

Approach to service-learning methodology through the physical practice of plogging and EFL teaching

BERTA BENITO COLIO¹, LUIS MANUEL MARTÍNEZ ARANDA², EEVA-MARIA HOOLI^{3*}, FRANCISCO TOMÁS GONZÁLEZ-FERNÁNDEZ⁴, PEDRO JESÚS RUIZ-MONTERO⁵

¹Department of Physical Activity and Sports Sciences, Comillas Pontifical University. CESAG, Palma, Spain.

²MALab (Movement Analysis Laboratory) Research Group, Faculty of Sport, Catholic University of Murcia, Murcia, Spain, Murcia, SPAIN.

³Department of Didactics of Language and Literature, University of Granada, Granada, SPAIN.

^{4,5}Department of Physical Education and Sport, Faculty of Sport Sciences, University of Granada, Granada, SPAIN

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Abstract:

The practice of physical activity and sport (PAS) is an excellent educational tool for the development of sustainable attitudes in students. In addition, the service-learning (SL) methodology is recognized as an educational proposal that combines learning and community service processes where the participants learn while working on real needs of the environment. The present study aims to analyse the effects of a SL program in university students of Physical Activity and Sport (PAS) area based on an intervention of plogging in Melilla (Spain). Moreover, these students have the opportunity to interact at the same time with female foreign unaccompanied minors (FUM) through the use of English as foreign language (EFL). A parallel two-group, longitudinal (pre, post) design was used with an experimental group and a control group. The effects of the intervention were assessed with the impact of service learning during initial training of PAS questionnaire (S-LPA) and the Prosocial and Civic Competence (PCC) questionnaire. Data showed that plogging intervention produced changes in the S-LPA and in PCC questionnaire. Posteriorly, correlation analysis revealed a negative moderate correlation between professional skills of S-LPA questionnaire and prosocial leadership of PCC questionnaire ($r = -.41$, $p = .011$) that was better explain with a regression analysis ($p = 0.01$, adjusted $r^2 = 0.14$). An 8-sessions of the service learning program had a positive impact on S-LPA and PCC questionnaire of university students' participants. In conclusion, the use of SL program reflected in plogging intervention can help achieve high level of physical activity in favour of a healthy lifestyle in university students.

Keywords: Physical activity, active methodology, teacher training, English as foreign language, natural environment.

Introduction

The continuous transformation of our society demands a reconsideration of educational opportunities and progress in the teaching-learning (T-L) processes. Among them, the service-learning (SL) methodology stands out as “an educational proposal that combines learning and community service processes in a single well-articulated project in which participants learn while working on real needs of the environment with the aim of improving it” (Chiva-Bartoll et al., 2021). From this definition, it can be determined that SL is recognized as an experience that is developed through educational projects (Sales and Monfort-Monfert, 2019), that seeks the development of academic and professional competencies whereas providing community service needs (Capella-Peris et al., 2020). This methodology consists of developing the curricular content of a given subject while at the same time providing a service to society, where participants learn actively in their educational process through real experiences in the environment with the aim of improving it (Chiva et al., 2021). Thus, this pedagogical model is generally aligned with an education system that seeks to respond to social needs, and therefore to educate citizens capable of engaging in and transforming their society.

Furthermore, the practice of physical activity and sport (PAS) is recognized as an excellent educational tool for the development of sustainable attitudes in students (Ruiz-Montero et al., 2021). More specifically, nature is an educational space with great pedagogical potential, being a fundamental pillar for articulating people's education through experiences where the natural environment emerges as an enriching space (Santos et al., 2018). In this research, the SL methodology is used with university students in the only natural environment of the border between Africa and Europe through the practice of plogging. This activity is peculiar because consists of picking up rubbish in a natural space while doing physical activity at the same time, normally running (Raghavan et al., 2022). This practice is closely linked to the Sustainable Development Goals (SDG) framed within the 2030 Agenda of the United Nations (United Nations, 2015). In this way, the integration of SL model

through the practice of plogging enables the achievement of SDGs 3 and 4, as well as some specific targets of other goals such as 13.2 (incorporate measures related to climate change), 15.4 (ensure the conservation of ecosystems and biodiversity) or 15.1 (ensure the conservation, restoration, and sustainable use of terrestrial ecosystems). In this context, SL as a pedagogical model in PAS teaching is aligned with the achievement of the SDG in the educational context (Baena-Morales et al., 2021; García-Rico et al., 2021). In addition, SL methodology shows a particular interest given the current climate emergency and the deterioration of our planet. Given this situation, it is necessary to reconsider opportunities for nature education and pedagogical models that are up to the task. Moreover, SL is seen as an option to emphasise authentic learning outcomes, critical reflection, and civic engagement of students (Gil et al., 2014). On the other hand, the use of English as foreign language (EFL) with the practice of PAS can be used as a tool that favours the development of academic, professional and personal skills of university students (Corral-Robles et al., 2022). This is the main cause which the EFL is used by PAS students of this study, at least in only one session.

In this way, and taking into consideration previous research, it is necessary to emphasise the need for a PAS teaching model based on social values and consciousness-raising, as behavioural modifications have been found in university students. However, to the best of our knowledge there is no previous research studying the effects of plogging on young university students by a SL methodology. Therefore, the aim of the study was to use the plogging intervention to approach learning and SL in order to raise students' awareness of the environmental situation of our planet and to develop positive attitudes for its conservation and improvement.

Materials and Methods

Research Setting

The SL methodology was implemented at the Faculty of Education and Sport Sciences of the University of Granada in Melilla (Spain), located in the African continent and neighbouring with Morocco. The contents of the courses involved were: (1) Environmental education and SDG, (2) Regulation of natural areas, and (3) Physical activities in the natural environment. The service that the students offered consisted of making these aware of the environmental situation of our planet and developing positive attitudes for its conservation and improvement through the practice of plogging.

This experience is framed within the subject of "Assessment of Physical Activity and Sports Teaching" and "Planning and Organization of Sports Activities" of the fifth and sixth year of the degree, respectively. Thus, one of the main recipient of the service are users of natural spaces. More specifically, the place where the service was carried out at was the named Horcas Coloradas beach. This beach has a metallic barbed-wire fence which is used to delimit the border between Morocco (Africa) and Spain (Europe). However, a multitude of immigrants try to cross this wire fence every month by jumping or using dinghy in the sea. The beach is witness of this frequent tragedy and pick up all kind of garbage, materials, etc. Thus, this natural environment is always very crowded, which leads to a large accumulation of garbage on it.

Study design

The present research was conducted between May and June of 2022. At the time of these observations, the students had completed between two months of training during the different practice class. A parallel two-group, longitudinal (pretest-posttest) design was used with two questionnaires what complemented quantitatively, was performed before (pre-intervention) and after (post-intervention) the one-month period. The students were assigned and matched into two groups, an experimental group (EG) and a control group (CG), based on convenience of researcher. In order to investigate the effect of a one-month plogging intervention program on PAS students, those from the CG were asked to maintain their routines, while those from the EG follow the plogging proposal by introducing one hour of nature outings

Participants

Description of the simple service provider

A total of fifty-four students of the Double Degree in Primary Education Teaching and Sport Sciences at the Universidad of Granada, Melilla (Spain) during the 2021/2022 academic year; twenty-four in the CG (aged = 23.74 ± 2.15) and thirty in the EG (aged = 23.76 ± 6.63) from the city of Melilla, Spain, were recruited which has a population ranging from 85.000 to 90.000 inhabitants according to the National Institute of Statistics from the Spanish Government (<http://www.ine.es/>; accessed on 1st October 2022). Moreover, a group of 20 female FUM participated as receptors of PAS students' teaching. The contents of this teaching were related to the improvement of natural environment' conscience in Melilla in the penultimate session (S7) of the present plogging intervention. However, the main peculiarity of this lesson resided in the use of EFL. The reason was to transform the contact between PAS students and FUM in a different experience where all participants would obtain an extra motivation. The PAS students taught to female FUM the care and optimum behaviours in a natural environment while this last group offered to PAS students the possibility to meet new realities and collectives of Melilla. It was only a session but the experience offered an intensive and rewarding experience. All the participants were asked about current sports habits, addictions and diseases that could prevent the practice of physical exercise. Table 1 shows the most outstanding sociodemographic characteristics of the participants.

Table 1. Sociodemographic characteristics of the sample.

SC	EG (n= 30)	CG (n=24)
Sex	♀ 8 (26.7%) ♂ 22 (73.3%)	♀ 7 (29.2%) ♂ 17 (70.8%)
Religion	Catholic (42.11%), Islamic (20%) and professed no religion (37.89%)	Catholic (38.53%), Islamic (22%) and professed no religion (39.47%)
PEV-SL	Yes (39.47%) and No (60.53%)	Yes (31.58%) and No (68.42%)

Note: SC: Sociodemographic characteristics; EG: Experimental Group; CG: Control Group; PEV-SL: Previous Experience of volunteering or Service-Learning.

The participants obtained information about the main aims of the investigation and signed informed consent forms. All the students in this study were treated according to American Psychological Association (APA) guidelines, which ensured the anonymity of participants' responses. The study was conducted in accordance with the ethical principles of Helsinki declaration for human research. Inclusion criteria for the participants in this study were: (i) reporting normal vision and no history of any neuropsychological impairments that could affect the results of the experiment, (ii) not presenting any injuries during the intervention (iii) giving consent, and (v) participating in 85% of the plogging intervention during the study period.

Instruments and procedures

Impact of Service Learning During Initial Training of Physical Activity and Sports questionnaire (S-LPA)

In order to assess the impact of the SL methodology on student competences, the Impact of Service Learning During Initial Training of Physical Activity and Sports (S-LPA) questionnaire was used. The S-LPA is a validated tool that analyses SL experiences in the context of PAS (Santos-Pastor et al., 2020). This questionnaire consists of 41 items distributed in seven dimension: context identification (nine open questions), learning (five items), pedagogical value (seven items), social impact (six items), professional development (four items), professional skills (seven items), and experience opinion (three items and one open- ended question). All the questions had been evaluated using the Likert scale, ranging from one (totally disagree) to five (totally agree), with the exception of the first part and the last open-ended question. Due to the quantitative nature of this research, those open questions were not used.

Prosocial and Civic Competence (PCC) questionnaire

In addition, students' values and attitudes were also analysed, as well as the promotion of PB in the implementation of SL project (Gil-Gómez et al., 2016). For this purpose, the questionnaire of Prosocial and Civic Competence (PCC) was used. This questionnaire consists of a total of 31 items distributed in six categories: compliance with social norms (three items), social sensitivity (six items), help and collaboration (four items), security and firmness in interaction (eight items), prosocial leadership (four items), and social responsibility (six items). Each question is scored on a Likert scale, ranging from one (totally disagree) to five (totally agree).

Procedures

We distinguish between three distinct phases for the correct investigation of the proposal. On the one hand, the preliminary work and design of the proposal. On the other hand, the implementation of the proposal over several sessions (see figure 1, for more information).

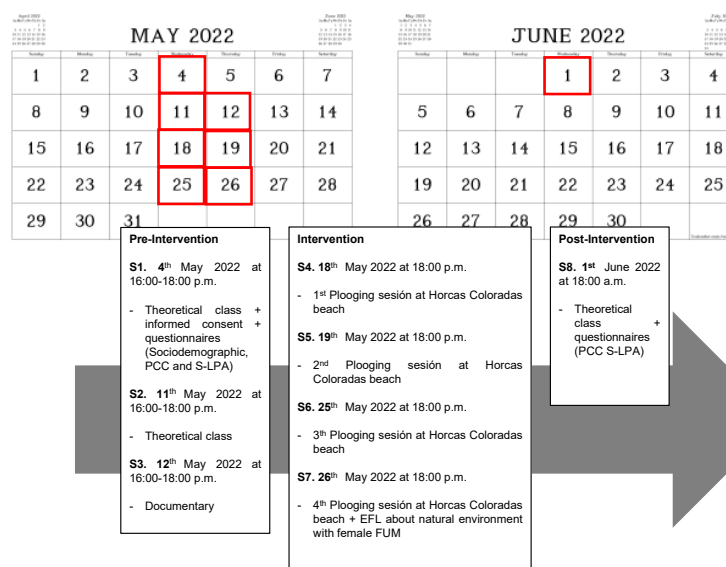


Figure 1. Schematic representation of a test day (see text for full description).

Pre-intervention

During the first session (S1) informed consents, questionnaires, and an introduction of theoretical class was done. First, the students were informed about the objectives of the study, and the research team ensured that students signed their informed consents after having received details of the possible benefits and risks of the study.

Secondly, the students performed the different questionnaires. This article focuses on this first phase with the aim of showing the information about the subject matter and its context and prior predisposition (pre-intervention data), carrying out the session for contacting the context and familiarisation with the SL teaching methodology (intervention) and, finally, a space for reflection and evaluate the new predisposition of the students (post-intervention). In this way, during the first session, the students were asked to answer the following questionnaires: the S-LPA and PCC questionnaires. They had forty-five minutes for all the questionnaires (fifteen minutes for the first one, and thirty minutes for the other tone). At no time were they informed of the time available to them, so as not to condition the *rush*. In addition, the time allotted was checked beforehand to ensure that it was adequate. Finally, a familiarisation and awareness-raising session was carried out as follows. Also, the concepts of environmental education and SDG were explained and deepened (one hour). During the second session (S2), the classification of the existing protected natural areas and their importance as ideal places for the practice of physical activity due to their environmental richness were presented. Moreover, the impact of physical activities in the natural environment was analysed, as well as the concepts of SL and plogging were explained (two hour).

In the third session (S3), the documentary *An Inconvenient Truth* is a 2006 American documentary film directed by Davis Guggenheim. It was shown to complement the concepts worked on in the previous theoretical session and to be able to provide objective data on climate change (one hour thirty minutes). Finally, a joint reflection about the documentary on what was observed was carried out.

Intervention

Once the theoretical sessions were over, the following sessions (S4, S5, S6 and S7) were held in the beach aforementioned before. All the practical sessions had the same structure. First, the session was explained to them, as well as the established times and distance limitations. Also, they were organized into groups, given gloves and garbage bags to begin the activity (ten minutes). Thereafter, the plogging sessions begins (one hour). Once the students had collected all the garbage, they are sorting the materials that had recollected in different containers and bags according to the material (fifteen minutes). Then, all the students picked up the bags and deposited them in the recycling garbage cans (ten minutes). They were divided in groups. In addition, in the S7, the students gave a talk to female FUM to make them aware of Melilla natural environment and, the prevention of garbage increasing in the coast. This fact helps them to assimilate better the contents of the two courses involved in this study, being part of a possible influence in the pre-posttest questionnaires too.

Post-intervention

Finally, during the last session (S8), was deepened in the different theoretical concepts worked on, the experience lived and their ideas for the future to promote environmental education and its implication for the conservation of the planet (one hour). Finally, the students were asked to fill out again the forms of S-LPA and PCC (forty-five minutes).

Statistical Procedures

Descriptive statistics are represented as mean $\pm$ standard deviation (SD) with standard mean difference data. Tests of normal distribution and homogeneity (Kolmogorov–Smirnov and Levene's, respectively) were conducted on all data before analysis. Paired sample *t*-test was used for determining differences as a repeated measures analysis (pre– post). Cohen *d* was the effect size indicator. To interpret the magnitude of the effect size, we adopted the following criteria: $d = 0.20$, small; $d = 0.50$, medium; and $d = 0.80$, large. In the same line, to discover between-group differences, another *t*-test. Standard Mean Difference (SMD) was calculated with the difference between Post and Pre for each variable in both questionnaires. Pearson's correlation coefficient *r* was used to examine PCC questionnaire [(1) Compliance with social norms; (2) Social sensitivity; (3) Help and collaboration; (4) Security and firmness in interaction; (5) Prosocial leadership, and (6) Social responsibility (post-pre)] and S-LPA [(1) Learning (2) Pedagogical value; (3) Social impact; (4) Professional development; (5) Professional skills, and (6) Experience opinion (post-pre)]. To interpret the magnitude of these correlations, we adopted the following criteria: $r \leq 0.1$, trivial; $0.1 < r \leq 0.3$, small; $0.3 < r \leq 0.5$, moderate; $0.5 < r \leq 0.7$, large; $0.7 < r \leq 0.9$, very large; and $r > 0.9$, almost perfect. Multiple regression analysis was used to model the prediction of each variable of training load variables from remaining variables with positive correlation. Questionnaires data were analysed using Statistica software (version 13.3; Statsoft, Inc., Tulsa, OK, USA).

Results

S-LPA questionnaire

First, a paired measures *t*-test with participants of EG was performed to each variable (pre–post), revealed no significant differences except in learning, social impact, professional skills, and experience opinion ($p = 0.03$, $d = -0.49$; $p = 0.02$, $d = 0.44$, $p = 0.01$, $d = 0.48$, and $p = 0.03$, $d = -0.43$, respectively). Second, another

paired measures *t*-test with participants of CG (pre– post) showed no significant differences in any variable. Equally decisive, data on S-LPA questionnaire between CG and EG before the plogging intervention (at pretest) were similar between them (see table 2, for more information).

Table 2. S-LPA questionnaire dimensions before (pretest) and after (posttest) the intervention period (mean $\pm$ SD).

D	EG (n=30)				CG (n=24)				DBG	
	Pretest	Posttest	SMD	RM <i>t</i> -test (p)	Pretest	Posttest	SMD	RM <i>t</i> -test (p)	Pre CG-EG	Post CG-EG
L	4.33 $\pm$ 0.56	4.58 $\pm$ 0.44	0.25 $\pm$ 0.67	<i>p</i> =0.03* <i>d</i> =-0.49	4.26 $\pm$ 0.39	4.38 $\pm$ 0.52	0.12 $\pm$ 0.61	<i>p</i> =0.25 <i>d</i> =-0.25	<i>p</i> =0.52 <i>d</i> =-0.15	<i>p</i> =0.07 <i>d</i> =0.42
PV	3.91 $\pm$ 0.61	3.99 $\pm$ 0.63	0.08 $\pm$ 0.79	<i>p</i> =0.54 <i>d</i> =-0.13	4.11 $\pm$ 0.48	4.19 $\pm$ 0.53	0.08 $\pm$ 0.67	<i>p</i> =0.50 <i>d</i> =-0.15	<i>p</i> =0.11 <i>d</i> =-0.36	<i>p</i> =0.16 <i>d</i> =-0.33
SI	4.11 $\pm$ 0.57	4.34 $\pm$ 0.47	0.23 $\pm$ 0.59	<i>p</i> =0.02* <i>d</i> =-0.44	4.11 $\pm$ 0.58	4.09 $\pm$ 0.75	-0.01 $\pm$ 0.93	<i>p</i> =0.93 <i>d</i> =0.02	<i>p</i> =1.00 <i>d</i> =0.01	<i>p</i> =-0.10 <i>d</i> =-0.39
PI	3.99 $\pm$ 0.59	4.02 $\pm$ 0.65	0.03 $\pm$ 0.70	<i>p</i> =0.79 <i>d</i> =-0.05	3.68 $\pm$ 0.73	3.80 $\pm$ 0.82	0.13 $\pm$ 0.96	<i>p</i> =0.43 <i>d</i> =-0.16	<i>p</i> =0.15 <i>d</i> =0.37	<i>p</i> =0.17 <i>d</i> =0.29
PS	3.61 $\pm$ 0.44	3.83 $\pm$ 0.49	0.22 $\pm$ 0.48	<i>p</i> =0.01* <i>d</i> =-0.48	3.79 $\pm$ 0.49	4.00 $\pm$ 0.59	0.21 $\pm$ 0.78	<i>p</i> =0.11 <i>d</i> =-0.38	<i>p</i> =0.10 <i>d</i> =-0.39	<i>p</i> =0.20 <i>d</i> =-0.30
EO	4.06 $\pm$ 0.40	4.25 $\pm$ 0.48	0.19 $\pm$ 0.51	<i>p</i> =0.03* <i>d</i> =-0.43	4.24 $\pm$ 0.48	4.28 $\pm$ 0.49	0.04 $\pm$ 0.66	<i>p</i> =0.72 <i>d</i> =-0.08	<i>p</i> =0.09 <i>d</i> =-0.41	<i>p</i> =0.81 <i>d</i> =-0.05

Note: EG: Experimental Group; CG: Control Group; DBG: Differences between groups; SMD: Standard Mean Difference, and RM: Repeated Measures; D: Dimensions; L: Learning; PV: Pedagogical value; SI: Social impact; PD: Professional development; PS: Professional skills, and EO: Experience opinion. * Denotes significance at *p*<0.05, and ** denotes significance at *p*<0.01.

Table 3. PCC scale dimensions before (pretest) and after (posttest) the intervention period (mean $\pm$ SD).

D	EG (n=30)				CG (n=24)				DBG	
	Pretest	Posttest	SMD	RM <i>t</i> -test (p)	Pretest	Posttest	SMD	RM <i>t</i> -test (p)	Pre CG-EG	Post CG-EG
CSC	4.13 $\pm$ 0.49	4.54 $\pm$ 0.41	0.41 $\pm$ 0.68	<i>p</i> =0.001** <i>d</i> =-0.91	4.37 $\pm$ 0.49	4.51 $\pm$ 0.42	0.14 $\pm$ 0.60	<i>p</i> =0.17 <i>d</i> =-0.30	<i>p</i> =0.06 <i>d</i> =-0.49	<i>p</i> =0.71 <i>d</i> =0.09
SS	3.85 $\pm$ 0.57	3.80 $\pm$ 0.47	-0.05 $\pm$ 0.74	<i>p</i> =0.70 <i>d</i> =0.09	3.83 $\pm$ 0.59	3.95 $\pm$ 0.61	0.12 $\pm$ 0.80	<i>p</i> =0.001 <i>d</i> =0.50	<i>p</i> =0.87 <i>d</i> =0.03	<i>p</i> =0.26 <i>d</i> =-0.27
HC	3.84 $\pm$ 0.51	4.14 $\pm$ 0.47	0.30 $\pm$ 0.66	<i>p</i> =0.01* <i>d</i> =-0.62	4.08 $\pm$ 0.55	4.02 $\pm$ 0.54	-0.06 $\pm$ 0.74	<i>p</i> =0.61 <i>d</i> =0.11	<i>p</i> =0.07 <i>d</i> =-0.46	<i>p</i> =-0.11 <i>d</i> =-0.34
SIF	4.25 $\pm$ 0.35	4.29 $\pm$ 0.44	0.04 $\pm$ 0.52	<i>p</i> =0.62 <i>d</i> =-0.11	4.28 $\pm$ 0.54	4.27 $\pm$ 0.52	-0.01 $\pm$ 0.65	<i>p</i> =0.94 <i>d</i> =0.02	<i>p</i> =0.11 <i>d</i> =0.37	<i>p</i> =0.88 <i>d</i> =0.03
PL	3.80 $\pm$ 0.46	4.03 $\pm$ 0.41	0.23 $\pm$ 0.60	<i>p</i> =0.02* <i>d</i> =-0.53	3.99 $\pm$ 0.47	3.79 $\pm$ 0.55	-0.20 $\pm$ 0.73	<i>p</i> =0.10 <i>d</i> =0.39	<i>p</i> =0.09 <i>d</i> =-0.40	<i>p</i> =0.06 <i>d</i> =0.50
SR	4.31 $\pm$ 0.36	4.06 $\pm$ 0.42	-0.26 $\pm$ 0.55	<i>p</i> =0.01* <i>d</i> =0.66	4.17 $\pm$ 0.43	4.19 $\pm$ 0.48	0.02 $\pm$ 0.51	<i>p</i> =0.79 <i>d</i> =-0.05	<i>p</i> =0.12 <i>d</i> =0.35	<i>p</i> =0.23 <i>d</i> =-0.30

Note: EG: Experimental Group; CG: Control Group; DBG: Differences between groups; SMD: Standard Mean Difference, and RM: Repeated Measures; D: Dimensions; CSC: Compliance with social norms; SS: Social

Sensitivity; HC: Help and collaboration; SIF: Security and firmness in interaction; PL: Prosocial leadership, and SR: Social responsibility. * Denotes significance at *p*<0.05, and ** denotes significance at *p*<0.01.

In the same line of above analysis, a paired measures *t*-test with participants' PCC questionnaire of EG was performed to each dimension (pre–post) and revealed significant differences in CSC, HC, PL and SR (*p* = 0.001, *d* = -0.91; *p* = 0.01, *d* = -0.62; *p* = 0.001, *d* = 1.28, and *p* = 0.01, *d* = 0.66, respectively. However, any significant differences were found in SS and SIF. Posteriorly, another paired measures *t*-test with participants of CG (pre– post) showed no significant differences in any variable.

Last, data on PCC between CG and EG before the plogging intervention (pretest) were similar and unremarkable (see table 3, for more information).

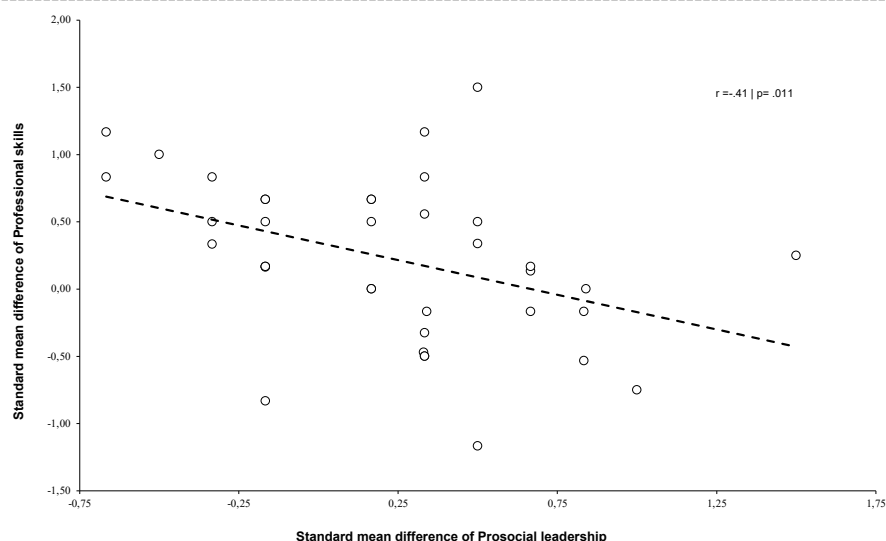


Figure 2. Correlation between the standard mean difference of Professional skills and standard mean difference of Prosocial leadership.

Correlation analysis were performed between the SMD of each variable of PCC questionnaire (post-pre) and the SMD of each dimension of S-LPA questionnaire. Crucially, the only a negative moderate correlation was found between professional skills of S-LPA questionnaire and prosocial leadership of PCC questionnaire ($r = -.41$, $p = .011$). In this sense, a multilinear regression analysis was performed to verify if the variables of SMD of both questionnaires (agreement with the correlation analysis) could be used to better explain the SMD of other variables. The SMD of professional skills of S-LPA questionnaire was a predictor of SMD of prosocial leadership of PCC questionnaire, $F = 7.27$, $p = 0.01$, $r = 0.41$, $r^2 = 0.17$, adjusted $r^2 = 0.14$, $SE = -0.41$.

Discussion

The aim of the present research was to use the plogging intervention to approach learning and SL in order to raise students' awareness of the environmental situation of our planet and to develop positive attitudes for its conservation and improvement. Taken together, the results demonstrated that plogging intervention produced changed in S-LPA questionnaire, concretely in Learning, Social Impact, Professional skills and Experience opinion dimension and also in PCC questionnaire, emphasizing specially in Conformity with social norms, Help and collaboration, Prosocial leadership and Social responsibility dimensions. In addition, the overall results demonstrated a positive association between Professional skills dimension of S-LPA and Prosocial leadership of PCC questionnaire.

Considering responses of both questionnaires and the literature findings that suggested that the mains objectives of SL cause different level of knowledge about the problems of the society must face (Kronick et al., 2011). For this reason, participating in the plogging intervention could have made that the students to change their behaviour and to act more responsibility with regards to different issues linked to naturally environmental. Related to that, the effect of plogging intervention on the promotion of prosocial behaviour it can be demonstrated the results obtained for the experimental group. Furthermore, our results are related with the finding of Mesurado et al. study (2019) that suggests that prosocial behaviour is encouraged through values as empathy and experiencing practical.

Concerning the dimensions of S-LPA questionnaire it can be suggested an improvement effect on *student-applied learning* (Kassabgy and El-Din, 2013). Some studies linked this improvement to the value of the practical experience generated from SL (Baldwin et al., 2007; Robinson and Meyer, 2012). In addition, the globally consolidation of curricular learning is possible due to interventions in small groups, in which all members provide efficient solutions and give reciprocal feedback (Short et al., 2019). Likewise, recent studies indicate that SL facilitates the acquisition of knowledge related to inclusive pedagogy and social values of the students (Santos, et al., 2020). Linked into a more personal context, some studies expose that SL helps them to visualize themselves in their professional and personal lives with different groups in their closest social context. Moreover, the teaching of EFL seen in the session 7 could help to provide positive attitudes and better social understanding of the reality in Melilla. SL intervention also entails university students to step them outside of their comfort zone (Kassabgy and El-Din, 2013). Consequently, their participation allowed them to learn more about the different groups as FUM participants and associations that make up Melilla's particular environmental reality.

The results of *student-applied learning* are closely linked with *professional skills* dimension due to their can be developed through the implementation of different teaching strategies, that bring the students to self-assess in real-life situations (Chiva, 2020). Furthermore, as one might deduce, experimenting real experiences plays a determining role in the development of professional skills (Brown and Bright, 2017). Another issue of great relevance revolves around the intrinsic motivation of the students, due to those with greater motivation can develop professional skills more effectively (Shin et al., 2018). However, not all SL programs stimulate professional skills in the same way. Some studies state that this improvement may be limited by a lack of connection between the curriculum of the course and the service provided (Segal-Engelchin et al., 2017). Thus, the relationship between the academic content and the intervention should be clear to maximize the benefits of SL.

SL intervention also evidence the effect of *social impact* dimension on the students. In this sense, SL enables students to develop their competences as it is a good practice of learning competences with a social involvement and commitment (Palos, 2011; Ostrander, 2004); a social commitment that is reflected in a positive impact on society as the female FUM which participated in S7. Thus, the SL methodology leads students to develop a source of solidarity and social transformation experiences (Rubio et al., 2014) that have a direct impact on society. Several studies demonstrate the contribution of students to civil society in general (Ruiz-Montero et al., 2021; Soska et al., 2010; Stoecker and Tryon, 2009), and to the environment in particular, involving the preservation and care of natural spaces.

In relation with experience *opinion dimension*, previous studies shown that higher education students who participate in these projects have a greater and more complex understanding of reality than those who do not take part in them (Ruiz-Montero et al., 2021). In this sense, there is an improvement of critical and reflective thinking, a widely documented result in research on the application of SL (Carrington et al., 2015). Furthermore, there is a positive change regarding the students' vision in the service or in the methodology itself, for example. In order to achieve that, it is important to count on the support of the institutions. Consequently, collaboration agreements should be set up as soon as possible, as well as the students should be involved as much as possible the decision processes (Playford et al., 2019).

Analysing individually the variables of the PCC questionnaire, the results shown that there are improvements in *compliance with social norms*, *help and collaboration* and *social responsibility* and *prosocial leadership* dimensions. Previous studies found improvements in the *compliance with social norms* (Gil-Gómez et al., 2016). Thus, the students have developed the ability to understand and accept the existing government regulations, understanding that all the improvements of experimental group were due to the implementation of the SL program, exclusively (Chiva, 2020). Thus, it would therefore be appropriate to carry out further research on this issue.

The effects of the application of the SL intervention are also reflected in *help and collaboration* and *social responsibility* dimensions, as previous studies found improvements in both aspects after implementing SL (Whitley et al., 2017). Although it seems logical to think along the lines of the results obtained, it is important to note that other studies have not found significant results (Chiva, 2020). Therefore, this situation a need for additional research on the topic.

Finally, *prosocial leadership* dimension it can be closely linked with *humility* and *social equality* concepts (Owens et al., 2019). Furthermore, when educational entities provide services to the community, an effectively communication it is a key element in promoting prosocial leadership (Sanders et al., 2019). In addition, as several studies indicate, the implementation of SL as well as other active methodologies had positive effects on prosocial leadership skills (Celio et al., 2011; Sun et al., 2017).

The results obtained by correlations emphasized the previous commentaries and strengthen existing findings of SL (Chiva et al., 2021). Crucially, the results have shown a negative moderate correlation was found between professional skills of S-LPA questionnaire and prosocial leadership of PCC questionnaire. The main reasons for this relationship might be due to both dimension and highly related. In this sense, as discussed earlier the SL had positive effects on prosocial leadership skills as a prosocial behaviour and it was no differ of a professional skill in the topic of sports sciences. In fact, qualitative analysis reflects the lack of experience in SL program which is acquired by putting into practice and implemented different program throughout of grade formation. In addition, multilinear regression emphasized the relationship and shown the strength that have the professional skills as a predictor of prosocial leadership in this study. For instance, Chiva et al. (2021) showed relationship between professional skills and prosocial leadership. In fact, all results together showed the profound relationship of the professional ability, the expertise and familiarization with the diary functions reflected in the professional skills dimension. Celio et al. (2011) also suggests that the greater the impact of SL is the more prosocial behaviour that student develops.

Conclusion

The article has analysed the use the plugging intervention to approach learning and SL in order to raise students' awareness of the environmental situation of our planet and to develop positive attitudes for its conservation and improvement. Overall, the application of the SL program had a positive impact on S-LPA and

PLL questionnaire of university students. Although the outcomes of the present research provide implications concerning the importance of incorporating new methodologies, i.e., SL program, in university teaching because can help student's acquisition of different general competences as Design, develop and implement teaching-learning processes related to physical activities in the natural environment, for example. In addition, the use of SL program reflected in plogging intervention can help achieve high level of physical activity in favour of a healthy lifestyle in university students. In fact, these benefits could have a direct impact on general competences mentioned as well as on the achievement of the SDG. The present study provides a comprehensive view about the different step of application of SL program and represents a positive intervention where teachers can receive academic formation and integrate information about this pedagogical method. Lastly, the present research shows an important gap inside of university education and suggest these important pedagogical methods as a key factor in achieving the neglected general competences and support sustainable human development objectives. A draft framework with suggest novel and relevant lines of research that can favour the improvement of SL.

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