

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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