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Original Article

TEACHER SELF-EFFICACY AND ITS SOURCES IN PHYSICAL EDUCATION TEACHING TRAINING EXPERIENCES

DESENVOLVIMENTO DA AUTOEFICÁCIA DOCENTE DURANTE O ESTÁGIO SUPERVISIONADO NA FORMAÇÃO INICIAL EM EDUCAÇÃO FÍSICA

Roberto Tadeu Iaochite[1] and **Roraima Alves da Costa Filho**[2]

[1]Graduation in Education Program, São Paulo State University, Rio Claro-SP, Brazil.

RESUMO

Na formação inicial, futuros professores deveriam aprender a como lidar com a elevada demanda cognitiva, emocional e comportamental decorrente do ensino. Ao mesmo tempo, precisam desenvolver e fortalecer a crença pessoal de que serão capazes de lidar com esses desafios. No contexto da educação física, essas demandas podem ser ainda mais desafiadoras dado o ambiente e as condições em que as aulas são ministradas. Este estudo teve por objetivo analisar a crença de autoeficácia docente para ensinar educação física e sua constituição a partir das experiências vividas durante a realização das disciplinas de estágio curricular supervisionado. 87 futuros professores (54% mulheres; idade média = 21,8) de uma universidade pública do interior do estado de São Paulo responderam a um questionário sociodemográfico, escala de autoeficácia docente e de fontes de autoeficácia docente. Para descrever as fontes de autoeficácia foram analisados os portfólios reflexivos produzidos como produto final do estágio supervisionado. Os futuros professores demonstraram moderada a elevada crença de autoeficácia, que foram sustentadas basicamente por experiências diretas de ensino e persuasões verbais. A relevância da autoeficácia docente para a formação dos professores, em particular, nos processos de formação inicial em educação física são discutidas.

Palavras-chave: Ensino. Autoeficácia. Educação física. Estudantes.

ABSTRACT

During initial training, aspiring teachers should learn how to deal with the high cognitive, emotional and behavioral demands generated by teaching. At the same time, they need to develop and strengthen their personal belief that they will be capable of handling said challenges. In the physical education context, these demands can be even more challenging, given the environment and conditions in which classes are taught. This study aimed to analyze teacher self-efficacy belief as to teaching physical education, and its construction from situations experienced during school-based teacher training. A total of 87 future teachers (54% women; average age = 21.8) from a public university in the state of São Paulo completed a sociodemographic questionnaire and the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001). To describe sources of teacher self-efficacy, reflective portfolios composed as the final product of a supervised internship were analyzed. The student teachers showed moderate to high self-efficacy belief, which was primarily supported by teaching experiences and verbal persuasions. The relevance of teacher self-efficacy for teacher training, particularly in physical education early training processes, is discussed.

Keywords: Teaching. Self-Efficacy. Physical Education. Students.

Introduction

Teaching is a complex, dynamic and multifaceted process. In initial training, future teachers should learn how to deal with the high cognitive, emotional and behavioral demands resulting from said activity[1]. In physical education classes, these demands can be perceived even more, due, for instance, to contextual conditions in which classes are taught, lack of adequate materials and spaces, demotivation and shame from students towards engaging in body practices[2].

During initial training, different subjects and university courses offer learning opportunities for the future teacher. Among these courses, supervised internship has been spotlighted, which is a period when undergraduate teaching students begin to have observation and lecture experiences at school under the supervision of a professor. Research in different contexts has highlighted the central role that supervised internship has in

developing future educators to teach at school. Acquisition of knowledge, the link between theory and practice, knowledge of reality, and the development of personal capability beliefs have been pointed out among different contributions[3,4].

A teacher's behavior in the classroom depends on what they believe they can do. That is, what the teacher does during the class depends on how much they believe they can mobilize, with a certain competence, their knowledge and skills in favor of a practice that allows their students to learn. Among teaching beliefs, self-efficacy has been proven to be an important predictor of teacher behavior in the classroom[5,6]. This belief is defined as the judgment that a teacher makes about their own ability to achieve learning results with their students, however difficult and demotivated the latter can be, and considering different teaching conditions[7].

The self-efficacy belief influences the way that people perceive the conditions around them. Those with strong self-efficacy beliefs tend to have a more optimistic view, understanding difficulties as variables that can be overcome, while those with weak self-efficacy beliefs tend to perceive barriers as hindrances to their achievements[8]. Because behavior is contextualized and socially performed, the self-efficacy belief must be investigated considering the domain and the context in which the action is performed. To consider context and domain does not meant to restrict self-efficacy to a single aspect, but rather to understand that, for a task to be performed, a series of subtasks is required, which may or may not allow said task to be carried out[9]. For instance, beginning teachers who showed a strong self-efficacy to teach managed to face the demands of the beginning of their careers, sought solutions to their daily classroom issues, as well as ended the year believing that they had grown professionally[10,11].

In this study, the context of teacher self-efficacy belief is considered within the field of physical education teaching at school. Research results have shown relationships between this belief and other variables linked to teaching, such as attitudes towards the profession and the adoption of new educational curricula[12], selection of teaching strategies that promote physical activity among students[13], as well as association with student motivation[14]. Despite these benefits, the interest in the sources of information on how and when teacher self-efficacy changes is still incipient[15,16].

Bandura's postulations[8] present four sources of information by which self-efficacy can change: enactive mastery experience, vicarious experience, social persuasion, and physiological and affective states. Information coming from mastery experience refers to the interpretation that people have about their results in a given task. Experiences interpreted as successful tend to strengthen the belief, while interpretations of failures tend to weaken it. Vicarious experiences provide information from observation of models. The greater the similarity between model and observer, the greater the impact of this source. Social persuasion refers to information, evaluations and feedback that people receive about their skills, effort, persistence and results achieved, and that can indicate their ability to perform tasks. Information on physiological and affective states can manifest itself from different activations, such as physiological (sweating, tachycardia), physical (pain, tiredness) and/or emotional (mood, stress), which, when interpreted as positive, can strengthen the belief, while negative interpretations weaken one's belief in their capability for achievements.

Studies on teacher self-efficacy development with future physical education teachers have focused on investigating mastery experience, pointing out that information from this source, involving lecturing, interpretation of successful teaching of specific contents, and student academic performance have been used as a source of information on self-efficacy[17,18]. In this context, supervised internship has been a very effective moment for promoting teacher self-efficacy, especially when future teachers can have contact with the reality of schools[18].

On the other hand, when future teachers have a weak self-efficacy belief they tend to interpret their internship experiences in a negative way that weakens said belief[19].

Few studies with future physical education teachers have explored, in addition to mastery experience, the contributions of other sources for teacher self-efficacy development. The few that have invested in this task have stressed the guided support of supervisors towards the learning of new types of knowledge and teaching skills[20] and the observation of classmates and school teachers during lectures in the internship[21] as situations that also provide information for the future physical education teachers' personal judgement on their capability. Social persuasion manifested itself through sharing of experiences among classmates, as well as through the contributions of supervisors to lesson plans to be carried out during the internship[19]. Finally, emotional activations, such as nervousness and anxiety, were perceived as something that weakened the belief the participants had in their own ability at the beginning of the internship, while positive emotions, such as happiness and sense of professional accomplishment, promoted self-efficacy beliefs at the end of the supervised internship[21,22].

The identification of these situations can provide evidence on how supervised internship experiences can contribute to the formation of teachers who are better prepared for teaching. Longitudinal studies can help understand how beliefs behave and how sources are manifested at different moments of initial training to influence the perception of capability[16,20]. Understanding these facets can assist supervisors in proposing learning situations that effectively contribute to strengthening the belief in critical moments of training, especially during the learning of requirements for the teaching activity. Thus, this study aimed to analyze teacher self-efficacy and its sources of information in situations experienced by future physical education teachers during supervised curricular internship (SCI) at school.

Methods

This is a mixed method study, characterized by the descriptive-exploratory type[23,24], as it investigated different aspects in order to seek a better understanding of the investigated phenomenon. Quantitative and qualitative strategies were used for both data collection and analysis.

Participants

The participants were future physical education teachers (N = 87; 54% women; 46% men; Mean age = 21.8) enrolled in a teacher training course and attending a supervised curricular internship program at a state university in São Paulo. Inclusion criteria were: being an undergraduate teaching student in physical education at the respective institution and being regularly enrolled in one of the SCI courses during the data collection period. The research excluded those students who did not accept to participate and did not fill out the scales or hand in the reflective portfolios. Thus, data were collected from future teachers enrolled in the four SCI courses between the fifth and eighth semesters of the physical education teaching program: SCI I (n = 19), SCI II (n = 16), SCI III (n = 17) and SCI IV (n = 34).

Study Context

The physical education teaching program that participants were attending aims to train physical education teachers to work at basic education schools. The SCI of said teaching program is understood as a space for training and research that seeks to promote the progressive insertion of future teachers in their work environment.

The four SCI courses from which data were collected are taught from the third year (fifth semester), until the end of the fourth year (eighth semester) of the physical education teaching program. The SCI presents as guiding aspects the theoretical and methodological foundation of physical education teaching at school, as well as the development, planning and implementation of physical education teaching projects, and are structured as follows:

- SCI I (third year, annual): length of 120 hours, 60 of which are meant for the learning of contents and legislation on physical education teaching at school, and the other 60 hours are for observing the school reality of kindergarten and elementary school, and drafting a teaching project to be applied during SCI II;
- SCI II (sixth semester): length of 90h, 60 of which are meant for teaching activities in kindergarten and/or elementary school, and for developing the teaching project drafted during SCI I, while 30h are for theoretical and methodological training, which occurs through sharing and discussion of classroom experiences with classmates and supervisors at the university;
- SCI III (seventh semester, fourth year): length of 90h, 60 of which are meant for teaching activities in middle school, and 30h are for theoretical and methodological training, which occurs through studies, as well as sharing and discussion of classroom experiences with classmates and supervisors at the university;
- SCI IV (fourth year, annual): annual course making up 120 hours, 50 of which, in the first semester, are meant for teacching activities in high school, 50 for work on school management, and 20 hours for theoretical and methodological training, which occurs through studies on legislation and school management, as well as through sharing and discussion of classroom experiences with classmates and supervisors at the university.

Instruments

To investigate self-efficacy, the Teachers' Sense of Efficacy Scale was used, which is composed of 24 items divided into three dimensions: efficacy for student engagement (8 items), efficacy for using instructional strategies (8 items) and efficacy for class management (8 items)[7]. The instrument was adapted to the context of Brazilian physical education teachers[25], and the questions were presented on a 6-point Likert scale, on which 1 represents little and 6 represents very much. To calculate the scores of the total self-efficacy scale and its dimensions, the mean of its items was calculated, resulting in a score that can vary between a minimum of 1 and a maximum of 6 points. The higher the score, the greater the teacher's sense of efficacy, as to both the scale as a whole and each dimension. Using the dimensions of the original scale, the values, in this study, for the internal consistency of the total scale – 0.925 by Cronbach's Alpha – and of its dimensions indicate good levels of reliability: student engagement ($\alpha = 0.840$), efficacy for using instructional strategies ($\alpha = 0.863$), and efficacy for class management ($\alpha = 0.820$).

The Teacher Self-Efficacy Source's Scale, developed and validated with Brazilian physical education teachers[26], was also employed. The instrument includes 16 items on a Likert scale from 1 to 6 points (1 = totally false; 6 = totally true), divided into four dimensions that represent sources of teacher self-efficacy. In said instrument, the higher the score, the stronger the perception of the source of teacher self-efficacy. This scale also obtained good reliability indexes, analyzed by Cronbach's Alpha: Physiological and Affective States (5 items; $\alpha = 0.783$), Social Persuasion (5 items; $\alpha = 0.751$), Vicarious Experiences (3 items; $\alpha = 0.806$), and Enactive Mastery Experiences (3 items; $\alpha = 0.723$).

In order to deepen the description of the information that makes up teacher self-efficacy, 51 reflective portfolios developed by future teachers enrolled in SCI III and IV were analyzed. The portfolios had a formative, self-reflective and self-assessing character as to learning[27]. There is also indication that the production of a reflective portfolio is an

opportunity for the student to reflect on the beliefs that affect their own ability to deal with the demands of teaching[28]. Thus, the portfolio consisted of an activity aimed at complementing the activities carried out during SCI III and IV.

Procedures

Complying with ethical procedures on research involving with human beings, the conduction of this research was approved under legal opinion 2.971.091 by São Paulo State University's ethics committee on research involving human beings. Data were collected during the respective SCI courses, after the students consented to participate in the research. After the objectives were explained, the students who agreed to participate filled out the scales in the classroom, a procedure that lasted approximately 25 minutes, whereas the portfolios were developed throughout the course of the SCI program.

Quantitative Analysis

Statistical analysis was run on Statistical Package for the Social Sciences (SPSS), version 22 for Windows. The quantitative variables under study were characterized through means and standard deviations.

The reliability (or internal consistency) of the scales used was assessed using Cronbach's Alpha. After most variables were proven to have no normal distribution (checked through the Kolmogorov-Smirnov test), the Kruskal-Wallis non-parametric test was used for comparing quantitative variables among the four groups included in the research. For cases in which the test was significant, Dunn's multiple comparison test was run to identify pairs of groups with significant differences. Spearman's correlation coefficient was also used for studying correlations at least among ordinal variables. A significance level of 5% was considered for the conclusions of the results of the statistical tests.

Qualitative Analysis

Qualitative analysis of the information contained in the portfolios was conducted by two researchers and through the construction of thematic axes[23]. The coding procedure adopted was based on the self-efficacy framework. First, each portfolio was read comprehensively for the central ideas to be identified and for the data systematization process to be started. Then, the information was coded deductively and inductively and transformed into data. Such data were systematically organized into descriptive categories, created by grouping the coding (content units) of the explicit information contained in the portfolios. These units were categorized deductively based on the four sources of self-efficacy information[8].

Results

Means, standard deviation and differences among the four SCI groups are displayed in Table 1. Overall, the participants presented a moderate to high teacher self-efficacy belief. The analysis of the multiple comparison tests between groups, two by two, shows that the SCI I group was the one with the highest self-efficacy scores, and differences were statistically significant in relation to all the other groups, both in the total scale and in all its dimensions. There were no significant differences ($p > 0.05$) among the SCI II, SCI III and SCI IV groups as to efficacy for instructional strategies and efficacy for class management, neither as to the total scale. Concerning the dimension of efficacy for student engagement, the SCI III group presented significantly lower levels compared to the SCI II and SCI IV groups, with no significant differences between both.

Table 1. Characterization and comparison of teacher self-efficacy, its dimensions and sources of constitution among the four SCI groups

	TOTAL (N = 87)	SCI I (*n* = 18)	SCI II (*n* = 16)	SCI III (*n* = 19)	SCI IV (*n* = 34)	
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	*p* (1)
Teacher Self-Efficacy	4.43 (0.61)	5.07 (0.51)	4.35 (0.47)[a]	4.20 (0.42)[a]	4.28 (0.60)[a]	< 0.001
Instructional Strategies	4.59 (0.64)	5.08 (0.47)	4.47 (0.54)[a]	4.62 (0.56)[a]	4.38 (0.69)[a]	0.005
Class Management	4.37 (0.64)	4.90 (0.65)	4.19 (0.54)[a]	4.40 (0.55)[a]	4.17 (0.58)[a]	< 0.001
Student Engagement	4.34 (0.79)	5.24 (0.51)	4.39 (0.53)[a]	3.57 (0.51)	4.30 (0.68)[a]	< 0.001
Sources of Teacher Self-Efficacy						
Mastery experience	4.61 (0.79)	4.61 (0.54)	4.77 (0.84)	4.74 (1.04)	4.47 (0.71)	0.418
Vicarious experience	4.60 (0.75)	4.78 (0.80)	4.77 (0.64)	4.51 (0.93)	4.47 (0.65)	0.424
Social persuasion	4.78 (0.81)	4.88 (0.89)	4.91 (0.69)	4.58 (0.95)	4.79 (0.75)	0.528
Physiological and affective states	3.74 (1.01)	3.66 (1.10)	3.93 (1.09)	4.16 (1.09)	3.46 (0.80)	0.064

Note: (1)Kruskal-Wallis significance test value; [a] No significant difference among groups with the same letter
Source: The authors

With respect to sources, social persuasion presented the highest means for participants in the SCI I, II and IV. For SCI III, mastery experience obtained higher scores, followed by social persuasion. The results show no significant differences among the four study groups in relation to any of the sources of teacher self-efficacy ($p > 0.05$).

Table 2 displays correlations between teacher self-efficacy (total and dimensions) and its sources. Results show significant positive correlations between mastery experience and teacher self-efficacy ($R = 0.236$; $p < 0.05$), efficacy for using instructional strategies ($R = 0.340$; $p < 0.01$) and efficacy for class management ($R = 0.249$; $p < 0.05$), indicating that the stronger the interpretation of mastery experience, the higher the levels of teacher self-efficacy. The correlations between social persuasion and teacher self-efficacy ($R = 0.231$; $p < 0.05$) and efficacy for class management ($R = 0.304$; $p < 0.01$) were also positive and significant. On the other hand, the source of physiological and affective states was negatively correlated with self-efficacy ($R = -0.229$; $p < 0.05$), with efficacy for student engagement ($R = -0278$; $p < 0.01$) and with efficacy for class management ($R = -0.221$; $p < 0.05$). None of the other correlations were significant ($p > 0.05$).

Table 2. Correlation among self-efficacy, its dimensions and the sources of self-efficacy in the total sample

	Teacher Self-Efficacy	Instructional Strategies	Class Management	Student Engagement
Physiological and affective states	**-0.229***	-0.053 [NS]	**-0.221***	**-0.278****
Social persuasion	**0.231***	0.161 [NS]	**0.304****	0.206 [NS]
Vicarious experience	0.156 [NS]	0.130 [NS]	0.153 [NS]	0.146 [NS]
Mastery experience	**0.236***	**0.340****	**0.249***	0.071 [NS]

Note: Spearman's correlation coefficient; [NS] Not significant ($p > 0.05$); [*] $p < 0.05$; [**] $p < 0.01$
Source: The authors

Table 3 displays the coding for portfolio data of relevance to teacher self-efficacy development. Experiences that relate to mastery experience were the most frequent ones,

mainly the perception of success (14 quotes) and the perception of acquisition of experience (12 quotes). These experiences were followed by discussion and guidance with and among classmates and supervisors (12 quotes), and initial uncertainty (10 quotes).

Table 3. Coding of information relevant to teacher self-efficacy development present in the reflective portfolios (N = 51)

Sources of Self-Efficacy	Situations	Portfolios (*n*)	Quotes	%
Mastery experience	Perception of success	13	14	12.7
	Acquisition of experience	12	13	11.8
	Put knowledge into practice	8	8	7.3
	Test and practice teaching skills and methods	5	6	5.5
Social persuasion	Discussion and guidance with and among classmates and supervisors	12	13	11.8
	Guidance from supervisors	8	8	7.3
	Compliments from the school's students	4	5	4.5
Physiological and affective states	Initial uncertainty	8	10	9.1
	Security	7	8	7.3
	Self-knowledge	5	6	5.5
	Pleasure in teaching	4	4	3.6
Vicarious experience	Observe the supervisor teaching	4	4	3.6
	Observe classmates teaching during SCI	3	3	2.7
	Basic Education Physical Education Teachers	2	2	1.8
	Class observation	1	1	0.9

Note: Each portfolio could contain more than one situation identified as a source of teacher self-efficacy, as well as multiple mentions related to the same source.
Source: The authors

This evidence suggests that the future teachers, when explaining the origin of the information that composes their own self-efficacy assessment, relied on practical situations related to the source of mastery experience (27 portfolios), followed by the source of social persuasion (19 portfolios), and physiological and affective states (18 portfolios). Upon realizing their own success, they not only acquired experiences, but also developed their personal perception of capability for teaching physical education at school. Only nine portfolios mentioned any type of vicarious experience, with observing the supervisor teaching being the most frequent situation for this source.

Discussion

This study aimed to investigate the development of the self-efficacy belief of future physical education teachers during supervised internship, identifying the level of the belief and its sources of construction, in the four courses referring to the SCI. Researchers in different contexts have supported this type of investigation, as its results can contribute to the proposal of more appropriate training practices and promote the formation of teachers who are better prepared to face the reality of schools[15,16].

This study found moderate to strong teacher self-efficacy beliefs. Specifically, SCI I participants presented a higher self-efficacy, while a more moderate belief was detected in SCI IV. Gurvitch and Metzler[18] found similar behavior for self-efficacy in interns only during the first supervised-internship course held at school. In this study, the belief showed a decreasing trend over the internships.

Results in this direction can also be observed with teachers at the beginning of their careers, who, when entering the profession, show a decrease in their belief due to a clash between expectations and reality[10,11]. Such changes are believed to have been caused by differences in the context and characteristics of the tasks during the SCI courses. If, in the first one, the task was predominantly observation, in the other ones, lectures took most of the workload. Thus, as of SCI II, when the participants had real teaching experiences at school, the interns began a process similar to that of career induction. This argument is supported by Bandura's proposition[9] that people cannot accurately assess their own capability when they are not clear about what task they will have to perform.

Perhaps, self-efficacy at the beginning of internships (SCI I) was high because most interns believed that they knew how to teach and deal with children. However, the moment they faced the reality of teaching, not only regarding movement, but contents related to the body culture of movement, they realized that they did not yet have knowledge on other elements linked to teaching, for instance, on planning, selection of instructional strategies, evaluation strategies. This is especially evidenced when one observes that the level of self-efficacy for student engagement among SCI III participants was the lowest in all groups. It is at this stage that they need to teach middle school students, when teaching physical education at school requires that future teachers select content and teaching strategies that motivate student participation, since the challenge of dealing with students who do not want to participate in classes begins to present itself at this stage of basic education in Brazil[2].

Another result that helps understand the self-efficacy development of the future physical education teachers was the association with sources of mastery experience and physiological and affective states. Similar results have also been observed in other studies[17,18,20]. According to Bandura's proposition[8], mastery experience is the source that can offer stronger evidence on personal capability. In this study, mastery experience was more favorable for strengthening efficacy for use of instructional strategies. Although there was no difference in results among groups, SCI II presented a higher level of influence from this source of information. On the other hand, SCI I showed the highest level of perceived self-efficacy, both total and in its sub-factors. Now, if mastery experience is the most prominent in the development of self-efficacy belief, which experiences do SCI I participants refer to when evaluating their own capability, if, during this internship, they only observe at school? Would it be their experience as basic education students?

Bandura[9] explains that, under some circumstances, the self-efficacy belief may not adequately predict theoretical assumptions. These circumstances include lack of knowledge on the requirements of the task to be performed and under which the belief is assessed. This incongruity is especially noticeable at the stage of development and acquisition of skills necessary for the performance of a certain task. The results support this description, since vicarious experience was the source that obtained the highest score among the SCI I participants, whose task was to observe and draft a teaching project.

On the other hand, analyzing the source of physiological and affective states, it is possible to observe an opposite movement. The stronger the interpretation of information from this source, the lower the self-efficacy assessment. This result follows the observed movement of decreased belief, since the influence of psychophysiological information was most perceived by the SCI III participants. This group had greater contact with the school and experienced different situations that may have caused different feelings, physiological

activations and reactions compared to the participants in SCI I and II. Bandura[8] argues that, under certain conditions, other sources of self-efficacy information may be more prominent than enactive mastery experience. Because the participants of this research had a small repertoire of practical experiences, information of other sorts, such as physical and affective activations, may have triggered feelings about teaching practice, as one can observe by analyzing the portfolios.

Investigating the portfolios, it was possible to detect that situations related to mastery experience were the most frequently mentioned, followed by social persuasion. These results are similar to those found in other studies[19,21]. The authors argue that those interns who felt more capable also mentioned the practical experiences of planning and teaching what has been planned as positive aspects of learning. It must be considered that the portfolios were produced at the end of SCI III and IV and that, at these stages, the students have necessarily gone through the experience of teaching. It is possible that these experiences helped consolidate what was learned at the university, since students valued putting knowledge into practice and recognized the internship as a place for testing and practicing teaching skills and methods. Situations linked to mastery experience are an important contribution to changing the belief of future physical education teachers[20,21].

Research also points out that future teachers use information from other sources, such as evaluations by classmates and school students, and affective activations based on their own teaching accomplishments[16]. Discussion and guidance with peers and supervisors can provide important information on the teaching practice of interns, as well as favor the link between theory and practice. Another point worth highlight is the participants' perception of uncertainty, mentioned especially when they were starting lecture activities at school.

Cohen and Zach[22] also found that the feeling of insecurity was present in future physical education teachers at the beginning of their internship activities. According to the reports in the portfolios, this affective activation gradually became an indication of a more stable professional choice, both in relation to the option for teaching and to their own ability to teach at school. This result contributes to the theoretical understanding of teacher self-efficacy development, as well as to thinking about pedagogical practices. Bandura[8] argues that a positive change in self-efficacy can be brought about through learning strategies for controlling affective and physiological activations. In the initial training of teachers, this can occur by means of the experimentation of teaching practice, provided mainly by the internship program, which brings the student closer to their future work environment.

Conclusions

In summary, there was a decrease in the teacher self-efficacy of the future physical education teachers over the course of the supervised internship. This belief was associated with positive interpretations of mastery experiences and social persuasion, especially for class management. These were also the most frequently mentioned sources of information in the portfolios produced by SCI III and IV students. On the other hand, the belief was shown to be negatively associated with physiological and affective states.

These results contribute to the knowledge on the process of teacher self-efficacy development, especially at the final stage of training of future physical education teachers. It seems that there was a process of readjusting the self-efficacy belief to the task of teaching physical education at school, since the future teachers gradually learned about the real demands of the task of teaching physical education at school.

The results of this study provide evidence on the relevance and importance of experiencing teaching situations to the development of teacher self-efficacy in the physical education field. The importance of supervised internship and the characteristics

of the context were also described in greater detail, with emphasis, among other aspects, on the interaction between supervisors and students.

It is worth noting that, despite the results found, care must be taken as to their generalization. The study took place in a formative context that privileges training and values teaching practices, understanding the school as the locus of the teacher's professional training[4]. Therefore, other training contexts, other curricular organizations of internships, may comprise different situations from those found in this study. Thus, the need for longitudinal studies in other Brazilian and international contexts is stressed. Another limitation concerns the study design; it did not allow following up the same student throughout their training journey over the internships. Although the curricular structure of the internship at the institution does not undergo major changes, students are individuals with unique previous experiences that can, to a greater or lesser extent, influence their view, perception and belief on what teaching and the teaching profession is. In addition, cohort studies that follow up the same student are recommended, if possible, since their entry in initial training.

It should be warned that the instrument used for assessing the self-efficacy belief does not investigate one's ability to use the pedagogical knowledge of the content, neither the effect of skill and knowledge acquisition for teacher self-efficacy assessment. Thus, other studies should be developed to understand the role of skills and knowledge for judging the ability to teach, since these are also important variables for the teaching practice[16]. Finally, investigating the behavior of self-efficacy in other initial training programs, such as teaching residency and the PIBID [*Programa Institucional de Bolsa de Iniciação à Docência*, Institutional Program for Teaching Initiation Scholarship], are opportunities for gaining new understandings, both of teacher self-efficacy and of these formative itineraries that are so important for teacher training.

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Authors' ORCID:
Roberto Tadeu Iaochite: https://orcid.org/0000-0003-1476-6253
Roraima Alves da Costa Filho: https://orcid.org/0000-0002-8452-7576

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Correspondence address: Roberto Tadeu Iaochite. Address: Avenida 24 A, 1515, Bela Vista, Rio Claro, SP. CEP 13506-900. E-mail: roberto.iaochite@unesp.br