

Incluye-T: Professional development program to increase the self-efficacy of physical educators towards inclusion

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Abstract

Physical Education teacher's (PET) self-efficacy (SE) is a cornerstone for a successful inclusion of students with special educational needs. This study aims to evaluate the effect of a training program called *Incluye-T* on the SE of Spanish in-service PETs (n = 229) toward the inclusion of students with special education needs in physical education, compared with a control group (n = 40). The study also evaluates how the training program is mediated by two demographic variables: teachers' gender and teaching setting. The Self-Efficacy Scale for Physical Education Teacher Education Majors towards Children with Disabilities was used to measure SE pre and post-intervention. Significant improvements in SE were demonstrated for in-service PET compared to the control group for all the sub-scales of the SE scale: intellectual, physical, and visual impairments ($p < 0.01$, large effect sizes). All teachers' self-efficacy subscales improved regardless of their teaching settings (e.g., primary or secondary schools) and gender. Implications for future professional development provision are discussed, including the delivered training strategies, materials or the duration of the intervention.

Keywords: self-efficacy; in-service physical education teacher; professional development; special educational needs; inclusive physical education.

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Introduction

Inclusion in Spain

The Convention for the Rights of Persons with Disabilities was adopted by the United Nations General Assembly in 2006. Article 24 of the Convention states that the inclusion of students with disabilities in the general education system should be the norm, not the exception (United Nations, 2009). Reflecting this philosophy, in Spain, students with special educational needs are educated in regular schools whenever possible, at the closest school to where they live (Economic and Social Council, 2004). The Law for the Improvement of Educational Quality (LOMCE), established in 2015 (MECD, 2013), is the general legal framework for education in Spain, ensuring equal opportunities for the full development of an individual by means of inclusive education, aiming to overcome inequalities by personal, cultural, economic or social factors. Within this framework, physical education is recognized as an effective tool to foster the personal and social development of the students (MECD, 2015). Currently, in Spain, there are 139,448 students with special education needs included in general schools (1.73% of the total school population). Within this group, 36.93% have intellectual or learning disabilities, 27.59% have severe behaviour/personality disorders, 16.64% have generalized development disorders, 8.34% have physical impairments, 5.17% have hearing impairments, 3.01% have multiple disabilities, and 2.26% have visual impairments (MECD, 2017).

Importance of the physical educator

The UNESCO's handbook for Quality Physical Education (McLennan and Thompson, 2015) identifies physical educators' training as a key factor influencing their skills, knowledge and attitudes towards inclusive physical education. As mentioned by Barber (2016), although there are national policies to support school inclusion, this process does not become effective due to limitations in the implementation of physical education programs, and the attitudes and the expectations of teachers towards those students with special education needs. It seems that the success of students with special education needs in physical education is largely dependent on the physical education teacher (PET) and, more specifically, on the initial PET training (Coates, 2012); however, internationally, PETs have often reported feeling unprepared, and incapable of achieving successful inclusion (Morley, Bailey, and Tan, 2005; O'Brien, Kudláček, and Howe, 2009). Some of the most frequently cited barriers to achieving inclusion, reported by PETs, are: (1) a lack of proper teacher training and therefore, absence of the required knowledge about how to include students with special education needs in their classes (Batsiou et al., 2008; Pocock and Miyahara, 2018; Vickerman, 2009); (2) a lack of experience working with students with special education needs (Haycock and Smith, 2011a); (3) feelings of not being able to provide the time and the personal attention that students with special education needs might need (Haycock and Smith, 2011b); (4) feelings of not being adequately supported (Kuyini and Desai, 2007); and (5) other factors such as fear for pupils' safety, the possible negative impact on peers (Haycock and Smith, 2010, 2011a; Hersman and Hodge, 2010; Ko and Boswell, 2013).

It has been reported that teachers' development as practitioners is inextricably linked to their personal experience and personal training (Morgan and Hansen, 2008); these experiences have an important impact on physical education teachers' beliefs and attitudes. Within the Spanish physical education context, research with pre-service Spanish PETs has demonstrated

that their attitudes (Abellán, 2015) and SE (Abellán et al., in press) are more favourable towards the inclusion of students with special education needs if they had previous contact with persons with disabilities. In addition, Jiménez-Monteagudo and Hernández-Álvarez (2013) also analyzed the job skills required for a pre-service PET in secondary schools in Spain and concluded that favourable attitudes towards students with disabilities are a key factor for effective inclusion. However, there are currently no studies examining the self-efficacy (SE) of in-service PETs related to including students with special education needs.

Self-efficacy and inclusive physical education

A review of the literature shows high teacher SE to be a cornerstone for successful inclusion (Block et al., 2010). SE is a task-and situation-specific form of self-confidence, defined by Bandura (1977) as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments”. Whereas individuals with higher SE have increased confidence and perseverance in setting and pursuing goals, and have more positive expectations, those with lower SE are hindered by feelings of stress, helplessness, and are more likely to abandon their efforts (Bandura, 1997). In relation to inclusion in physical education, SE is positively related to more positive attitudes and efforts toward the inclusion of students with special education needs (Hutzler, Zach, and Gafni, 2005). This SE derives, among other things, from adequate training (Hutzler et al., 2005; Jovanović et al., 2014; Taliaferro, Hammond, and Wyant, 2015; Kozub and Lienert, 2003; Ocete-Calvo, 2016). Conversely, a lack of, or inadequate, teacher training has proven to have a negative effect on educators’ SE and attitudes towards working in inclusive settings (Ammah and Hodge, 2005; Hutzler et al., 2005; Ocete-Calvo, 2016). Therefore, effective training that focuses on improving SE beliefs among PETs is highly important.

Improving PET self-efficacy

The recognition of the importance of SE of PETs, for the inclusion of students with special education needs, has led to an increase in research on how we may positively affect the SE of this population. Thus far research has primarily focused on curriculum innovations and the increase of the number of teachers trained (Elliot et al., 2013), especially, the pre-service PETs. For example, Taliaferro et al. (2015) examined the effect of participation in one of two adapted physical education courses, with practicum experiences, on pre-service teachers' SE toward the inclusion of students with special education needs. Results revealed the semester-long (16-week) courses significantly affected the SE beliefs related to all disability types, of pre-service teachers involved in the study. The positive effect of pre-service training was replicated in prior research, including research by Hodge and Jansma (1998; 1999) which demonstrated the ability of coursework, including a practicum, to improve pre-service teacher's attitudes towards the inclusion of students with special education needs in physical education. Variables thought to moderate this attitude of pre-service physical educators include: (a) gender (favoring females), (b) academic major (favoring non-physical education teacher education majors), (c) having hands-on experience (favoring experience teaching individuals with disabilities) (Folsom-Meek et al., 1999), and (d) the teaching environment (Ko and Boswell, 2013; Tripp, Rizzo, and Webbert, 2007). A growing body of research supports the effectiveness of pre-service PET programs for the development of pre-service teachers' attitudes and competencies to include students with special education needs. Fewer studies have evaluated the effectiveness of a program to affect the SE of in-service PETs toward the inclusion of students; Taliaferro and Harris (2014) examined the effectiveness of a one-day workshop on the SE of general PETs to include students with autism spectrum disorder; changes in the SE of the intervention group (n=

38) were non-significant when compared to the control group. Similar non-significant findings were reported by Haegele, Hodge, Filho, and de Rezende (2016) who examined the effect of a two-day workshop on in-service PET's judgements about inclusion (encapsulating the dimensions of judgments about Inclusion versus Exclusion, Judgments about Acceptance of Students with Disabilities, and Judgments about Perceived Training Needs). As suggested by Taliaferro and Harris, (2014), professional development of a longer duration may be required for successful SE change. There remains an extreme dearth of research on professional development for in-service PETs, related to the inclusion of students with special education needs (Kozub and Lienert, 2003).

To address the scarcity of research on the topic, the current study aimed to evaluate the effect of a training program called *Incluye-T* on the SE of in-service PETs toward the inclusion of students with special education needs in physical education. In addition, the authors evaluated how the training program effects varied based on the teachers' gender and teaching setting (i.e. primary vs secondary school vs TAFAD – an advanced secondary school setting, described below).

Methods

Design

To assess the effectiveness of the program, this study employed a pre- and post-test quasi-experimental design in which there were two groups; an experimental group who received the intervention, the *Incluye-T* training program, and a control group, who did not (Tavakoli, 2013, p. 482).

Participants

The local CEFIREs offices (Offices for Teachers Training and Innovation) of the Valencian Government (Spain) and the Official Professional Board for Physical Education Professors of the Valencia Region (COLEFCAFE-CV), responsible for the provision of in-service professional development to teachers in that region of Spain, assisted in the recruitment of PETs for participation in the *Incluye-T* Program. All PETs in the Valencia region were emailed with information about the program and a printed brochure was also sent to the schools by post. All PETs interested in the *Incluye-T* program were then invited to participate in the research. The inclusion criteria, for participation, were that: (1) all participants held a university-level degree related to physical education (e.g., a diploma in physical education, or a bachelor degree in physical activity and/or sports sciences) and (2) they were currently employed as physical educators. Participants included a sample of 269 in-service PET (age range from 23 to 61 years). The intervention group comprised initially of a group of 261 PET, with 229 of them completing the whole intervention and pre-post evaluations (12.26% drop out). The study sample of the intervention group consisted of PET from three different teaching settings: primary schools (n = 122, 53.28%), secondary schools (n = 81, 35.37%), or TAFAD programs (n = 26, 11.35%). TAFAD are specific training programs oriented to students that, after finishing secondary school, do not follow university studies, receiving a specific training in physical activity and sports (i.e. usually aged between 16-18 years). TAFAD includes within its curricula a specific subject about adapted physical activity and para-sports. The control group consisted of forty in-service PETs who responded to the recruitment call expressing an interest in the program but without availability to attend the six sessions scheduled. Ethical approval was obtained from the Projects Evaluation Office of the University responsible for this study (Reference: DPS.RRV01.15).

Intervention

Structure of the intervention; Incluye-T

The main purpose of the *Incluye-T* program was to improve the SE of the participating PETs to successfully include students with special education needs in physical education via the development of the necessary attitude, knowledge, and skills. Each session involved a theoretical component, followed by a practical component when participants experienced vicarious and mastery experiences of modifying activities, equipment, and instruction for students with special education needs, via the use of simulations. The program consisted of 6 sessions, each 3 hours in duration, conducted during three consecutive weeks, 2 days per week. To reach all participants involved in this study, the *Incluye-T* program was administered fourteen times. All the principal elements of the training program, e.g. duration, number and distribution of the sessions, administration of pre- and post-tests, instructors, content, and time of contact with a para-athlete were kept constant. Each of the offering of the program included 16 to 28 in-service PETs and was conducted in the period from February 2016 until April 2017.

The programs were conducted in public education centres, selected in cooperation with the CEFIREs of the Regional Official Education Board. The first part of session 1 was conducted in a regular classroom; all remaining sessions were conducted in a gymnasium or outdoor sport/physical education facility. All the sessions were performed in the evenings. A brief description of the contents of the *Incluye-T* program sessions is provided in Table 1. The final session was conducted with the participation of one para-athlete. The para-athletes group included (1) three football players with blindness (one took part in Rio Paralympic Games; one participated in the 2015 IBSA World Championships, and one participated regularly at the Spanish National League), (2) one F11 Athletics thrower, who participated at Sidney, Athens,

Beijing, London and Rio Paralympic Games (4 gold and 1 bronze medals); (3) one para-cyclist with cerebral palsy, who participated in London and Rio Paralympic Games (1 bronze medal); and finally, (4) the Spanish national champion in wheelchair slalom (class WS3).

Table 1. Description of the training program and teaching strategies used.

Session 1	<p>Pre-test</p> <p>Theoretical session about principles and benefits of inclusion, ICF model in PE, SEN in PE curriculum</p> <p>Awareness lesson (practical activity and debate) about different impairments, including activities simulating visual and physical impairments.</p>
Session 2	<p>IPE for students with visual impairments (information on characteristics and teaching strategies, simulation, practical activity and debate)</p> <p>IPE for students with hearing impairments (information on characteristics and teaching strategies, simulation, practical activity and debate)</p>
Session 3	<p>IPE for students with physical impairments (information on characteristics and teaching strategies, simulation, practical activity and debate)</p> <p>How to use a wheelchair and optimize position, propulsion and safety (i.e. straps, 5th wheel, etc.)</p>
Session 4	<p>IPE for students with intellectual impairments (information on characteristics and teaching strategies, simulation, practical activity and debate)</p> <p>Boccia</p>
Session 5	<p>Sitting Volleyball</p> <p>Inclusive PE: “all together, all is possible”</p>
Session 6	<p>Paralympic sport with a para-athlete (i.e. direct contact) and debate</p> <p>Post-test</p>

ICF = International Classification of Functioning, Disability and Health, PE = physical education, SEN = student with special needs, IPE = inclusive physical education.

The *Incluye-T* Guide

To ensure consistency across program offerings, The *Incluye-T* Guide (Reina et al., 2016a) was developed, and used by the facilitators for each offering of the program. The *Incluye-T* Guide was created with special emphasis on situation-specific content related to inclusive physical education for students with visual, hearing, physical, and intellectual impairments. In addition to increasing the participant's awareness and understanding of the philosophy of inclusion, and the various types of impairments that students with special education needs may experience, inclusion strategies are presented including the adaptation of activities and instructional strategies. General and disability-specific strategies are provided. See the supplementary *Incluye-T* Guide, translated into English (Reina et al., 2018).

The Guide also includes examples of practical lessons and infographics for all summer and winter Paralympic sports. The infographic card presents a brief explanation of each para-sport, including information on the rules and the specific equipment needed to practice the sport. Additionally, it includes basic information about the classification system used in the sport and a brief biography of a local or national para-athlete. Furthermore, each infographic card includes a QR code that directs the reader to a video that further explains each para-sport (i.e. Paralympics A-Z by International Paralympic Committee).

Content Validity of the program

In order to validate the content of the training program, its content, as described in the *Incluye-T* Guide, was reviewed by three experts with academic and research experience in adapted physical activity: i) two professors with expertise (teaching and research) in adapted physical activity and adapted physical education (PhD), and ii) a graduate student in sports sciences and physical activity with international experience in adapted physical activity and a

European Diploma in Adapted Physical Activity. Experts provided feedback on the appropriateness of the content to enable physical educators to include students with special education needs. Additionally, the practical lessons and the infographic cards provided in the Guide were designed in cooperation with two assistant professors in adapted physical activity/education (with experience in teaching inclusive physical education) and two students from a Master Program in Health and Sport Performance (with bachelor degrees in sport sciences and physical activity). A final version of the *Incluye-T* Guide and program was decided upon after three meetings where goals, content, duration of time to be spend on content, and methods of instruction were discussed.

Social validity of the program

To determine the acceptability of and satisfaction with the intervention procedures, participants completed a feedback form at the end of the final session to evaluate three components of the program: i) the content provided, and teaching strategies used, by the *Incluye-T* teachers (5 items), ii) the resources, equipment and facilities, and duration of the training program (5 items), and iii) how useful participants found the program overall (3 items). Participants were asked to rate the 13 questions on a scale ranging from 1 (strongly disagree) to 4 (strongly agree). This evaluation survey reported high rating scores (i: $M = 3.68$, $SD = 0.15$; ii: $M = 3.66$, $SD = 0.23$; iii: $M = 3.72$, $SD = 0.25$), indicating that the training program was perceived as being useful and appropriate for participants.

Measures

The Self-Efficacy Scale for Physical Education Teacher Education Majors towards Children with Disabilities (SE-PETE-D) was used to evaluate changes in SE. The questionnaire was created and validated by Block, Hutzler, Barak and Klavina (2013) in English, and adapted

to Spanish by Reina, Hemmelmayr, and Sierra-Marroquín (2016b) [*Escala de Autoeficacia en Profesores de Educación Física hacia Alumnos con Discapacidad* (EA-PEF-AD)]. The questionnaire begins with a general introduction to Bandura's SE theory and general guidance of how to use the rating scale to answer the questions. Then, three vignettes are presented – describing a child with an intellectual disability, a physical disability, and a visual impairment – followed by three sets of 10-12 questions relating to fitness testing, teaching sport skills, and organizing the actual playing of a sport. The questions measure how competent a participant feels in each category. The competency scale – a Likert Scale – for each question ranges from 1 (no confidence) to 5 (complete confidence). Higher scores on these three sub-scales mean higher perceived competence to accommodate, or include, a student with special education needs in physical education. The EA-PEF-AD shows good Cronbach's reliability scores (Nunnally and Bernstein, 1994): overall scale = 0.96, intellectual sub-scale = 0.98, physical sub-scale = 0.94, and visual sub-scale = 0.94 (Reina et al., 2016b).

The fourth and last part of the EA-PEF-AD includes questions about demographic characteristics of respondents such as age, sex, years of working experience, years of education, previous courses completed in adapted physical education, and previous experiences with, and frequency of contact with, people with disabilities (Block et al., 2013).

The measurements were administered anonymously to the intervention groups as a pre-test before the commencement of the training program, and the post-test was administered after the last session (session 6). The administration of the questionnaire to the control group was conducted by visiting them at their school/education centre over the same period of time as that of the intervention. To maintain anonymity, pre- and post-test scales were matched using a free-choice code (e.g. picture, last digits of his/her telephone number or ID, etc.).

Data analysis

Descriptive statistics were expressed as mean (M) and standard deviation (SD). Descriptive statistical analyses were conducted to represent the participants' demographic characteristics. Data were screened for normality of distribution and homogeneity of variance using the Kolmogorov-Smirnov and Levene's tests, respectively, to determine the appropriateness of using parametric techniques for data analysis. EA-PEF-AD reliability was assessed by Cronbach's Alpha calculation, considering acceptable scores over 0.70 (Nunnally and Bernstein, 1994). In order to determine the internal consistency of the scale to evaluate SE, the relationships among EA-PEF-AD sub-scales were assessed using Pearson's product moment correlation (r). The following scale of magnitudes was used to evaluate correlation coefficients: < 0.1 , trivial; $0.1-0.3$, small; $< 0.3-0.5$, moderate; $< 0.5-0.7$, large; $< 0.7-0.9$, very large; and $< 0.9-1.0$, almost perfect (Hopkins et al., 2009).

The change in the level of SE was analyzed using a mixed $2 \times 3 \times 2$ ANOVA, using pre-post intervention scores as the within-group factor, and teaching setting (i.e. primary, secondary, or TAFAD) and gender (i.e. male or female) as the between groups factors. A Tukey's honestly significant difference post hoc analysis was used for multiple comparisons. Practical significance in repeated measures ANOVA analyses were calculated by partial eta-square (η^2), as a measure of effect size for mean differences with the following interpretation: > 0.26 , between 0.26 and 0.02 , and < 0.02 were considered as large, medium and small, respectively (Pierce, Block, and Aguinis, 2004). All data in this study were analyzed using the Statistical Package for Social Sciences (version 24.0 for Windows, SPSS Inc, Chicago, IL, USA). Statistical significance was set at an alpha level of $p < 0.05$.

Results

Demographics

Demographic characteristics of the participants are detailed in Table 2. No significant differences are observed between the intervention and control groups for age, teaching experience, or gender distribution. Comparing teachers across teaching setting subgroups (primary, secondary, and TAFAD) and control group, it can be seen that gender distribution and experience in teaching physical education to students with special education needs across all groups is similar. Participants in the TAFAD group were significantly older ($p < 0.01$) and had more teaching experience ($p < 0.01$) than the other two intervention subgroups and the control group. Previous training in adapted physical education increases across the groups, with the TAFAD group most likely to report having training (68.42%). Reported experience with teaching students with special education needs was similar across intervention subgroups and higher among the control group (reported by 75%).

Table 2. Characteristics of the participants in the *Incluye-T* training program.

	Primary	Secondary	TAFAD	IG	CG	IG-CG (<i>p</i>)
Gender						
Male	77 (63.11%)	48 (59.26%)	17 (65.38%)	142 (62.01%)	25 (62.50%)	0.805
Female	45 (36.89%)	33 (40.74%)	9 (34.62%)	87 (37.99%)	15 (37.50%)	0.657
Age						
	36.09 ± 6.87	38.92 ± 8.09	45.89 ± 9.30	37.99 ± 8.40	38.00 ± 4.12	0.997
Years of Teaching						
	10.25 ± 6.59	11.90 ± 8.09	19.16 ± 9.81	11.74 ± 8.23	12.25 ± 2.13	0.698
Training in APE						
Yes	35 (29.07%)	37 (45.76%)	18 (68.42%)	139 (60.70%)	25 (62.50%)	
No	87 (70.93%)	44 (54.24%)	8 (31.58%)	90 (39.30%)	15 (37.50%)	
Experience in APE/IPE						
Yes	79 (64.71%)	52 (64.41%)	18 (68.42%)	149 (65.07%)	30 (75.00%)	
No	43 (35.29%)	29 (35.59%)	8 (31.58%)	80 (39.93%)	10 (25.00%)	

APE = adapted physical education, IPE = inclusive physical education, TAFAD = training program in physical activity for leisure and recreation, IG = intervention groups, CG = control group

Scale reliability and internal consistency

Cronbach's alpha scores for the pre-test EA-PEF-AD scores were calculated, showing scores of 0.97, 0.93, 0.96 and 0.95 for overall, intellectual sub-scale, physical sub-scale and visual sub-scale, respectively. Similar results were obtained at post-test measure: overall = 0.97, intellectual = 0.93, physical = 0.94, and visual = 0.95. Table 3 shows very high positive correlations among the three sub-scales, increasing slightly at the post-test measurement ($p < 0.001$).

Table 3. Pearson's product moment correlation between EA-PEF-AD sub-scales at pre- and post-intervention measures.

	Pre-Intervention			Post-Intervention		
	Intellectual	Physical	Visual	Intellectual	Physical	Visual
Intellectual	--	0.768**	0.696**	--	0.812**	0.767**
Physical		--	0.765**		--	0.869**
Visual			--			--

** $p < 0.001$

The effect of Inclusive-T and interaction effects with the between-groups variables

The 2 x 3 x 2 mixed ANOVA revealed an overall significant effect of the intervention program in all the self-efficacy subscales: intellectual [$F(3,261) = 124.80; p < 0.001; \eta^2 = 0.412$, large], physical [$F(3,261) = 170.75; p < 0.001; \eta^2 = 0.490$, large], and visual [$F(3,261) = 229.12; p < 0.001; \eta^2 = 0.563$, large]. Significant differences were also obtained for the interaction of the within-groups factor (i.e. intervention) * and the PET's teaching setting (i.e. primary, secondary, TAFAD) in the three subscales: intellectual [$F(3,261) = 15.34; p < 0.001;$

$\eta^2 = 0.205$, medium], physical [$F(3,261) = 22.59$; $p < 0.001$; $\eta^2 = 0.276$, large], and visual [$F(3,261) = 49.40$; $p < 0.001$; $\eta^2 = 0.454$, large]. Medium-to-low effect sizes were obtained for the between comparisons of the teaching setting variable [intellectual ($p = 0.225$; $\eta^2 = 0.024$), physical ($p = 0.062$; $\eta^2 = 0.040$), visual ($p = 0.044$; $\eta^2 = 0.044$)]

Conversely, no interaction effects were revealed in the mixed ANOVA among Intervention * Gender factors nor in the comparison between male and female PETs in all the single groups ($p > 0.05$). In addition, only one significant interaction was obtained between the three factors (i.e. intervention * gender * teaching setting) for the intellectual subscale [$F(3,261) = 3.15$; $p = 0.026$; $\eta^2 = 0.050$, medium].

Considering the interaction effects exposed above, Table 4 shows the effect of the program on participants, according to their teaching setting, demonstrating significant ($p < 0.01$) and large effect sizes ($0.470 < \eta^2 < 0.825$) for each of the EA-PEF-AD sub-scales for the intervention group, and the intervention subgroups (i.e. primary, secondary, and TAFAD). No differences were seen, from pre- to post-test, for the control group ($p > 0.05$). Comparing the results among sub-scales of the EA-PEF-AD, the greatest effect was seen for SE scores relating to students with visual disabilities, compared to SE scores relating to students with physical or intellectual disabilities ($0.594 < \eta^2 < 0.825$, large).

Table 4. Repeated measures ANOVA (pre-post intervention) for the EA-PEF-AD sub-scales.

	N	Pre-Intervention (M ± SD)	Post-Intervention (M ± SD)	F	<i>p</i>	η^2
Intellectual sub-scale						
Primary	122	3.17 ± 0.63	3.98 ± 0.49	146.89	< 0.001	0.631
Secondary	81	3.17 ± 0.67	3.97 ± 0.56	197.56	< 0.001	0.664
TAFAD	26	3.53 ± 0.74	4.17 ± 0.62	20.89	< 0.001	0.566
IG	229	3.22 ± 0.67	4.01 ± 0.55	398.34	< 0.001	0.646
CG	40	3.46 ± 0.96	3.48 ± 0.95	0.17	0.686	0.004
Physical sub-scale						
Primary	122	3.01 ± 0.73	4.20 ± 0.46	289.60	< 0.001	0.771
Secondary	81	2.98 ± 0.77	4.20 ± 0.51	290.78	< 0.001	0.744
TAFAD	26	3.54 ± 0.87	4.34 ± 0.72	14.19	0.002	0.470
IG	229	3.05 ± 0.77	4.22 ± 0.51	592.05	< 0.001	0.731
CG	40	3.36 ± 1.14	3.47 ± 1.04	1.95	0.170	0.048
Visual sub-scale						
Primary	122	2.81 ± 0.72	4.23 ± 0.50	404.81	< 0.001	0.825
Secondary	81	2.79 ± 0.78	4.12 ± 0.56	347.33	< 0.001	0.776
TAFAD	26	3.39 ± 0.99	4.32 ± 0.68	23.37	< 0.001	0.594
IG	229	2.87 ± 0.79	4.19 ± 0.55	786.96	< 0.001	0.783
CG	40	3.25 ± 1.11	3.25 ± 1.09	0.60	0.443	0.015

TAFAD = training program in physical activity for leisure and recreation, IG = intervention groups, CG = control group, M = mean, SD = standard deviation, η^2 = effect size.

Discussion

This study examined in-service teachers' SE for including students with special education needs in their physical education classes before and after participation in a specially designed professional development program, called *Incluye-T*. Significant improvements in SE were demonstrated for participants in the intervention group compared to the control group, for all sub-scales of the SE-PETE-D scale: intellectual, physical, and visual impairments. In addition, improvements were revealed for teachers from all teaching settings (primary, secondary, and TAFAD). This positive result differs from previous research demonstrating non-significant changes in SE, and perceptions of inclusive physical education, after a one-day (Taliaferro and Harris, 2014) and two-day workshop (Haegele et al., 2016).

To identify characteristics of *Incluye-T* that may have contributed to its positive impact, it is worthwhile to compare it to previously defined criteria for high-quality professional development (Yoon, Duncan, Lee, Scarloss, and Shapley, 2007). First, Yoon et al. (2007) described the need for professional development to be intensive (at least 14 hours in duration). The longer duration of *Incluye-T*, with 18 face-to-face hours, may be one factor that contributed to its success. Indeed, research on interventions of a longer time period has been shown to positively influence pre-service physical education teachers' self-efficacy and beliefs towards inclusion (e.g. Taliaferro et al., 2015). The result of the current study reinforces the view that teachers with more training about students with special education needs have more positive attitudes toward inclusion (Hodge et al., 2009; Kurniawati et al., 2016). Second, Yoon et al. (2007) observed that of the effective professional development studies reviewed, the vast majority were provided directly to the teachers, as opposed to a 'train the trainer' model, most often in workshops or summer institutes. *Incluye-T* adhered to the workshop model of

professional development, with participating teachers receiving instruction from the program facilitators for the duration of the course. Finally, Yoon et al. (2007) suggest follow-up for teachers is beneficial. Whereas *Incluye-T* did not involve long-term follow-up (i.e. semester, or year-long follow-up), the offering of the professional development program over a three-week period may have contributed to its success. The ability of the teachers to attend the training and return to their schools over a three-week period may have allowed for increased application of the lessons to their gymnasiums, contributing to an increased positive effect. Accordingly, *Incluye-T* might be in line with the results by Umhoefer, Vargas, and Beyer (2015), who explored the differences in self-efficacy to include children with disabilities in physical education among general physical education teachers who received three different adapted physical education services delivery approaches. Their results indicated a trend of higher efficacy scores as the Adapted Physical Education support increased, in which teachers who received the collaborative approach reported the highest efficacy (i.e., the basis of the *Incluye-T* delivery), compared with the teachers who received a consultation approach or an itinerant approach.

Furthermore, the comprehensive breadth of the content included in the course most likely contributed to its success, and reflects research that suggests that special education professional development courses that developed generic skills were more successful than those that concentrated on short-term responses to specific needs of students with different special education needs (Ljiljana, 2000). Research should now seek to further increase the impact of professional development programs, such as *Incluye-T*, for in-service PETs. One method to achieve this may be the inclusion of a follow-up component after the face-to-face component of the training has ended. The combination of in-service teacher training plus in-class consultation

and support has been demonstrated to be more effective than providing just one or the other (Friend and Cook, 2010), and thus, has been identified as a component that characterizes effective professional development programs (Yoon et al., 2007).

Limitations and future research

The current study contributes to the limited literature available on the topic of professional development and inclusive physical education. To inform the design, implementation, and evaluation of future training programs, several limitations should be acknowledged. First, the current study did not employ a randomized experimental research design. Factors including motivation and interest to include students with special education needs may have influenced the participants' self-selection to the control group. Future research should seek to employ a true experimental design. Second, the current study involved a face-to-face professional development program, involving 6 sessions, each 3-hours in duration, conducted over three consecutive weeks. To continue to advance our understanding of effective professional development programs focused on the inclusion of students with special education needs in physical education, further research must seek to examine the optimal format, content, and duration of effective programs. For example, an examination of training programs utilizing other formats of delivery (e.g. online, hybrid methods, etc.), and the dose is required. A host of factors may impact on the effect of inclusion-related professional development for in-service PETs but, thus far, research is very limited in its scope. Similarly, the current study focused on increasing self-efficacy related to the education of students with physical disabilities, intellectual disabilities and visual impairments. Future research should seek to examine the impact of professional development on self-efficacy related to educating a broader array of students groups, such as students with autism spectrum disorder, behavioral disorders, etc. The current study's findings

cannot be extrapolated to the development of teachers' self-efficacy to teach students with these diagnoses.

Third, although several efforts were made to promote fidelity of each program offering, and consistency across programs (e.g. the *Incluye-T* program guide was used by instructors, the same instructors facilitated all offerings of the program), fidelity measures were not gathered. Indeed, this omission has commonly been reported as a weakness of research on professional development (Synder et al., 2018; Artman-Meeker et al., 2015). Future research should seek to overcome this limitation, gathering and providing detailed information about the content and instructional practices used in professional development programs, and assess the fidelity at which the intervention was provided.

Fourth, and finally, the current study examined changes in the SE of the participants towards the inclusion of students with special education needs, to evaluate the effectiveness of the *Incluye-T* program. This was decided upon due to the recognition that a high level of SE of PETs towards the inclusion of students with special education needs is a cornerstone of inclusive physical education (Block et al., 2010); indeed, this belief has led to SE being the outcome of interest in much of the literature available on the training of pre-service and in-service PETs (e.g. Taliaferro and Harris, 2014). Furthermore, reflecting models of effective professional development (e.g. Cohen and Hill, 2000; Fishman et al., 2003), the creators of *Incluye-T* believe the teacher's knowledge and practice mediate student achievement. However, to increase the utility of findings, research must now seek to examine the application of training lessons to the classroom and gymnasium. Changes in the behaviours of PETs for the inclusion of children with special education needs, and ultimately the learning and participation of the student with special education needs, should be assessed. Previous research on professional development of in-

service teachers in other subject areas provides an array of strategies that can be employed to assess application of learning from training programs to the classroom (or gymnasium), including video recording (Fishman et al., 2013), audio-recording (Powell et al., 2010), teacher observation (Fisher et al., 2010), and self-report (Masters et al., 2012). Only then can the true effect of professional development be understood.

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