



Social, Personal, and Innovative Competencies Effect of Service-Learning in Physical Education Teacher Education: A Mixed-Methods Analysis

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The purpose of this study was to compare the development of social entrepreneurship competency in physical education teacher education students ($n = 89$), through two modalities of intervention from the same service-learning program. The student teachers provided a direct service to children with motor functional diversity, promoting their motor skills and counteracting their lack of social attention. The study was conducted using mixed methods with methodological triangulation. Quantitative evidence was gathered through a quasi-experimental design of two non-equivalent experimental groups implementing the *Social Entrepreneurship Competency Scale*. Qualitative analysis was undertaken by elaborating 12 life histories of multiple crossed stories. Quantitative results provide significant evidence about the social entrepreneurship competency effect of service-learning on physical education teacher education students while qualitative interpretation complements this view, reflecting how this competency was developed. We provide original findings on promotion of personal, social, and innovative social entrepreneurship competency features as well as the promotion of moral and civic values.

Keywords: social entrepreneurship competency, physical education teacher education (PETE), scale, motor functional diversity, life histories

INTRODUCTION

The competence-based approach to the training of future teachers promotes the implementation of active and experiential methodologies, allowing students to apply their learning in real conditions. In accordance with this view, service-learning (SL) is a teaching methodology that seeks to develop academic competencies while providing a community service to meet social needs (Yorio and Ye, 2012). Moreover, SL has the potential to encourage entrepreneurial and innovative learning experiences (Meaney et al., 2016), promote social justice (Jones and Kiser, 2014), enhance students' critical thinking (Mitchell, 2008), and foster educational transformations (Meidl and Sulentic, 2018). Thus, SL stands as a firm opportunity to develop the social entrepreneurship competency (SEC) through integral training that provides a melding of theory and practice (Wilkinson et al., 2013). For the purpose of this research, we considered the SEC as the ability

to initiate or embrace new projects of social entrepreneurship. As established in previous research, this competency comprises personal, social, and innovative personality features (Capella-Peris et al., 2020a).

Understanding the influence of SL in Physical Education (PE) is currently a topic of great interest (Chiva-Bartoll et al., 2020a, 2021a, 2021b; García-Rico et al., 2021; Pérez-Ordás et al., 2021; Valverde-Esteve et al., 2021). Even new theoretical proposals have been made (Chiva-Bartoll and Fernández-Rio, 2021). For this reason, following a similar approach of previous works, we analyzed the effects of SL in PE (Domangue and Carson, 2008; Wilkinson et al., 2013; Peralta et al., 2015; Ward et al., 2017; Webster et al., 2017; Whitley et al., 2017; Capella-Peris et al., 2020b). Previous research has already focused on the personal, civic, or social effects of this methodology, for example, investigating how a SL program shaped preservice teachers' cultural competency (Domangue and Carson, 2008), examining the influence of SL upon first-year PETE candidates' vocational call to teach (Miller, 2012), exploring preservice teachers' experiences of cognitive disequilibrium theory during a SL project in a study abroad experience (Ward et al., 2017), and conducting narrative inquiry regarding undergraduate students' experiences in a physical activity-based SL (Whitley et al., 2017). However, there is a lack of emphasis regarding the effects of SL on promoting the SEC of physical education teacher education students (PETEs). The promotion of this competency in teacher education is important not only because it increases social skills and moral values in future teachers, but it also leads society to improve global wealth, counteract social crises, and resolve community problems. Thus, this paper fills this gap in the research field.

Another significant contribution is made in our research design, based on a comparison of two modalities of intervention in the same SL program, since no similar comparisons have been performed in previous studies. The main difference between the two modalities lies in the duration and intensity of the service provided. Despite several prior recommendations (National Youth Leadership Council, 2004), there are no established parameters for SL programs regarding duration (i.e., how long does the intervention last) and intensity (i.e., effective amount of time invested in the intervention). A previous review analyses several studies about implementations of SL programs in physical education (PE) that varied from 5–20 h to 4–12 weeks (Cervantes and Meaney, 2013). However, the comparison of their effects is skewed by many individual differences, which makes it difficult to interpret the duration and intensity variables. Therefore, we try to shed light on this issue by comparing two intervention modalities of the same SL program with different and well-defined duration and intensity parameters.

Specifically, the purposes of this study are to: 1) investigate the effect of a service learning (SL) program on the SEC of PETEs, and 2) compare the difference between the SEC of PETEs exposed at different SL intervention modalities characterized by different levels of SL duration and intensity. Thus, the studied variables in this study are the SL program (in both intervention modalities) as independent variable, while the dependent variable refers to the SEC of the PETEs.

Moreover, the use of mixed methods represents a new trend in education (Gullo and Sperandio, 2020; Cheung and Ng, 2021; Raza et al., 2021), allowing us to analyze the research question from a double perspective. In addition, the implementation of our design differs from previous work related to SL (Domangue and Carson, 2008; Miller, 2012), since it performs a qualitative data transformation and combines three types of results in the discussion (Creswell and Plano Clark, 2007; Camerino et al., 2012).

MATERIALS AND METHODS

Research Settings

The study was performed in the Elementary Education Degree program of a public university in Spain. The PETEs had to organize, apply, and manage several sessions of motor skills and body language games, and to directly serve a total of 150 children with motor functional diversity caused mainly by Autism Spectrum Disorder, Down Syndrome, Cerebral Paralysis, Attention Deficit and Hyperactivity Disorder, and Rett's Syndrome. The term 'motor functional diversity' is an umbrella concept used to describe any alteration of motor behavior such as repetitive movements or hyperactivity; problems with balance or coordination; poor muscle control, reflexes, and posture; hypotonia; delayed development; and other alterations of motor function produced by several causes. This term proposes a shift towards non-negative, non-disparaging, and non-patronizing terms, aiming to replace the ones with pejorative semantics as special needs, disability, impairment, and handicap. The goal was to stimulate the motor skills of these children and to relieve their lack of social attention. These sessions could foster both the academic learning in PE and the SEC of the PETEs. The academic effect of this project was evidenced in a previous publication (Capella-Peris et al., 2020b).

The study used an incidental-type non-probabilistic sample, with the sample selection matched to the class-group. The total sample was 89 PETEs: 31.5% ($n = 28$) in the Experimental Group I (EGI), and 68.5% ($n = 61$) in the Experimental Group II (EGII). The same SL program was implemented on the two groups under study, but at varying degrees. Specifically, they worked jointly on the design and implementation of the game sessions, although there were important differences in their dedication in terms of duration and intensity (Table 1 near here).

These characteristics led the researchers to hypothesize that the duration and intensity differences (among modalities) will

TABLE 1 | Dedication characteristics of the SL Program.

Characteristic	SL intervention modality	
	Experimental Group I	Experimental Group II
Subject dedication	150 h (100%)	45 h (30%)
Intervention sessions (1 h)	30	9
Implication period	9 months	2 months
Frequency	Weekly	Weekly
PETEs involved	28	61

impact the SEC outcomes of EGI and EGII students, with EGI recording higher SEC than EGII.

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by all institutions involved. All participants provided written informed consent before enrollment.

Design and Data Collection

This study combines quantitative and qualitative research methodologies; its design is located within mixed methods approaches and uses methodological triangulation. The use of this design has been previously supported in several contexts of education (Gullo and Sperandio, 2020; Cheung and Ng, 2021; Raza et al., 2021), as well as in the PE and sports field (Camerino et al., 2012).

Quantitative evidence was gathered through a quasi-experimental design using two non-equivalent experimental groups, performing pre-test and post-test measurements. To assess the dependent variable, the *Social Entrepreneurship Competency Scale* (SECS) instrument was used (Capella-Peris et al., 2020a). This scale specifically measures SEC development in higher education.

The qualitative segment was undertaken through a biographical design, elaborating 12 life histories of multiple crossed stories. Narrative inquiry was used to illustrate the students' SL intervention trajectory. Open questions were performed on interviews to retrieve or expand valuable information. Individual and collective effects on the SEC of PETEs were analyzed. Life histories allow the knowledge, experiences, feelings, beliefs, and values shared in a learning community to be investigated more deeply, as previous studies demonstrated in teaching PE (Sparkes et al., 1993). As SL was expected to produce a stronger impact on EGI students (due to their greater exposure to the SL program) only participants from this group were interviewed. All EGI members were interviewed to elaborate the life histories. From all interviews collected, four were selected to apply the qualitative analysis using quota sampling, considering the representativeness of the students. Eight additional interviews were selected, applying snowball sampling, regarding the suggestions of the students from quota sampling. Following common guidelines to perform life histories (Pamphilon, 1999; Hernández et al., 2011), students were requested to prepare themselves for the interviews as follows: 1) they should explain their experience as if they were telling a story to a friend (narrative exposition); 2) they could use any support file to illustrate their story (e.g., guides, reflections, comments, reminders, reports, etc.); 3) stories should be focused on academic and personal impacts as main objectives, including contextual and additional information for clarification (e.g., suggestions, opinions, interpretations, etc.); and stories should be organized in chronological order, from the very beginning until the end of their intervention of the SL program. Students were asked at any moment to retrieve or expand information regarding interesting issues. All interviews were open, so there were no questions decided beforehand. After displaying those instructions, any additional doubt regarding the interviews was resolved (e.g., assigned day for the interview, location of the

interviews, duration of the interviews, etc.). All interviews were audio-recorded and transcribed verbatim to conduct a thematic analysis from an illustrative approach (Demazière and Dubar, 1997). Thematic areas to perform qualitative analysis were defined by the SECS (Capella-Peris et al., 2020a), allowing researchers to compare quantitative and qualitative results on discussion. In addition, researchers' interpretations were added while constructing life histories from biographical stories, as this was the main difference between both approaches (Denzin, 1989).

Finally, we transformed qualitative data into quantitative results (Capella-Peris et al., 2020b). While the qualitative study assessed the importance and depth of comments from the PETEs, the qualitative data transformation showed the frequency with which each category and aspect analyzed was cited in interviews. This quantitative analysis of the transcripts provides a complementary view of their discourse, offering a new perspective of the effects of SL.

Hypotheses and Research Question

The specific hypotheses to be tested were H_1 : *The SL program will produce a significant improvement ($p < 0.05$) in the SECS results for the EGI*, H_2 : *The SL program will produce a significant improvement ($p < 0.05$) in the SECS results for the EGII*, and H_3 : *The SL program will produce a significant improvement ($p < 0.05$) in the SECS results for the EGI compared with the EGII*. Furthermore, the main question needing a response in this research is *How does the SL program affect the experiences and learnings of PETEs related to their SE?*

RESULTS

Quantitative Analysis

This section shows the results of the statistical tests performed throughout the quantitative study. The IBM SPSS v.24 software package was used in this analysis.

Reliability test: a value of $\alpha = 0.832$ was obtained for the Cronbach's Alpha test, showing good internal consistency.

Initial equivalence: a value of $t(58) = 0.017$, $p > 0.05$ was obtained for the Levene's test, so the initial samples were considered equal.

Pre-test/Post-test comparison: the values obtained when applying the t test for paired samples were $t(29) = 4.864$, $p < 0.001$ for the EGI and $t(29) = 2.606$, $p = 0.014$ for the EGII, respectively. Hence, there were significant differences between the pre-test and post-test measures in the two cases. However, when analyzing categories, there were significant differences only in the EGI (Table 2 near here).

Post-test/Post-test comparison: a value of $t(58) = 1.110$, $p > 0.05$ was obtained for the Levene's test. Therefore, despite the higher results in EGI ($x = 4.002$) compared with EGII ($x = 3.868$), there were no significant differences in the post-test results between both groups. This situation was reflected in the comparison by categories, where the two groups obtained similar results without significant differences between them. The results obtained were $t(16) = 1.093$, $p > 0.05$; $t(20) = 0.882$, $p > 0.05$; and $t(18) = 0.945$, $p > 0.05$, for the categories of personal,

TABLE 2 | Pre-test/Post-test categories comparison in each group.

Category	EGI (n = 28)		EGII (n = 61)	
	Pre-test	Post-test	Pre-test	Post-test
	Mean (SD) ^a	Mean (SD) ^a	Mean (SD) ^a	Mean (SD) ^a
Personal features	3.853 (0.3)	4.128 (0.311) ^b	3.903 (0.365)	3.977 (0.274)
Social features	4.246 (0.306)	4.336 (0.336)	4.17 (0.295)	4.22 (0.275)
Innovative features	3.26 (0.422)	3.522 (0.302) ^b	3.292 (0.438)	3.382 (0.358)

^aMean and Standard Deviation values are displayed for each case.

^bSignificant differences between Pre-test and Post-test measurements ($p < 0.05$).

social, and innovative features, respectively. In all these cases, the EGI registered higher results.

Correlations: three significant records out of three were found in the Pearson's Test; all were positive and had a significance level of $p < 0.01$. The degrees of correlation were moderate ($0.4 \leq r_p < 0.6$) for two cases, and low ($0.2 \leq r_p < 0.4$) for one case. When analyzing categories, 92 significant records out of 136 were found; all were positive and had significance levels of $p < 0.01$ for 74 cases and $p < 0.05$ for 18 cases. The degrees of correlation were high ($0.6 \leq r_p < 0.8$) for one case, moderate ($0.4 \leq r_p < 0.6$) for five cases, low ($0.2 \leq r_p < 0.4$) for 64 cases, and very low ($0 < r_p < 0.2$) for 22 cases.

Qualitative Analysis

Qualitative analysis was elaborated through life histories of multiple crossed stories. The interviews were analyzed following the categories and aspects of the SECS (Capella-Peris et al., 2020a). The analysis was embraced through a multiphase approach, based on an initial open-coding phase and a second axial coding phase (Flick, 2014). Open-coding was applied to identify personal, social, and innovative features of SEC which are of great interest to this study (e.g., PETEs' perceptions of the benefits and effects of service learning, overall satisfaction, promotion of ethical and moral values, improvements in diversity understanding, etc.). Axial coding was used to classify comments that could be associated to the SECS features (i.e., confidence, goal-oriented motivation, ability to take risks, ability to learn and evolve, creativity, social awareness, etc.). NVivo 10 software was used in this analysis.

All extracts used in this qualitative analysis included category and aspect name, researcher interpretation, textual transcript of the PETEs comments, and reference codes. This section offers the information for two extracts per category as an example. The selection of these quotations is related to its importance and depth, and to highlight the PETEs experiences in each case.

Personal features > Goal-oriented motivation: the following student's appreciation of the training provided shows her desire to be prepared in advance for the SL program. This situation demonstrates that she is motivated to fulfil the service in the best way possible. It also contains a critique of the educational system, suggesting several learning elements that appear to be otherwise missing from her teacher education program. Additionally, the statement connects to the previous feature, confidence.

"I liked the preliminary theory sessions because people usually think that as elementary education teachers, we have plenty of

knowledge about children. I have not had experience working with children before that. Hence, I liked that we didn't go directly. Come on with the children! That made me feel more confident as well".

Personal features > Ability to take risks: PETEs expressed concern about preparing an information session for parents, but this situation helped them to overcome their fear of communicating informally with the children's families. This is a common concern among those who begin to teach in elementary, primary, or secondary education for the first time. Therefore, this experience is of great value in their educational training.

"The Down Syndrome Foundation requested that we offer an information session for parents. At the beginning we were so nervous, but later we understood that it was an easy task. They are people like you, you only need to tell them what you are going to do with their children, that's it. Sincerely, I liked a lot".

Social features > Social awareness: this student showed her social awareness about gender equality and respect when facilitating a game activity. Such a situation is common in PE, mainly because of gender stereotypes related to sports and physical activities. Thus, promoting gender equality, no matter what activity or sport the group plays, is of great educational value, especially when working with children at formative stages.

"This day we created groups using two puzzles. The first one had a Superman image and the second one had a Supergirl picture. A man and a woman, because in the group we had boys and girls. Otherwise, they could say that working with superheroes was only for boys! No, games were for boys and girls equally".

Social features > Coexistence and respect of public affairs: sharing their time with these children presented certain challenging situations because of the significant social contrasts arising due to the children's differences of experience, habit, and tradition. The PETEs came to recognize these differences with their professor's support, improving their understanding of the children's varying needs.

"During a break, the children went to take a drop of water. A boy saw the water touching a peer's face and he was afraid about that. The professor told us that ... maybe cleaning your face is a routine for you, but for them could be something new, maybe they don't have this habit from home. You just don't know! ... We usually have 10 minutes at the end of the sessions to promote their habit to clean their faces and hands with water".

Innovative features > Leadership: the following student speaks about playing a leadership role among her classmates during the

TABLE 3 | Global quotes of Social Entrepreneurship Competency.

Categories	Interviews																								Total ^a	
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12														
Personal features	27	4.4%	50	8.2%	69	11.3%	90	14.7%	74	12.1%	53	8.7%	32	5.2%	32	5.2%	49	8.0%	36	5.9%	47	7.7%	52	8.5%	611	29.7%
Social features	108	6.8%	93	5.8%	173	10.8%	186	11.7%	175	11.0%	129	8.1%	81	5.1%	111	7.0%	129	8.1%	123	7.7%	142	8.9%	146	9.1%	1,596	41.3%
Innovative features	83	10.1%	55	6.7%	71	8.6%	61	7.4%	85	10.3%	71	8.6%	46	5.6%	63	7.7%	57	6.9%	65	7.9%	84	10.2%	81	9.9%	822	29.0%

^aThe total percentage was normalized to compare results between categories.
Upright/roman values show number of citations; italic values show percentages.

TABLE 4 | Personal features quotes.

Features	Interview																								Total ^a	
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12														
Confidence	3	3%	17	16.2%	6	5.7%	12	11.4%	9	8.6%	9	8.6%	7	6.7%	9	8.6%	7	6.7%	4	3.8%	14	13.3%	8	7.6%	105	19.7%
Goal-oriented motivation	8	3.6%	10	4.5%	26	11.7%	34	15.3%	28	12.6%	19	8.6%	14	6.3%	7	3.2%	24	10.8%	13	5.9%	13	5.9%	26	11.7%	222	41.6%
Ability to take risks	4	3.1%	8	6.2%	12	9.3%	22	17.1%	22	17.1%	9	7.0%	6	4.7%	10	7.8%	7	5.4%	8	6.2%	9	7.0%	12	9.3%	129	24.2%
Ability to learn and evolve (p)	10	8.1%	14	11.3%	20	16.1%	15	12.1%	13	10.5%	13	10.5%	3	2.4%	4	3.2%	10	8.1%	9	7.3%	9	7.3%	4	3.2%	124	11.6%
Creativity (p)	2	6.5%	1	3.2%	5	16.1%	7	22.6%	2	6.5%	3	9.7%	2	6.5%	2	6.5%	1	3.2%	2	6.5%	2	6.5%	2	6.5%	31	2.9%

^aThe total percentage was normalized to compare results between features.
Upright/roman values show number of citations; italic values show percentages.

TABLE 5 | Social features quotes.

Features	Interview																								Total ^a	
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12														
Ability to learn and evolve (s)	10	8%	14	11.3%	20	16.1%	15	12.1%	13	10.5%	13	10.5%	3	2.4%	4	3.2%	10	8.1%	9	7.3%	9	7.3%	4	3.2%	124	4.0%
Giving help and cooperation	16	5.7%	10	3.5%	27	9.6%	17	6.0%	38	13.5%	14	5.0%	18	6.4%	28	9.9%	28	9.9%	33	11.7%	26	9.2%	27	9.6%	282	18.4%
Social awareness	12	7.5%	3	1.9%	15	9.3%	19	11.8%	19	11.8%	9	5.6%	4	2.5%	4	2.5%	13	8.1%	12	7.5%	25	15.5%	26	16.1%	161	10.5%
Coexistence and respect of public affairs	11	4.2%	5	1.9%	20	7.7%	20	7.7%	22	8.5%	23	8.8%	21	8.1%	23	8.8%	25	9.6%	30	11.5%	25	9.6%	35	13.5%	260	16.9%
Resilience	19	8.1%	27	11.5%	32	13.6%	31	13.2%	24	10.2%	18	7.7%	14	6.0%	23	9.8%	15	6.4%	12	5.1%	8	3.4%	12	5.1%	235	15.3%
Responsibility	4	4.0%	6	5.9%	13	12.9%	15	14.9%	14	13.9%	5	5.0%	6	5.9%	8	7.9%	6	5.9%	8	7.9%	6	5.9%	10	9.9%	101	6.6%
Commitment and coherence	15	9.6%	10	6.4%	24	15.4%	12	7.7%	16	10.3%	7	4.5%	7	4.5%	11	7.1%	18	11.5%	11	7.1%	9	5.8%	16	10.3%	156	10.2%
Ability to create ideas	21	7.6%	18	6.5%	22	7.9%	57	20.6%	29	10.5%	40	14.4%	8	2.9%	10	3.6%	14	5.1%	8	2.9%	34	12.3%	16	5.8%	277	18.1%

^aThe total percentage was normalized to compare results between features.
Upright/roman values show number of citations; italic values show percentages.

TABLE 6 | Innovative features quotes.

Features	Interview																								Total ^a	
	C01		C02		C03		C04		C05		C06		C07		C08		C09		C10		C11		C12			
Creativity (<i>i</i>)	2	6.5%	1	3.2%	5	16.1%	7	22.6%	2	6.5%	3	9.7%	2	6.5%	2	6.5%	1	3.2%	2	6.5%	2	6.5%	2	6.5%	31	1.9%
Leadership	10	9.1%	3	2.7%	10	9.1%	4	3.6%	19	17.3%	3	2.7%	5	4.5%	6	5.5%	6	5.5%	13	11.8%	13	11.8%	18	16.4%	110	13.6%
Initiative	7	6.3%	11	9.8%	11	9.8%	9	8.0%	8	7.1%	4	3.6%	9	8.0%	11	9.8%	14	12.5%	5	4.5%	4	3.6%	19	17.0%	112	13.9%
Ability to change	20	12.3%	6	3.7%	18	11.0%	11	6.7%	15	9.2%	15	9.2%	13	8.0%	12	7.4%	9	5.5%	20	12.3%	8	4.9%	16	9.8%	163	20.2%
Being part of social networks	40	16.4%	19	7.8%	22	9.0%	11	4.5%	27	11.1%	20	8.2%	7	2.9%	21	8.6%	20	8.2%	14	5.7%	30	12.3%	13	5.3%	244	30.3%
Ability to identify opportunities	4	2.5%	15	9.3%	5	3.1%	19	11.7%	14	8.6%	26	16.0%	10	6.2%	11	6.8%	7	4.3%	11	6.8%	27	16.7%	13	8.0%	162	20.1%

^aThe total percentage was normalized to compare results between features. Upright/roman values show number of citations; italic values show percentages.

TABLE 7 | Quotes of Social Entrepreneurship features on interview C12.

Categories	Interview C12												Total ^a					
	Confidence		Goal-oriented motivation		Ability to take risks		Ability to learn and evolve (<i>p</i>)		Creativity (<i>p</i>)									
Personal features	8	15.4%	26	50.0%	12	23.1%	4	7.7%	2	3.8%			52	27.5%				
Social features	Ability to learn and evolve (<i>s</i>)		Giving help and cooperation		Social awareness		Coexistence and respect of public affairs		Resilience	Responsibility	Commitment and coherence		Ability to create ideas					
Innovative features	4	2.7%	27	18.5%	26	17.8%	35	24.0%	12	8.2%	10	6.8%	16	11.0%	16	11.0%	146	41.2%
	Creativity (<i>i</i>)		Leadership		Initiative		Ability to change		Being part of social networks		Ability to identify opportunities							
	2	2.5%	18	22.2%	19	23.5%	16	19.8%	13	16.0%	13	16.0%			81	31.2%		

^aThe total percentage was normalized to compare results between categories. Upright/roman values show number of citations; italic values show percentages.

SL activities. Her comment shows that this task is not as easy as it seems. Problems can often arise in following guidelines, in respecting rules, or in reaching agreements, especially when trying to lead a group of peers.

“ We told them . . . you should do this, this, and this, right? It was supposed that they had a clear idea about what to do, but later when the session came, they had no idea. They were neither performing their roles nor following our directions . . . for example, someone who should be preparing next game but was playing the current one, or someone who should be managing an activity but was watching another game . . . they didn't play their roles. Hence, what did we learn? We learned how to lead them establishing the initial rules more clearly”.

Innovative features > Ability to identify opportunities: assessing the advantages and disadvantages of taking part in the SL program, the following student indicates that one of the most favorable aspects is the realism of the activity. This situation is very important in training PETEs, displaying one of the most valuable contributions of this methodology compared to other, more traditional ones. The recognition of these opportunities let students take full advantage of their participation in those educational experiences.

“ When the professor told us that we could tackle the subject in a more practical way, at first, we did not want to, because we knew there would be more work to do. But, on the other hand, we think this could be better for our training because it meant no longer taking classes with our classmates. We could work directly with children. So, we chose the Service-Learning option. Besides, the fact that they were children with disabilities was a plus for us because we could help them as well. Then, we did not hesitate any longer about taking it”.

Qualitative Data Transformation (Qualitative Data Quantitatively Expressed)

This section displays a frequency analysis of the excerpts from selected interviews, counting the number of citations related to the categories and aspects of the SECS (Capella-Peris et al., 2020a), as well as the percentage value of each. In this study, the procedure was performed globally, showing the number of excerpts per category in each interview (Table 3 near here), by aspects, indicating the frequency of citations into each specific category (Tables 4, 5, and 6 near here), and by interviews, presenting all records related to each interview individually (Table 7 near here).

These tables reflect on the frequency to which each category and feature analyzed is cited in life histories. This data provides a complementary view of PETEs' discourse, offering a new perspective of AL effects. Additionally, the information displays analyses in global terms, by course, and by participant, showing three different approaches.

DISCUSSION

Globally, the results obtained in the quantitative analysis indicate that the two experimental groups improved their SEC

significantly. Although EGI results tend to be higher than EGII, the post-test results reveal no significant differences between them. However, qualitative analysis shows an enormous impact on EGI students describing a substantial development of all personal, social, and innovative features. Similarly, the qualitative data transformation (qualitative results quantitatively expressed) reinforces this global assessment, since the interviews show so many references to social entrepreneurship—more than 2,400. Altogether, this evidence points to outstanding progress in the PETEs' SE, due to their participation in the SL program. This situation agrees with most theoretical works regarding the impact of SL on education (Butin, 2003; Seban, 2013), as well as several meta-analyses concerning SL effects (Conway et al., 2009; Celio et al., 2011; Yorio and Ye, 2012; Carson and Raguse, 2014). In addition, as there are no statistical differences between the post-test measures of both groups, new proposals of intervention with bigger differences between modalities should be analyzed in future research.

Moreover, the category-by-category analysis supports the global findings described above. The quantitative study reveals that EGI improved significantly in two out of three categories on the SECS, while EGII registered non-significant differences. Similarly, the post-test comparison indicates that EGI recorded superior results in all three categories and in 16 out of 17 features compared to EGII. Results are highest for the category of *social features*, followed by the categories of *personal* and *innovative features*, respectively. In addition, there are significant correlations between the categories of the SEC in all cases and between the individual features in 92 out of 136 cases, evidencing the strong relationship among the features analyzed. The qualitative data transformation shows a similar distribution with the *social features* category being the most important. However, in this case more of the comments addressed the *innovative features* than the *personal features*. These results are supported by the qualitative study, where the PETEs specifically emphasize their social experiences and learning (Conway et al., 2009; Celio et al., 2011; Yorio and Ye, 2012). Furthermore, it is important to highlight the impressive results obtained in all categories and features, both according to an analysis of the quantitative data and based on the qualitative data transformation analysis, which suggests a significant impact for the SL program in promoting the SEC on the PETEs.

Therefore, the results from the different analyses performed present highly coherent and complementary data. In addition, this situation indicated that the SL program had a very similar effect among the PETEs in this study. The next sections offer an analysis of the results obtained in the individual features of the SEC.

The first feature, *confidence*, registers high scores in both quantitative and qualitative data transformation analyses. In addition, the improvement in the pre-test/post-test score on EGI is one of the largest observed. Moreover, the qualitative evidence shows how the PETEs increased both their personal and professional confidence, specifically in relation to handling functionally diverse populations and teaching sessions of PE. Altogether, the data points

to a huge enhancement of the PETEs' *confidence* during the study (Miller, 2012; Robinson and Meyer, 2012).

Goal-oriented motivation presents one of the highest results in the quantitative analysis and is the most cited category within the qualitative data transformation. Indeed, this is the only feature that shows statistically significant improvement in the pre-test/post-test EGI comparison. The qualitative data relates the desires of PETEs to develop teaching competencies related to their academic fields (Wilkinson et al., 2013; Capella-Peris et al., 2020b). They also showed a strong intention to help the children, improving their behavior and offering a quality service experience.

Ability to take risks also shows impressive results in the quantitative study. Similarly, the qualitative data transformation represents almost 25% of references coded for personal features. The qualitative analysis reveals the tendency of PETEs to face unknown situations with a high degree of uncertainty. This is mainly related to their participation in the SL program and the benefits of dealing with children with special needs (Miller, 2012; Santiago et al., 2016).

Ability to learn and evolve reveals more moderate results in the qualitative data transformation analysis but still shows high scores in the quantitative data. Moreover, the qualitative analysis reveals how improvement in this feature is connected to enhanced personal, social, and professional competencies among PETEs. All of this suggests both personal and professional progress, enhancing social skills as well as citizen participation (Whitley et al., 2017).

Creativity received moderate results on quantitative and qualitative data transformation analyses. However, it does show one of the higher levels of improvement in the pre-test/post-test comparison for EGI. In addition, analysis of the qualitative data reveals great advances in preparing and implementing new practice activities and highlights the relationship between this feature and the *ability to create ideas*. Some authors associate both elements with the ability to "create differences" in the community through SL (Fleck et al., 2017).

Giving help and cooperation, was the most cited of the social features and received one of the highest post-tests results for both groups. In addition, the qualitative analysis suggests that it benefits from both the service provided and the improvement in communication skills (Lee et al., 2018a).

Social awareness feature obtained remarkable scores in the quantitative study. The qualitative analysis reveals how this feature was developed for the PETEs; basically, it resulted from taking care of the special educational needs of the children receiving the service (Covitt, 2002; Furco and Root, 2010; Himelein et al., 2010; Peralta et al., 2015; Santiago et al., 2016).

Coexistence and respect of public affairs represents the highest score in the quantitative analysis and holds third place in the qualitative data transformation. The qualitative study suggests that it developed alongside attitudes of understanding and deference among PETEs towards the child participants and through contact with other involved groups, including classmates, teachers, and family members of the children, neighborhood and community members, and the school itself as an educational organization (Furco and Root, 2010; Celio et al., 2011; Santiago et al., 2016; Lee et al., 2018a).

Resilience received a high number of comments in the interviews and remarkable scores in the quantitative analysis as well. Both results are reinforced by the qualitative study, which indicates that students improve their response significantly when they face conflicts and unfavorable situations while providing the service (Covitt, 2002).

Responsibility received outstanding quantitative response in both experimental groups. The qualitative data describes that PETEs had to deal with new and complicated experiences related to preparing and performing the service, developing their social, personal, citizen and civic responsibility (Celio et al., 2011; Fleck et al., 2017; Whitley et al., 2017; Iyer et al., 2018). The enhancement of social responsibility is especially interesting because it contrasts with previous research in PE (Chiva-Bartoll et al., 2020b).

Commitment and coherence was one of the features valued most strongly in the quantitative study. Qualitative data shows that the promotion of this social feature occurs due to experience of service provision, along with a desire to participate again in similar proposals. That improvement has been described in previous work in relation to different views of commitment: community, civic, academic, and social (Furco and Root, 2010; Celio et al., 2011; Capella-Peris et al., 2020b). Likewise, there is also precedent for the stimulation of this feature in PE (Robinson and Meyer, 2012).

Ability to create ideas obtained high quantitative records and sits second in frequency of interview mentions within the social features category. The qualitative study explains how this feature was improved due to the PETEs development of reflection skills. They analyzed questions not only about education in general, but also about practice implementation individually. All of this suggests an increase in critical and reflective thinking skills through SL (Yorio and Ye, 2012; Carrington et al., 2015; Barnes and Caprino, 2016; Lee et al., 2018b).

Leadership, received the lowest scores in the quantitative and qualitative data transformation analyses, which contrasts with previous results (Chiva-Bartoll et al., 2020b). However, the qualitative study described that the PETEs led multiple activities while working with the children and their university peers (Celio et al., 2011).

Initiative represents the best improvement between pre-test and post-test measurements in the quantitative analysis for both groups. The qualitative data indicates how the PETEs enhanced this feature through implementation of the service, especially by conducting sessions concerning motor and body language games; this points to a personal improvement in organizational and management competencies (National Youth Leadership Council, 2004; Carrington et al., 2015) regarding how to handle such aspects as children, materials, space, and time in the course of sessions (Webster et al., 2017; Capella-Peris et al., 2020b).

Ability to change received a high number of quotations in the qualitative data transformation analysis, with more than 20% of references coded for innovative features. The qualitative study indicates a positive disposition among PETEs to adjust their perceptions of service recipients and the implementation processes while performing the game sessions. These situations imply important modifications referring to teaching

competencies and preconceived stereotypes (Peralta et al., 2015; Santiago et al., 2016).

Being part of social networks is the most cited feature on interviews for the category of innovative features. The comments extracted in the qualitative study refer to the relationship between the SL students and several groups of others, such as professors, university mates, members of the institutions involved, and children receiving the service and their families, which is in line with previous SL effects on PETEs (Salter and Halbert, 2019).

The qualitative results explain how PETEs developed their *ability to identify opportunities* taking advantage of their participation in the SL program on personal, academic, and professional levels. For this reason, all of them valued the experience positively, signifying an improvement not only for them but also for society. Basically, the main focus was on their potential to develop personal, interpersonal, and citizen participation skills (Ward et al., 2017; Whitley et al., 2017).

In addition, the SL program stimulated several personal, social, and innovative features of great interest to this study. The most outstanding aspects reflect a change in PETEs' perceptions of the children (Baldwin et al., 2007; Conway et al., 2009; Wilkinson et al., 2013). Another remarkable feature is their overall satisfaction with the SL program (Miller, 2012; Fleck et al., 2017), even appreciating the opportunity to participate in the educational experience (Himelein et al., 2010). This situation had a direct impact on their attitudes towards the school and academic learning in general (Furco and Root, 2010; Celio et al., 2011; Barnes and Caprino, 2016). The promotion of ethical and moral values through SL represents another remarkable feature from an educational and social point of view (Yorio and Ye, 2012). Specifically, this highlights the development of empathy, which facilitated the change in PETEs' perceptions of the service recipients and a related improvement in care for their individual needs (Baldwin et al., 2007; Lee et al., 2018a).

More enhanced features to take into consideration are improvements in diversity understanding (Baldwin et al., 2007), the development of interpersonal skills (Ward et al., 2017; Whitley et al., 2017), overcoming the initial doubts and insecurities about classroom management, reinforcing feelings of effectiveness among students (Miller, 2012), the connection between practice skills and the context of preparation for lessons (Baldwin et al., 2007), as well as the promotion of teaching independence and activism that may encourage innovation and social change (Sharra, 2005; Meidl and Sulentic, 2018).

Finally, the complementarity among the various measurement strategies used in this mixed-methods analysis reveals a marked interrelation among the personal, social, and innovation-related features enhanced by the PETEs. This situation explains why the SEC was promoted broadly instead of addressing needed improvements in various individual features.

CONCLUSION

The approach of mixed-methods, using methodological triangulation, offers a great opportunity to analyze the promotion of social entrepreneurship in physical education teacher education students. Indeed, highly reinforcing and complementary records emerge among the different results observed in this study. From this

data, service-learning fostered the SEC of the PETEs, signifying an educational experience that boosted their personal, social, and innovative features. Additionally, the qualitative results offer valuable information to help researchers understand how these learning outcomes were achieved.

Therefore, the H_1 and H_2 hypotheses are accepted as there are significant improvements ($p < 0.01$) in the SECS results for EGI and EGII, respectively. On the other hand, the H_3 hypothesis is rejected, as there is no significant difference ($p < 0.05$) in the SECS results for EGI compared with EGII. Meanwhile, the depth of experience and insight demonstrated by the PETEs, in terms of increasing their SE, offers a broader answer to the research question.

The fact that life histories were only elaborated with students from EGI is a main limitation in this study. Regarding future research, it would be necessary to contrast SL modalities with bigger differences in terms of duration and intensity. Similarly, it would be promising to develop new strategies to assess SL with greater applications in practice, to open lines of inquiry that analyze the effects of SL on service recipients and community members, and to study the impact of this methodology throughout the entire teaching-learning process, analyzing its long-term effects on students, recipients, and society.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

This study was led, designed and conducted by CC-P and MM-P. CS-G and MM-V played a major role in analyzing the results and presenting them appropriately. All authors participated in drafting and reviewing the manuscript.

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