

The impact of Service-Learning on Pre-Service Physical Education Teachers

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Abstract

Service Learning (SL), a pedagogical approach that integrates academic learning with practical service to the community, is an important strategy for developing a range of essential skills, from social and personal to professional. The field of Physical Education is particularly suited to the application of SL, given its myriad social benefits, such as fostering personal and social responsibility, promoting inclusion and cultivating conflict resolution skills. In this sense, the present research aims to identify the state of the art and extend the search for quality interventions to the year 2023, checking whether SL research has improved in the last 7 years. Therefore, the primary objective of this systematic review is to evaluate and synthesise the results of SL interventions implemented at university level for pre-service physical education teachers. The expert guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses were followed to conduct this systematic review. The findings of the review highlight the positive impact of SL on pre-service physical education teachers. However, the existing body of research also highlights the need to improve the quality of research by raising standards of validity and reliability to strengthen the robustness of the evidence base.

Keywords: service-learning; physical education; teacher education; systematic review.

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Impacte de l'aprenentatge servei en el professorat d'Educació Física en formació

Resum

L'aprenentatge servei (ApS), un enfocament pedagògic que integra l'aprenentatge acadèmic amb el servei pràctic a la comunitat, és una estratègia metodològica que fomenta un espectre de competències essencials que van des dels aspectes socials i personals fins als professionals. El camp de l'Educació Física és particularment adequat per a l'aplicació de l'aprenentatge servei, atesa la gran quantitat de beneficis socials com el foment de la responsabilitat personal i social, la promoció de la inclusió i el desenvolupament d'habilitats per a la resolució de conflictes. En aquest sentit, aquesta investigació pretén conèixer l'estat de la qüestió i estendre la recerca d'intervencions de qualitat fins a l'any 2023, comprovant l'evolució de la investigació sobre l'ApS en els darrers 7 anys. Per això, l'objectiu principal d'aquesta revisió sistemàtica és avaluar i sintetitzar els resultats de les intervencions amb aprenentatge servei implementades a nivell universitari per a professors d'Educació Física en formació. Per dur a terme aquesta revisió sistemàtica, es van seguir les directrius d'experts descrites a *Preferred Reporting Items per a Systematic Reviews and Meta-Analyses*. Les troballes de la revisió emfatitzen l'impacte positiu de l'ApS als professors d'Educació Física en formació. Així i tot, el cos de recerca existent també destaca la necessitat de millorar la qualitat de la recerca elevant els estàndards de validesa i fiabilitat per enfortir la solidesa de les evidències.

Paraules clau: aprenentatge servei, educació física, formació del professorat, revisió sistemàtica.

Impacto del aprendizaje-servicio en el profesorado de Educación Física en formación

Resumen

El aprendizaje-servicio (ApS), un enfoque pedagógico que integra el aprendizaje académico con el servicio práctico a la comunidad, es una estrategia metodológica que fomenta un espectro de competencias esenciales que van desde los aspectos sociales y personales hasta los profesionales. El campo de la educación física es particularmente adecuado para la aplicación del aprendizaje-servicio, dada su gran cantidad de beneficios sociales como el fomento de la responsabilidad personal y social, la promoción de la inclusión y el cultivo de habilidades para la resolución de conflictos. En este sentido, la presente investigación pretende conocer el estado de la cuestión y extender la búsqueda de intervenciones de calidad hasta el año 2023, comprobando la evolución de la investigación sobre el ApS en los últimos 7 años. Consecuentemente, el objetivo principal de esta revisión sistemática es evaluar y sintetizar los resultados de las intervenciones en ApS implementadas a nivel universitario para profesorado de Educación Física en formación. Para llevar a cabo esta revisión sistemática, se siguieron las directrices de expertos descritas en *Preferred Reporting Items for Systematic Reviews and Meta-Analyses*. Los hallazgos de la revisión enfatizan el impacto positivo del ApS en el profesorado de Educación Física en formación. Sin embargo, el cuerpo de investigación existente también destaca la necesidad de mejorar la calidad de la investigación elevando los estándares de validez y fiabilidad para fortalecer la solidez de las evidencias.

Palabras clave: aprendizaje-servicio, educación física, formación del profesorado, revisión sistemática.

1. Introduction

Over recent years, there is a growing recognition that higher education pedagogy needs to evolve, placing students at the center of their learning process. Various pedagogical innovations have emerged within higher education, aimed at fostering experiential and participatory learning experiences (Gerholz et al., 2018). In this sense, service-learning (SL) has emerged as a pivotal methodology to facilitate the development of a broad spectrum of social, personal, and professional competencies necessary for individuals (Furco, 2001). The growing interest in Service-Learning has gained international recognition, justified by the adoption of competency-based models by many educational systems (Fernández-Martín et al., 2019). This methodology provides university students with opportunities to develop professional competencies that ensure success in their integration into the labor market (González et al., 2022).

Service-Learning is defined as a strategy that integrates academic learning with community service (Furco & Billing, 2002). In SL programs, participants merge classroom instruction with volunteer-like service in the community, enabling them to both acquire course content and put it into practice in real-world scenarios (Chiva-Bartoll et al., 2021).

It is distinct from other concepts such as volunteering or community service projects, presenting a balance between service and learning (Resch & Knapp, 2020; Tapia, 2019). The essential elements that should be incorporated into Service-Learning interventions for optimal effectiveness are (Bryngler & Hatcher, 1996; Chiva-Bartoll & Fernández-Rio, 2021): (a) integration with curriculum; (b) significant learning; (c) recognition of community interests and needs; (d) reciprocal engagement; (e) encouragement of student reflection; (f) stimulation of problem-solving and decision-making; (g) relevant and meaningful service to the community; and (h) intentional civic learning. Hence, the service rendered must hold significance and worth for the community, the students, and the course objectives. Moreover, service-learning ought to enhance the academic learning journey by equipping students with the skills to engage actively as democratic citizens across various communities. A defining feature that sets SL apart from other methodologies is reflection (Howard, 2001), which is delineated as the deliberate contemplation of an experience grounded in the specific learning objectives (Hatcher & Bryngler, 1997).

Service-Learning has been successfully implemented in various areas, demonstrating its versatility and effectiveness (Kwon et al., 2022). Most of the research on SL in universities emphasizes its pedagogical, social, and ethical impact, advocating for a model that contributes to the creation of a fairer and more cohesive society (Martínez, 2008; Tapia, 2008). Specifically, it promotes various general and specific competencies among future Physical Education teaching

professionals (González et al., 2022) and, therefore, this methodology has been widely used in physical education teacher education.

To become a physical education teacher, social commitment is deemed essential (Brown, 2005; Lleixà & Ríos, 2015). Prospective physical education teachers must engage in reflection on how their actions will impact the social environment, extending beyond the necessary content and methodology for conducting classes (Arthur & Bohlin, 2005). Service learning emerges as a methodological strategy facilitating this reflection (Lleixà & Ríos, 2015). The field of physical education is particularly suited for the application of service learning, given its myriad social benefits such as fostering personal and social responsibility, promoting inclusion, and cultivating conflict resolution skills (Lleixà & Ríos, 2015).

Literature suggests that implementing this methodology in degrees related to Physical Activity and Sport can yield benefits, including improved understanding of theoretical concepts and practical application, enhanced critical thinking and problem-solving (Chiva).

Bartoll et al., 2019), cultural competence (Peralta et al., 2015), prosocial behavior (González et al., 2022), and social competence (Capella-Peris et al., 2019). SL has the potential to supplement and enrich traditional field experiences for pre-service physical education teachers, facilitating the development of essential knowledge, skills, and competencies (Webster et al., 2017). Furthermore, it could offer ongoing support to current school professionals in implementing comprehensive physical activity programs, thereby bolstering program development and ensuring sustainability (Webster et al., 2015).

However, the current evidence on Service-Learning in higher education remains inconclusive due to methodological weaknesses in Service-Learning interventions (Cayuela et al., 2020; Filges et al., 2022; Salam et al., 2019). Furthermore, researchers, such as Chiva-Bartoll et al. (2020b), argue that interventions in Service-Learning within the field of Physical Education lack methodological rigor in analyzing effects, particularly in the population receiving the service.

To date, two systematic reviews have been conducted on service-learning in physical education teacher education. Cervantes and Meaney (2013) aimed to examine theoretical models and the impact of SL on physical education teacher education students and community participants. They concluded that the field was in its early stages, highlighting the need for improvement in implementing SL practices effectively (Cervantes & Meaney, 2013). In contrast, the more recent systematic review by Chiva-Bartoll et al. (2019) covered studies up to 2017 and searched databases including Scopus-Elsevier and ISI Web of Knowledge. This review suggested that SL promotes competency development in this population. However, it also noted methodological weaknesses in the research, hindering clear conclusions regarding the effects of such interventions (Chiva-Bartoll et al., 2019).

In this sense, the present research aims to ascertain the state of the art and extend the search for quality interventions to the year 2023, checking whether SL research has improved in the last 7 years. Consequently, the primary objective of this systematic review is to evaluate and synthesize the results of Service-Learning interventions implemented at the university level for pre-service Physical Education teachers. For this purpose, the present study aim to address the following questions:

1. What are the main characteristics of the articles (i.e., geographical, and temporal distribution, journal, objectives, sampling, and research design) about Service-Learning interventions among pre-service Physical Education teachers?
2. What are the main characteristics of the Service-Learning interventions among pre-service Physical Education teachers (i.e., duration, university student sample, intervention participants sample, and instruments)?
3. In what areas have service-learning interventions demonstrated effectiveness in physical education teacher education?

2. Method

2.1. Procedure

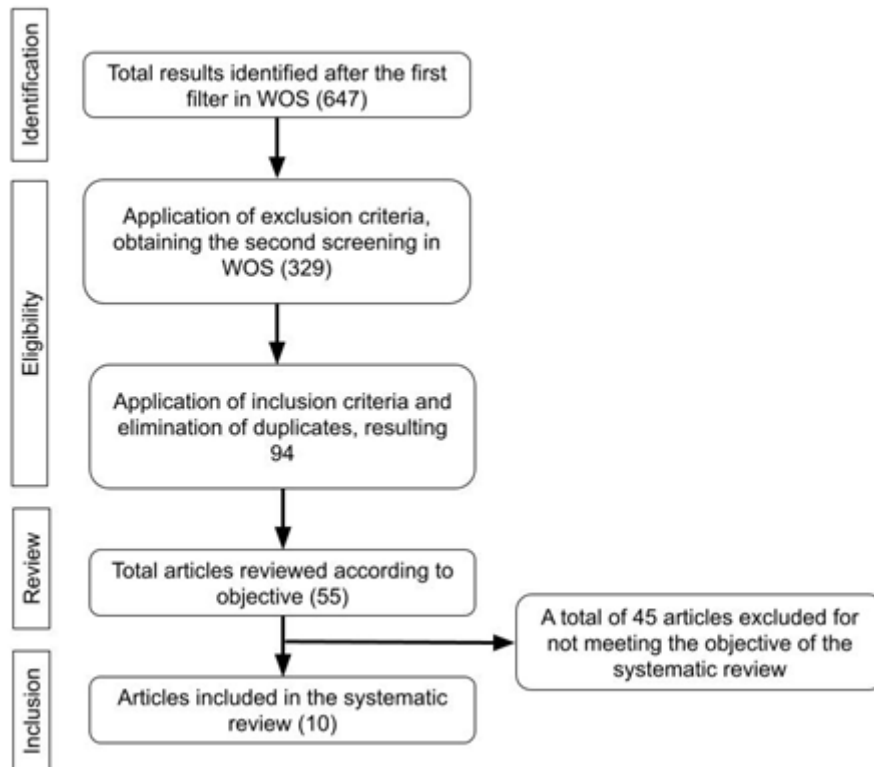
To conduct this systematic review, we adhered to expert guidelines outlined in Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2015; SotosPrietos et al., 2014). The aim was to explore how content related to Service-Learning and pre-service Physical Education teacher is addressed in the literature.

2.2. Search strategy

A search was performed in the Web of Science (WOS) bibliographic database during June 2023. Keywords were combined using the Boolean operator "AND," including "Physical Education," "teacher education," "Physical Education teacher education," "service-learning," and "experiential learning".

The research involved several processes. Initially, a search was conducted using various combinations of keywords and the Boolean operator "AND", yielding 647 articles relevant to the review's objective. Subsequently, exclusion criteria were applied, removing literature reviews and other documents, resulting in 329 articles in the second stage. In the third stage, selection criteria were implemented, and duplicates were eliminated, leading to 55 studies. Finally, these were carefully reviewed and filtered based on their titles and abstracts, resulting in the selection of only 10 studies for inclusion in this review, as they aligned with the review's objective. The stages of this process are illustrated in Figure 1.

Figure 1. Flowchart of the systematic review



2.3. Criteria for selection of studies

Articles were filtered based on the following inclusion criteria: (a) studies published between 2016 and 2023 (covering the last 7 years); (b) studies published in Spanish or English with peer review; (c) published as journal articles; (d) situated in the context of university education for primary or secondary education teachers specializing in Physical Education; (e) studies that include the specified terms in the title, abstract, or keywords; (f) use of validated instruments in data collection; and (g) reporting significant results.

The exclusion criteria were as follows: (a) meta-analyses, literature reviews, books, or communications were excluded; (b) articles on service-learning in sport management, kinesiology, athletic training, and physical therapy; (c) articles that do not include the term service-learning; (d) non-peer reviewed articles; (e) unpublished articles; and (f) articles that do not present clear design and methodology.

2.4. Data extraction

The authors independently extracted data from all eligible articles, encompassing information such as title, authorship, journal, publication details, research design, context, program information, dependent variables, outcomes, instruments and main conclusions.

3. Results

Ayllón-Salas, P. (2024). The impact of Service-Learning on Pre-Service Physical Education Teachers. *RIDAS, Revista Iberoamericana de Aprendizaje-Servicio*, 18, 182-200. DOI10.1344/RIDAS2024.18.12

Table 1 presents the characteristics of the studies included in this systematic review. A total of 10 studies were analyzed, with the majority conducted in Spain and utilizing a mixed-method approach.

Table 1. Characteristics of the analyzed studies

Study	Country	Journal	Objectives	Sampling	Study design
González et al. (2022)	Spain	Espiral. Cuadernos del profesorado	To provide initial pre-intervention information to the physical education teachers in charge of applying the service to the target group, to serve as a meta-evaluative and reflective tool on their predisposition to carry out the intervention using the SL methodology	Not available	Mixed approach
Capella-Peris et al. (2021)	Spain	Frontiers in Education	(1) To investigate the effect of a service-learning program on the Social Entrepreneurship Competency of Physical Education Teacher Education, and (2) to compare the difference between the social entrepreneurship competency of physical education teacher education exposed at different SL intervention modalities characterized by different levels of SL duration and intensity	Incidental-type non-probabilistic sample, with the sample selection matched to the class-group	Mixed approach
Abellán (2021)	Spain	Contextos Educativos	To evaluate the effect, on attitudes towards inclusion, of an SL program carried out by a group of future physical education teachers, providing a service of design and implementation of physical education activities to a group of adults with intellectual disabilities residing in a center for the care of severe intellectual disabilities	Not available	Mixed approach
García-Rico et al. (2020)	Spain and Chile	Revista Internacional de Educación para la Justicia Social	To compare the effects on the initial training of physical education teacher education of the two developed SL models, both with a social justice focus: (1) the model of a private university located in the region of Araucanía (Chile) and (2) the model of a public university located in Spain, specifically in the Autonomous Community of Madrid	Not available	Quantitative approach
Chiva-Bartoll et al. (2020a)	Spain	International Journal of Environmental Research and Public Health	To analyse the contributions of a SL program on physical education teacher education students' effective personality.	Non-probabilistic and convenience sampling of two different groups (experimental and control).	Mixed approach
Chiva-Bartoll et al. (2020b)	Spain	Frontiers in Psychology	To analyze the effects of a service-learning program on the subjective happiness, prosocial behavior, and professional learning perceptions of physical education teacher education students as well as to examine the correlations among these variables	Not available	Quantitative approach
Capella-Peris et al. (2019)	United States	Publicaciones	To analyze the development of the social entrepreneurship competence of physical education teacher education	The sampling was incidental non-probability sampling	Mixed approach

Galván et al. (2018)	United States	Journal of Teaching in Physical Education	(1) To explore the integration of two physical education curricula within a service-learning program on knowledge base for teaching among preservice educators and (2) to examine the impact of the program from the perspective of the preservice teachers and the children and adolescent participants	Not available	Mixed approach
Chiva-Bartoll et al. (2018a)	Spain	Revista de Investigación Educativa	To analyze and improve an SL program to favor the acquisition of social skills and attitudes in future physical education teachers	Not available	Mixed approach
Chiva-Bartoll, et al. (2018b)	Spain	Revista Complutense de Educación	To analyze the effect of the ApS on the development of the "Effective Personality" in the training of future teachers in the area of Physical Education	Not available	Mixed approach

Table 2 outlines the intervention's features, detailing the duration and frequency of sessions alongside participant demographics. Intervention durations ranged from 10 (e.g., Chiva-Bartoll et al., 2018a) to 30 sessions (Capella-Peris et al. 2021), with participant samples varying considerably. Studies included as few as 3 participants (e.g., González et al., 2022) and as many as 181 (e.g., Chiva-Bartoll et al., 2020a). Primarily, intervention participants were children, encompassing those with disabilities or in vulnerable circumstances.

Table 2. Characteristics of the SL Intervention

Study	Duration	Sample University Students	Sample Intervention Participants
González et al. (2022)	4 theoretical sessions, 8 practical sessions and one final session. 13 weeks	Three university students of the Degree in Primary Education with mention in Physical Education	30 children between the ages of 6 and 12 years old in vulnerable situations
Capella-Peris et al. (2021)	The dedication of the subjects in the first group was 150 hours with 30 1-hour intervention sessions for 9 months, while the other group had a dedication of 45 hours with 9 1-hour intervention sessions for two months. The frequency was weekly	89 students of the Degree of Primary Education with mention in Physical Education	150 children exhibiting motor functional diversity, including conditions such as autism spectrum disorder, Down syndrome, cerebral palsy, ADHD, and Rett syndrome
Abellán (2021)	Participants were required to complete 6 hours of direct service training. All activities were carried out over a 3-month period within the first four months of the course	12 students of the Primary Education Degree with mention in Physical Education	13 people with intellectual disabilities (i.e. functional diversity, visual impairment and hearing impairment)
García-Rico et al. (2020)	Not available	90 students of the Degree of Pedagogy in Physical Education and Physical Activity and Sport Sciences	Not available

Chiva-Bartoll et al. (2020a)	Physical education teacher education students accomplished 20 hours of direct contact with the children with special educational needs, all participating equally in the different actions of the SL program	181 students of the Primary Education Degree with mention in Physical Education	116 children ranging in age from 4 to 13 years, all with special educational needs, including conditions such as Down Syndrome, Autism Spectrum Disorder, Cerebral Palsy, ADHD, and Rett Syndrome
Chiva-Bartoll et al. (2020b)	Not available	104 students of the Degree of Primary Education in Physical Education and Physical Activity and Sport Sciences	Not available
Capella-Peris et al. (2019)	Two hours of class per week throughout the spring semester (30 hours). 10 practice sessions of games and sports activities with children	32 students of the 3rd year of the major in Physical Education	Boys and girls from the city of Baltimore, who did not have the financial or material resources to afford such activities
Galván et al. (2018)	All pre-service teachers were enrolled in a core course titled Measurement and Curriculum in Physical Education, which included 20 service-learning hours	16 students of physical education teachers	50 children from 10 to 13 years of age in a vulnerable situation
Chiva-Bartoll et al. (2018a)	10 theoretical and practical sessions	87 students of Didactics of Physical Education	Not available
Chiva-Bartoll, et al. (2018b)	Not available	108 students of the Teacher Training Degree in Physical Education	Not available

Table 3 outlines the principal outcomes of the articles and the instruments employed for their measurement. The outcomes cover a wide range, encompassing both personal and professional aspects within the sample of university students. All the included programs demonstrated effectiveness in at least one of the measured outcomes in each study. The instruments used differed according to the objective of the study.

Table 3. Evidence on the Effectiveness of the Service-Learning Interventions

Study	Outcomes	Measurement instrument	Main conclusions
González et al. (2022)	Identification of context, learning, pedagogical value, social impact, professional development, professional skills and experiential feedback	Impact of Service Learning During Initial Training of Physical Activity and Sports Scale (García-Rico et al., 2019)	Service-Learning not only contributes to knowledge acquisition and skill development but also enhances autonomy. Furthermore, it fosters a heightened capacity for reflection and encourages prosocial behavior, particularly concerning the social responsibility of young individuals
Capella-Peris et al. (2021)	Confidence, motivation, decision-making skills, creativity, learning to learn, cooperation, knowledge and social participation, respect,	Social Entrepreneurship Competency Scale (Capella-Peris et al., 2020). Life histories and interviews.	The intervention led to notable enhancements in personal, social, and innovation capabilities, as evidenced by both quantitative and qualitative data. The intervention significantly elevated social

	resilience, responsibility, commitment, leadership, initiative and adaptability		skills, with particularly impactful outcomes observed in goal-oriented motivation, decision-making proficiency, responsibility, commitment, initiative, social awareness, and respect
Abellán (2021)	In the educational context, key considerations encompass inclusion practices, classroom methodology, behavior management, dedication to students with special educational needs, and the training and competence of teachers	Spanish adaptation of the Opinions relative to Integration of students with disabilities scale (Tárraga et al., 2013). Experience diary	The implementation of a Service-Learning intervention in a context involving individuals with disabilities has shown positive effects on attitudes toward inclusion. Notably, the results demonstrate significant improvements in perceptions of the overall benefits of inclusion within mainstream classrooms. Students exhibited a positive shift in their attitudes, overcoming negative impressions, and gaining a deeper understanding of the importance of tailoring education to students with special educational needs
García-Rico et al. (2020)	Identification of context, learning, pedagogical value, social impact, professional development, professional skills and experiential feedback	Physical Activity Service Learning Scale (Santos-Pastor et al., 2020)	The results of the comparison between Chilean and Spanish students are different. Thus, there is no consensus on the perception of the learning acquired, nor on the impact it has on them. However, all agree that Service-Learning should be implemented more during the grade. In general, academic and professional learning, social awareness and responsibility were developed
Chiva-Bartoll et al. (2020a)	Academic self-efficacy, social self-actualization, self-esteem and resolution self-efficacy	Effective Personality Questionnaire for University Students (Gómez, 2012). Semi-structured interviews	The impact of service learning is not uniform across all dimensions; indeed, only social self-actualization and problem-solving self-efficacy demonstrated statistically significant differences. Qualitative findings further highlight enhancements in empathy, the development of communication skills, and improved problem-solving abilities as notable outcomes of the service-learning experience
Chiva-Bartoll et al. (2020b)	Professional learning, prosocial behavior and subjective satisfaction	Spanish version of the Subjective Happiness Scale (Extremera & Fernández-Berrocal, 2014) Prosocial and Civic Competence (Gil-Gómez et al., 2016) Impact of Service Learning During Initial Training of Physical Activity and Sports (García-Rico et al., 2019)	The Service-Learning intervention has a positive impact on prosocial behavior, particularly in areas such as respect for social norms, prosocial leadership, social sensitivity, and safety in interaction. Additionally, students exhibit an elevated perception of professional learning, encompassing factors such as perceived social impact, professional skills, and opinions
Capella-Peris et al. (2019)	Entrepreneurial social skills: personal, social and innovative traits	Social Entrepreneurship Competency Scale (Capella-Peris et al., 2019). Reflective journal	The experimental group demonstrated a significant improvement in social entrepreneurial competence. Specifically, enhancements were observed in social aspects, achievement motivation, creativity, and integration into social networks
Galván et al. (2018)	Academic self-actualization, self-esteem, self-efficacy in problem solving, social self-actualization and relationship between theory and practice	FITNESSGRAM one-mile run test One-mile run or PACER test. Preservice teacher's journal reflections, two focus group interviews and 53 pages of researcher's field notes	Students who took part in the intervention reported benefits related to pedagogical content, knowledge of the curriculum, and various educational contexts. Additionally, improvements were observed in the cardiorespiratory endurance of the participants
Chiva-	Social awareness, social	Social cognitive	The intervention resulted in a significant

Bartoll et al. (2018a)	sensitivity, helpfulness and collaboration, safety, pro-social leadership, communication skills, involvement, organization and group awareness	attitudes and strategies (Moraleda et al., 2004) Follow-up diaries and interviews	improvement in social skills and attitudes. Qualitative data further reveal enhancements in group commitment, argumentative skills, and organizational skills
Chiva-Bartoll, et al. (2018b)	Academic self-actualization, social self-actualization, self-esteem, resolution self-efficacy	Personality Effectiveness Questionnaire for University Students (Gómez, 2012). Semi-structured interviews and follow-up diaries	The students in the experimental group demonstrated overall improvement in their effective personality. Specifically, the most significant enhancements were observed in academic self-actualization. Nevertheless, students also exhibited positive outcomes in social self-actualization, self-esteem, and resolution self-efficacy, albeit to a lesser extent

5. Discussion and conclusions

The primary objective of this systematic review was to evaluate and synthesize the results of Service-Learning interventions implemented at the university level for pre-service Physical Education teachers. For this purpose, the present study aimed to address the following questions:

- What are the main characteristics of the articles about service-learning interventions among pre-service Physical Education teachers?

A total of 10 studies meeting the predetermined criteria were included (see Table 1), considering factors such as authors, title, year, sample, and design. Regarding the question 1, these studies specifically focus on the university stage of physical education teachers and professors and were published between 2018 and 2022. The distribution of scientific production is relatively even during these years, with three articles included in 2018 (i.e., Chiva-Bartoll et al., 2018a; Chiva-Bartoll et al., 2018b; Galván et al., 2018), and one in 2019 (i.e., Capella-Peris et al. 2019), and three in 2020 (i.e., Chiva-Bartoll et al., 2020a; Chiva-Bartoll et al., 2020b; García-Rico et al., 2020), and two in 2021 (i.e., Abellán, 2021; Capella-Peris et al., 2021). One article from 2022 was included (i.e., González et al., 2022), while none were published during 2016 and 2017. Thus, it can be observed that the scientific production related to SL in the field of physical education teacher training experienced its peak in 2018 and in 2020. Although it may have been affected in some years by the COVID-19 pandemic, the production remained stable.

Among the ten studies, 6 were in Spanish, and the remaining 4 were in English. Geographically, Spain is the predominant location for these interventions, featuring in 8 out of the 10 articles. The remaining two studies were conducted in the United States, and one each in Chile and Spain. These results are similar to those of the systematic review by Chiva-Bartoll et al. (2019) in which the selected studies were conducted in the United States, Spain, and Canada.

In terms of authors, Chiva-Bartoll and Capella-Peris emerge as the most notable contributors to this field, participating in four of the studies included in this review

over the last seven years. In addition, the journals in which the articles have been published are diverse, including *Espiral. Cuadernos del profesorado*; *Frontiers in Education*; *Contextos Educativos*; *Revista Internacional de Educación para la Justicia Social*; *International Journal of Environmental Research and Public Health*; *Frontiers in Psychology*; *Publicaciones*; *Journal of Teaching in Physical Education*; *Revista de Investigación Educativa*; and *Revista Complutense de Educación*.

Overall, the studies aim to assess the impact of service-learning interventions on physical education teacher education. However, many studies lack details regarding sampling, with non-probabilistic convenience sampling being commonly employed. Most of the studies ($n = 8$) adopt a mixed-methods approach, combining qualitative and quantitative methods, mirroring the methodology seen in the review conducted by Chiva-Bartoll et al. (2019).

- What are the main characteristics of the service-learning interventions among pre-service Physical Education teachers?

Regarding the duration of the interventions, the disparity is remarkable as in previous systematic reviews (e.g., Chiva-Bartoll et al., 2019). However, it's important to highlight that many of the studies provide vague and concise details regarding the intervention. Notably, the study by Capella-Peris et al. (2021) stands out for providing the most comprehensive information about the intervention implemented.

The sample sizes of university students varied widely, ranging from 3 to 181 participants, as reported in previous systematic reviews (Chiva-Bartoll et al., 2019; Cervantes & Meaney, 2013). Regarding the sample receiving the service, only half of the studies include concrete data, with sample sizes ranging from 13 to 150 participants, mainly involving children in vulnerable situations and people with diverse needs. The total sample of participants engaged in the service was 722, while participants who received the service numbered 359, although it is noteworthy that not all studies provide this specific data.

Quantitative data collection instruments include the Service-Learning Scale in Physical Activity (Santos-Pastor et al., 2020); Impact of Service Learning During Initial Training of Physical Activity and Sports (García-Rico et al., 2019); Effective Personality Questionnaire for University Students (Gómez, 2012); Social Entrepreneurship Competency Scale (Capella-Peris et al., 2020); Spanish version of the Opinions relative to Integration of students with disabilities scale (Tárraga et al., 2013); Spanish version of the Subjective Happiness Scale (Extremera & Fernández-Berrocal, 2014); and Prosocial and Civic Competences Questionnaire (Gil-Gómez et al., 2016). Qualitative methods, including interviews and follow-up diaries, were also prominent, complementing the quantitative findings.

- In what areas have service-learning interventions demonstrated effectiveness in physical education teacher education?

In relation to question 3, the analyzed variables cover a wide spectrum, categorizable into three main groups: (1) social (e.g., prosocial behavior, commitment, respect); (2) academic (e.g., learning to learn, pedagogical value, academic self-realization); and (3) personal (e.g., responsibility, initiative, creativity). Notably, the focus in data collection is primarily on the sample of participants performing the service, as no research has systematically collected data on the influence of the service on the community receiving it.

Finally, the results and conclusions of the studies indicate that service-learning interventions can yield various benefits. Notably, significant results are found in the enhancement of students' social competencies, fostering the development of empathy, social sensitivity, social commitment, and communication skills, among others. Service-Learning is also correlated with the professional development of university students, aiding in the development of competencies and the application of theoretical knowledge into practical contexts.

This study has several limitations that should be acknowledged. A significant limitation is the restriction to two languages, Spanish and English, by the research group, which resulted in the exclusion of publications in other languages due to the authors' limited proficiency. Additionally, the review relied on only one database (Web of Science), which might have limited the scope of scientific evidence included in the study. From a methodological perspective, the inclusion and exclusion criteria were broad, as the review did not specifically focus on the quality of interventions and their fidelity to the characteristics of Service-Learning. Many articles did not provide details on how they covered each element of Service-Learning, such as reflection, duration, and connection of the service to the curriculum. Future research could benefit from reporting such information to assess the quality of interventions. Analyzing programs with varying durations and intensities in different contexts would also be valuable. Another methodological concern is the common use of instruments without established validity and reliability, often created by the authors themselves. Future research should prioritize the use of systematic instruments specifically designed to assess the impact of interventions on university students, as highlighted by González et al. (2022).

The characteristics of the samples in the studies pose challenges for program evaluation. Increasing sample sizes to enhance result generalization is recommended. Moreover, the frequent use of convenience selection methods calls for more randomized controlled trials to increase the validity of the studies (Zirkel et al., 2015).

In summary, despite positive results regarding the effects of Service-Learning interventions, there is still room for improvement. This review sheds light on the

challenges faced by Service-Learning interventions in Physical Education teacher training. Further research and the development of effective strategies are necessary to enhance teacher training and ultimately improve the quality of education provided to students. The hope is that this review serves as a catalyst for improving the implementation and research quality in this field of knowledge.

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