

*Original article (short paper)*

## Strength and sources of self-efficacy beliefs by physical education student teachers

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**Abstract**—In the teaching domain, self-efficacy (SE) is related to teachers' judgment about their own ability to achieve learning outcomes and student engagement. SE is formed by four sources of information: mastery experiences, vicarious experiences, social persuasion, and psychophysiological states. We measured and analyzed SE and its sources for teaching physical education. Student teachers ( $n = 114$ ) from three universities responded to two Likert scales – Physical Education Teacher Self-Efficacy Scale and Teacher Self-Efficacy Scale Sources – and a social demographic questionnaire. SE for teaching was classified as moderate, and vicarious experiences and social persuasion were the main sources of information. Results were discussed for future researches related to teaching practices in undergraduate programs as well as in-service teacher training.

Keywords: self-efficacy, teacher training, physical education

**Resumo**—“Força e origem de crenças na autoeficácia de estagiários em educação física.” No domínio do ensino, a autoeficácia (AE) está relacionada com o julgamento dos professores sobre a sua própria capacidade para atingir resultados de aprendizagem e engajamento dos alunos. AE é formada por quatro fontes de informação: experiências diretas, experiências vicárias, persuasão social e estados psicofisiológicos. Nós medimos e analisamos a AE e suas origens para o ensino de educação física. Estagiários ( $n = 114$ ) de três universidades responderam a duas escalas de Likert – Escala de Autoeficácia do Professor de Educação Física e Escala de Fontes de Autoeficácia, e a um questionário sociodemográfico. AE para o ensino foi classificada em grau moderado; experiências vicárias e persuasão social foram as principais fontes de informação. Os resultados foram discutidos para futuras investigações relacionadas com as práticas de ensino em cursos de graduação, bem como em programas de formação de professores em serviço.

Palavras-chave: autoeficácia, formação de professor, educação física

**Resumen**—“Fuerza y el origen de las creencias en aprendices auto-eficacia en la educación física.” En el campo de la enseñanza, la auto-eficacia (AE) se relaciona con el juicio de los docentes sobre su propia capacidad de lograr los resultados del aprendizaje y la participación de los estudiantes. AE está formada por cuatro fuentes: las experiencias de maestría, las experiencias vicarias, persuasión social y estados psico-fisiológicos. Se midió y analizó la AE y sus fuentes para la enseñanza de la educación física. Los aprendices ( $n = 114$ ) de tres universidades respondieron a dos escalas tipo Likert - Escala de Auto-eficacia del Profesor de Educación Física y Escala de Fuentes de Auto-eficacia, y un cuestionario socio demográfico. AE para la enseñanza fue clasificado como moderado, y las experiencias vicarias y persuasión social fueron las principales fuentes de información. Se discuten los resultados para futuras investigaciones relacionadas con las prácticas de enseñanza en los cursos de pregrado, así como programas de capacitación para maestros en servicio.

Palabras clave: auto-eficacia, formación de docentes, educación física

### Introduction

Teaching is a complex, multifaceted, and dynamic process. The complexity stems from the intrinsic relationships among different variables involved in the process, as well as from the extent to which they affect teaching. These variables are directly interconnected with the education context and with the people who are involved in. These variables also add to intentionality and the ability of making things happen.

As indicated by a set of studies about teachers' beliefs (Gibbs, 2003; Pajares, 1992), teachers must learn how to address the substantial cognitive, emotional, and practical demands that result from the relationships among interpersonal behaviors,

environmental behaviors, and their own behaviors during the teaching process. Managing these demands requires that teachers have specific knowledge and skills, and that they believe in their own abilities to be resilient and persistent in the face of challenges (Fives & Buehl, 2008). Furthermore, teachers must innovate to introduce new solutions to old problems by using different approaches and by being willing to take risks. Studies in different areas of knowledge reaffirm the role of beliefs and the challenges of teaching practices (Cheng, Chan, Tan, & Cheng, 2009; McDonnough & Matkins, 2010). In the field of physical education (PE), some of these challenges include: teaching students with different levels of learning abilities and skills; teaching content related to exercise, fitness, dance, sports,

and games; the actual condition of physical inactivity of some high school students; poor school infrastructure; low levels of student participation in classes; and low levels of student effort (Martin & Kulinna, 2003; Marshall & Hardman, 2000).

In Brazil, the PE curricula in the elementary and secondary schools are diverse, and there is no consensus among government policy, national standards, teachers, and professional associations about curricula (Iaochite, 2007). Therefore, while teaching in school, PE teachers must be aware about the multiple contributions of their roles. They must believe that they can overcome obstacles in order to make such contributions (self-efficacy), and that they can achieve high standards when they are teaching. Supported by consistent theoretical and empirical findings, this study follows the framework of social cognitive theory and, in particular, the construct of self-efficacy proposed by Albert Bandura (1986, 1997). According to Bandura (1997), self-efficacy is the main mechanism that influences “beliefs in one’s abilities to organize and execute the courses of action required to produce given attainments.” (p. 3) According to Bandura, “perceived self-efficacy is not a belief about the skills one has, but about the belief of what one can do under different conditions with the skills he possesses” (p. 37). Bandura (1997) postulated that there are four sources in the construction of self-efficacy beliefs: a) mastery experiences, b) vicarious experiences, c) verbal persuasion, and d) physiological and affective states related to the activity performed.

In the field of education, specifically in studies of teaching, a teacher’s self-efficacy is understood as a “judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated” (Tschannen-Moran & Woolfolk Hoy, 2001, p.783). Among the sources for the construction of teacher self-efficacy, the mastery experiences of student teachers constitute the most effective way of creating a strong sense of efficacy. One important aspect of this source is that it extends beyond the results achieved in fulfilling a task to provide information about abilities rather than simply information about performance. A second source is the observation of social models. Observing other student teachers teaching classes and watching movies and videos related to teaching are examples of how this source can contribute to build teacher self-efficacy. According to Tschannen-Moran, Woolfolk Hoy, and Hoy (1998), teachers who are regarded as models of success demonstrate that teaching is a task that can be performed effectively. Also, they demonstrate which factors related to personnel and contexts are relevant to the promotion of self-efficacy beliefs.

The constant dialogue among supervisors, student teachers, and teachers is a type of verbal persuasion whose goal is to provide feedback, guidelines, praise, and other commentary that may facilitate self-assertion and create incentives to develop both teaching skills and self-efficacy beliefs. Regarding the third source of self-efficacy beliefs, Bandura (1997) affirms that the impact of persuasion in constructing these beliefs depends on the credibility, knowledge, and experience of the activity’s persuasive source.

Physiological and affective or psychophysiological states are the last source of information for the construction of self-effi-

cacy beliefs. Levels of arousal, fatigue, stress, anxiety, tension, pain, and mood states are signals that alter the perception of self-efficacy. They directly affect people’s judgments about their own abilities to accomplish a given task (Bandura, 1997). The interpretation of these reactions tends to influence the mobilization of efforts to perform a given task (Mulholland & Wallace, 2001; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

Although the number of investigations on this issue has increased over the last decade (Klassen, Tze, Betts, & Gordon, 2011), few studies have examined the strength, effects, and sources of self-efficacy in PE (Martin et al., 2008). Martin et al. (2004) found that teachers with strong self-efficacy had a strong intention in continuing to teach classes that were active, even with students who were unwilling to practice. In addition, teachers who had greater beliefs in their own self-efficacy reported more favorable attitudes toward education and expressed a greater feeling of control compared with teachers who were less self-efficacious. Teacher self-efficacy studies have found positive associations between teachers with high perceptions of self-efficacy and continuity in their teaching careers as well as their openness to the use of new technologies (Iaochite et al., 2011; Moseley et al., 2003; Vannata & Fordham, 2004; Watson, 2006).

In the context of teacher training, studies have found strong correlations among self-efficacy, teaching (Bordelon et. al., 2012; Hughes & Chen, 2011), and sources of self-efficacy (O’Neill & Stephenson, 2012). These studies examine various fields, such as biology and mathematics, but few studies have explored the field of PE (Silva, Iaochite, & Azzi, 2010; Martin et al., 2004) to specifically consider the role of teachers’ self-efficacy beliefs and the results of previous studies on academic performance, teachers’ engagement, and the use of various methodological strategies (Mordal-Moen & Green, 2012).

Therefore, this study focuses on teaching practices in PE and aims to identify and analyze the strength and sources of teacher self-efficacy in teacher training. We also aim to correlate sources of self-efficacy with contextual variables.

## Methodology

### *Context and participants*

The participants included 114 senior PE student teachers ( $M = 24.6 \pm 4.92$  years old) from three private institutions in São Paulo State, Brazil. Of the participants, 54.4% were male, and 45.6% were female. The teachers underwent 14-16 hours per week of training activities; 56.6% of the participants performed teaching activities in public schools, and 43.4% performed teaching activities at private schools. The majority of the student teachers (94.7%) served as trainees in urban public and private schools at the elementary level. There were no differences in curricula, content, or workload among the curriculum-supervised institutions. According to Brazilian law (Brasil, 2002), teachers must have 400 hours of student training, during the last four semesters (pre-service training). This process is designed to promote the articulation of different practices from an interdisciplinary perspective and offers student

teacher activities such as observation and teaching practices at schools and supervised group discussion in university classes. Participants were involved in tasks such as class observation and class regency at schools and their veteran teacher twice weekly for seven months in 2009. Each institution had the autonomy to conduct this process the way they see fit. Therefore, certain differences related to the management of teacher training by each institution were based on how they established the criteria of organization and assessment of the activities.

### Instruments

Teaching self-efficacy was assessed by the Teachers' Sense of Efficacy (TSE) scale (Tschannen-Moran & Woolfolk Hoy, 2001). This scale uses a Likert scale on a continuum from 1 (nothing at all) to 6 (a great deal) and consists of 24 items distributed among three dimensions. The "efficacy for student engagement" dimension (ESE) measures belief in the ability to mediate and mobilize students to perform activities ( $\alpha = .91$ ). A typical question is, "How much can you do to help your students think critically?" The "effectiveness for instructional strategies" dimension (EIS) measures belief in the ability to develop strategies to promote thinking and learning in students ( $\alpha = .90$ ). A typical question is, "How well can you provide appropriate challenges for very capable students?" Finally, the "efficacy for classroom management" dimension (ECM) measures belief in the ability to manage the development of teaching activities ( $\alpha = .86$ ). A typical question is, "How much can you do to calm a student who is disruptive or noisy?"

To investigate the sources of teacher self-efficacy, the Sources of Self-Efficacy (SSES) scale was used. This instrument is a Likert scale consisting of 16 statements related to the four sources of self-efficacy (Iaochite & Azzi, 2012). The instrument considers a continuum from 1 (completely false) to 6 (completely true). The scale consists of four dimensions ( $\alpha = .81$ ) that correspond to the postulates of Bandura (1997): *mastery experience* – SME ( $\alpha = .58$ ), *vicarious experience* – SVE ( $\alpha = .58$ ), *verbal persuasion* – SVP ( $\alpha = .75$ ), and *physiological and affective states* – SPAS ( $\alpha = .78$ ). Examples of items for each respective dimension include the following: "The mastery experiences of my teaching practice affect what I think about

my ability to teach," "Observing skilled teachers teaching contributes to what I think about my ability to teach," "Receiving feedback from my students evaluating my teaching practice influences what I think about my ability to teach," and "Changes in my mood during my practice as a teacher affect what I think about my ability to teach."

Finally, to assess the contextual variables, we used a 4-point Likert scale ranging from 1 (nothing) to 4 (a great deal), with four items related to infrastructure/facilities, administrative support, peer support, and preparation for teaching. Examples included, "I feel supported by my colleagues during the teacher training session" and "School facilities were sufficient to teach students in my class."

### Data collection and analysis

College professors responsible for the courses related to curriculum from three PE undergraduate programs in Vale do Paraíba (east of Sao Paulo state) supervised the training courses. These professors were contacted personally and by e-mail. The purpose of the study was explained, and permission for data collection was required. The student teachers were informed about the study, and permission was obtained using a signed consent form that was approved by the Institutional Ethics Committee from the University of Taubaté (CEP/UNITAU 31206). After the student teachers signed the consent form, data were collected in one session during a supervised class at the university. Data were analyzed using descriptive statistics that were calculated using the Statistical Package for the Social Sciences software, v. 17.

## Results

### Scores and levels of self-efficacy and sources of self-efficacy

Table 1 shows the results related to the strength of self-efficacy and its sources for teaching. The score range of the TSE and its dimensions indicate similar values and similar variability in both the TSE scale ( $M = 3.95$ ,  $SD = 0.76$ ) and its dimen-

Table 1. Descriptive measures and frequencies of teacher self-efficacy and its dimensions by strength levels ( $n=114$ ).

Scales	Descriptive Measures					Levels (1)		
	Min	Med	Max	M	SD	Low	Moderate	High
TSE	1.35	4.06	5.17	3.95	0.76	12.2%	76.5%	11.2%
EIS	1.39	4.08	5.34	3.99	0.78	12.8%	77.1%	10.1%
ECM	1.39	4.01	5.16	3.90	0.73	12.5%	76.0%	11.5%
ESE	1.27	4.14	5.33	4.02	0.83	13.6%	73.6%	12.7%
SME	1.63	3.19	4.88	3.15	0.68	16.2%	70.3%	13.5%
SVE	1.06	3.88	4.88	3.80	0.74	15.9%	66.4%	17.7%
SVP	1.63	3.63	4.88	3.62	0.67	16.1%	66.1%	17.9%
SPAS	1.31	3.62	4.88	3.52	0.72	18.0%	67.6%	14.4%

Note: (1) Frequencies of student teachers with low scores ( $\leq M-SD$ ), moderate scores ( $> M-SD$  and  $\leq M+SD$ ) and high scores ( $> M+SD$ ), Min - minimum value, Med - median, Max - maximum value, M - mean, SD - standard deviation.

Table 2. Scores of teacher self-efficacy and its sources by gender and type of institution ( $n=114$ ).

Scales	Gender			Type of institution		
	Female (n = 62)	Male (n = 52)	<i>p</i>	Public (n = 60)	Privative (n = 46)	<i>p</i>
TSE	3.94 (0.67)	3.96 (0.85)	0.865	3.87 (0.77)	4.03 (0.74)	0.329
EIS	3.96 (0.72)	4.03 (0.84)	0.627	3.91 (0.80)	4.09 (0.78)	0.270
ECM	3.89 (0.68)	3.91 (0.80)	0.929	3.81 (0.74)	4.00 (0.71)	0.194
ESE	4.00 (0.76)	4.03 (0.93)	0.865	3.98 (0.90)	4.06 (0.76)	0.616
SME	3.17 (0.66)	3.13 (0.71)	0.752	3.08 (0.67)	3.21 (0.66)	0.326
SVE	3.68 (0.79)	3.94 (0.67)	0.071	3.75 (0.78)	3.88 (0.63)	0.343
SVP	3.59 (0.70)	3.66 (0.63)	0.606	3.57 (0.69)	3.71 (0.60)	0.273
SPAS	3.59 (0.69)	3.43 (0.74)	0.259	3.51 (0.63)	3.44 (0.81)	0.587

Note: Values expressed as the mean (standard deviation); *p* - significance value of Student's *t* test.

sions: EIS ( $M = 3.99$ ,  $SD = 0.78$ ), ECM ( $M = 3.90$ ,  $SD = 0.73$ ) and ESE ( $M = 4.02$ ,  $SD = 0.83$ ). Regarding the classification according to the self-efficacy scores, on the TSE scale, 12.2% of the student teachers scored at a low level, 76.5% scored at a moderate level, and 12.2% scored at a high level. For sources of self-efficacy, the SME showed lower mean scores ( $M = 3.15$ ,  $SD = 0.68$ ). The lowest percentage of student teachers had high scores (13.5%), and most of the student teachers had moderate scores (70.3%). The student teachers had similar scores for other sources, with higher scores on the EVS ( $M = 3.80$ ,  $SD = 0.74$ ). The percentage of student teachers with a high score was higher for the EVS (17.7%) and SVP (17.9%) sources.

#### Sources of self-efficacy and self-efficacy by gender and type of institution

Table 2 shows the mean values and standard deviations of the scores and sources of self-efficacy as well as the significance values according to Student's *t* test by gender and type of institution. Males presented higher mean scores than females on the TSE scale and its dimensions; however, the differences were not statistically significant ( $p > 0.05$ ). The sources of self-efficacy also showed no significant differences ( $p > 0.05$ ) between genders and between the two types of institutions.

The student teachers in the private educational institutions had slightly higher average scores than public school student teachers on the self-efficacy scales, but the difference was not statistically significant ( $p > 0.05$ ). For sources of self-efficacy, the student teachers from private schools had higher average scores on the EMS, EVS, and SVP scales, verifying the SPAS on the opposite scale. In this case, the differences were not statistically significant for all sources ( $p > 0.05$ ).

#### Correlation between self-efficacy and self-efficacy source with the context variables

The Spearman coefficients (Table 3) show that the correlations between sources of self-efficacy are all positive, indicating a slightly increasing trend with the scores of the context variables. However, none of the correlations was statistically significant. The highest correlations were between the SVP and infrastructure ( $r = 0.18$ ,  $p > 0.05$ ), support ( $r = 0.16$ ,  $p > 0.05$ ), and general context ( $r = 0.17$ ,  $p > 0.05$ ).

With regard to self-efficacy, there was statistical evidence of a positive correlation of low intensity with some of the contextual variables, indicating a trend of increasing self-efficacy scores among these variables. Total self-efficacy was correlated with preparation for teaching ( $r = 0.24$ ,  $p < 0.05$ ) and the

Table 3. Spearman correlation coefficients on teacher self-efficacy and its dimensions, sources of teacher self-efficacy, and context variables ( $n=114$ ).

	Infrastructure/ Facilities	Administrative Support	Peer Support	Professional Preparation	General Context
TSE	0.043	0.132	0.163	0.249*	0.211*
EIS	-0.052	0.086	0.030	0.199*	0.085
ECM	0.039	0.190	0.203*	0.191	0.228*
ESE	0.047	0.168	0.238*	0.287*	0.280*
SME	0.056	0.148	0.163	0.067	0.160
SVE	0.126	0.010	0.058	0.154	0.092
SVP	0.184	0.167	0.126	0.003	0.170
SPAS	0.013	0.007	0.063	0.055	0.027

Note: *r* - Spearman correlation coefficient; \* $p < 0.05$ .

general context ( $r = 0.21, p < 0.05$ ) variables. There was also a significant correlation between the EIS and preparation for teaching ( $r = 0.19, p < 0.05$ ) and between the ECM and peer support variables ( $r = 0.203, p < 0.05$ ) and general context ( $r = 0.22, p < 0.05$ ). The ESE is the dimension showed a low correlation with the following variables: peer support ( $r = 0.23, p < 0.05$ ), preparation for teaching ( $r = 0.28, p < 0.05$ ), and general context ( $r = 0.28, p < 0.05$ ).

## Discussion

In this study, we aimed to identify and analyze the strength of beliefs in self-efficacy regarding teaching and the sources of this belief among PE student teachers. This investigation began with the assumption that identifying self-efficacy for teaching and its sources in student teachers is the first step in adjusting and improving teachers' perceptions of their ability to teach.

The results indicate a moderate level of self-efficacy beliefs about teaching among the Brazilian student teachers who participated in this study. These results are consistent with other studies showing that self-efficacy beliefs regarding teaching among student teachers are above average (Iaochite et al., 2011; Moseley et al., 2003). For example, in their investigation of the effects of teaching science on self-efficacy with respect to the teaching and classroom management of Turkish pre-service elementary teachers, Yilmaz and Çavas (2008) found that nearly all participants had moderate to high self-efficacy beliefs regarding teaching. Similar results were found in a study by Poulou (2007) with 198 fourth-year students from primary education departments in Greece. These students obtained high scores for the ESE dimension and similar scores for the EIS and ECM dimensions. In a study of science student teachers in Malaysia, Bakar et al. (2008) reported that the highest level of self-efficacy for teaching was linked to the ESE dimension and that all dimensions of teacher self-efficacy were positively correlated with the preparatory course.

In studying the progressive development of self-efficacy beliefs among student teachers of American agricultural science, Harlin et al. (2007) found high self-efficacy beliefs at the beginning of the semester (with no teaching experience). Throughout the teaching experience, the scores decreased and then increased at the end of teaching practice. Studies of PE teachers in different institutions of higher education have found similar results. In general, the scores range from "some influence" to "quite a bit" (5 to 7 points). Silva, Iaochite, and Azzi (2010) conducted a study with student teachers from four private institutions that resulted in a mean score that was slightly higher than average for the dimensions of instructional strategies and student engagement in relation to classroom management.

In the area of teaching PE or studies that include in-service workshops for PE teachers, the scores for perceived efficacy related to teaching have been found to be moderate to high (Onofre, Carreiro da Costa, & Marcelo, 2001; Iaochite, 2007, Martin, & Kulinna, 2005).

However, more important than identifying the strength of teaching self-efficacy in teachers is to determine how this belief is

fostered. Reports from teachers indicate that the perceived ability to teach is based upon information gathered from various sources, such as experiences of successes and failures related to the role of being a teacher and teachers' perceptions of these experiences. Self-confidence is also developed based on feedback received from students and supervisors, the observations of colleagues teaching classes, and the combination of these and other information sources related to the task of teaching and the context in which teaching occurs. Bandura (1997) argues that self-efficacy beliefs "are the product of cognitive processing of diverse sources of efficacy information conveyed enactively, vicariously, socially, and physiologically. Once formed, efficacy beliefs contribute to the quality of human functioning in diverse ways." (p. 115)

The results of the present study show that, among the sources postulated by Bandura (1997), situations related to vicarious experience and verbal persuasion had the highest averages, which conflicts with the results obtained by Poulou (2007). One possible explanation for this difference is that the student teachers in our study had few opportunities to directly practice teaching because most schools did not allow student teachers to lead classes. This restriction may explain the low score obtained for the set of situations related to mastery experience. Among the opportunities that a teacher training program may offer, observation and dialogue with teachers at the school were the most commonly performed activities. Observing good teachers, particularly those with similar characteristics as the observer, contributes to increased teacher self-efficacy beliefs (Bandura, 1997; Tschannen-Moran & McMaster, 2009). However, observing actions that are not appropriate for teaching—with careful consideration of how these actions may be related to different pedagogical approaches—can also influence student teachers' perceptions of their abilities to use approaches that differ from those of the observed model. According to Schunk (1987, in Usher and Pajares, 2008), "they (students) are most likely to alter their beliefs following the model's success or failure to the degree that they feel similar to the model in the area in question." (p. 89)

In the present investigation, vicarious experience was positively, but weakly associated with teacher self-efficacy. This result is similar to the results in Mulholland and Wallace (2001), which reports on a longitudinal case study of a beginning elementary teacher during her transition from preservice to inservice teaching. Additionally, Bandura (1997) notes that self-efficacy is especially sensitive to vicarious experience in circumstances or situations where people are inexperienced or uncertain about their own capabilities. Due to their social nature, schools are one of the most significant spaces for the construction and development of knowledge, abilities, and self-efficacy beliefs, especially because school is an environment that consistently allows learning by modeling.

Another positive weak, although not significant correlation, was related to the source of mastery experience. These results are partially consistent with data from other investigations (Mulholland & Wallace, 2001; Poulou, 2007). With regard to this source, the fact that the student teachers, for the most part, could not directly experience teaching at the schools may have contributed to the low score and weak correlation for this source in this investigation.

This study found a positive and weak correlation between physiological and affective states and teacher self-efficacy for the total scale and two of the three dimensions. O'Neill and Stephenson (2012) and Poulou (2007) found a weak correlation between sources of information and dimensions of teacher self-efficacy, particularly the physiological and affective states. Despite the weak correlation, this result encourages future studies that might better explain these relationships (Palmer, 2011).

Finally, although teacher self-efficacy and its sources had a weak positive correlation with the contextual variables, peer support and preparation for teaching were significantly correlated with teacher self-efficacy. A similar result was found by Gaudreau et al. (2013), who examined a training program in classroom management in relation to the self-efficacy of elementary school teachers. In this study, teachers who showed a high level of self-efficacy reported that peer support and a collaborative approach developed during the training program were important factors in their increased belief in their efficacy. Similarly, in a systematic literature review, van Dinther, Dochy, and Segers (2011) found that educational programs had the potential to enhance students' self-efficacy and that educational programs based on social cognitive theory proved to be particularly successful in this area for several fields of knowledge.

Moreover, through these associations, it is possible to confirm the theoretical postulation that the development of belief occurs through different pathways because it depends on a teacher's assessment of the task of teaching and the skills that must be performed to execute that task under existing conditions (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Thus, the way that each source relates to (impacts) self-efficacy depends on the cognitive processing of this information (i.e., what is remembered and the value (meaning) that the teacher places on the remembered information). Bandura (1997) explains that the sources of efficacy vary in the degree of their information, interaction, and complexity with respect to the evaluation of self-efficacy. Furthermore, Bandura suggests that the role of sources in the development of self-efficacy beliefs may be linear (i.e., the higher the contribution of a factor, the higher the self-efficacy) or curvilinear (i.e., a moderate level is more adequate than low or high levels). For example, given the contribution of mastery experiences as a source of information contributing to a teacher's perception of his/her teaching ability, it is likely that the more meaningful and positive experiences a teacher has, the higher his/her self-efficacy will be.

In summary, the results of our study demonstrate the scenario that trainees experience from the moment they step into the schools and begin the supervised training program. When they teach in real situations, their judgments about their efficacy are strong; thus, classroom management emerges as the most challenging dimension. Furthermore, when reflecting on the construction of these beliefs, vicarious experience and persuasion are important sources of teacher self-efficacy because they provide different possibilities for teachers to learn from one another and to receive feedback both from their supervisor (in a university) and from collaborating teachers in the schools.

Finally, the correlations among teacher self-efficacy, its sources, and its contextual variables, although weak, indicate

that context as well as undergraduate preparation could be associated to self-efficacy judgments of student teachers. The ability to learn from peers and from observational learning situations is a prominent aspect of the dimensions of classroom management and student engagement.

## Conclusions

In this study, we aimed to measure and analyze self-efficacy and the sources of this belief among student teachers. Considering that teachers' knowledge, attitudes, and teaching practices are mediated by their thoughts and beliefs, Gibbs (2003) affirms that teacher training programs should recognize that student teachers need to improve their cognitive capacities to self-reflect, self-motivate, and self-regulate to develop competence in exercising control of their thinking, behavior, and emotions.

As observed in our study, vicarious experiences and verbal persuasion are important sources of self-efficacy. However, as an information source of self-efficacy, teaching mastery experience should be considered a valuable opportunity to develop strong self-efficacy beliefs about teaching in different contexts. Teacher education programs should encourage student teachers to create and develop teaching practices in situations of increasing complexity when teaching elementary and secondary classes, to express confidence in themselves, and to continue to learn to become competent teachers.

As several studies have noted (Kaya, Lundeen, & Wolfgang, 2010; Oh et al., 2005; Ylmaz & Çavas, 2008), teacher education program activities should strengthen the experiences of teaching practice to reduce the distance between theory and practice. Ylmaz and Çavas (2008) emphasize that understanding the role of self-efficacy and classroom management can enhance the role of teachers in the university during their initial training.

In relation to the study of self-efficacy beliefs, their sources, and the context in which future teachers acquire teaching experiences, some studies have showed may increase the level of commitment to teaching (Oh et al., 2005), promote resilience (Tait, 2008), and reduce the dropout rates of beginning teachers.

With regard the teacher identity, Lamote and Engels (2010) highlight the need to build the professional identities of future teachers during training, leading them to explore, articulate their perceptions, strengthen their self-efficacy, create opportunities to experience the complexity of practice, and provide frequent and systematic support. As discussed above, depending on how teachers and supervisors select, organize, and manage multiple factors involved in the teaching and learning processes, the experiences of teacher training can provide excellent opportunities to extend beyond these conditions and build high self-efficacy beliefs and other self-beliefs, especially in relation to classroom management. The use of observational learning principles may offer relevant contributions in this area.

With respect to future investigations, Pajares (1992) and Usher and Pajares (2008) indicate that qualitative approaches, such as ethnography, classroom observations, interview techniques, journal entries, and reflective writings, when conducted over time, might open new perspectives for research on

self-efficacy beliefs, their role in teacher education, the way these self-beliefs are shaped, and the implications for teaching practice in PE classes at school.

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