2001). Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education, 17*, 783–805.
- Tschannen-Moran, M., & Hoy, A. (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, LA.
- Tschannen-Moran, M., Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*, 202–248.
- Van den Berg, R. (2002). Teachers' meanings regarding educational practice. *Review of Educational Research, 72*(4), 577–625.
- Woolfolk, A., & Hoy, W. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*, 81–91.
- Yeung, K., & Watkins, D. (2000). Hong Kong student teachers' personal construction of teaching efficacy. *Educational Psychology, 20*(2), 213–235.