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Educating for the sustainable development goals through service-learning: University students' perspectives about the competences developed

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The purpose of this study was to examine the perceived impact of a Service-Learning (SL) experience titled "Educating for Sustainable Development Goals (SDGs)," at the Porto campus of *Universidade Católica Portuguesa* (UCP), in which 15 university students from different programs were challenged to train other students about the SDGs. The main aim of the SL project was to raise awareness about the SDGs among the recipients (200 high school students, 20 students from a University in Angola and 40 from a University in Brazil). Besides the development of soft skills in UCP students, the learning objectives also focused on training socially responsible citizens who can take the SDGs into their future professions and help create a better and more sustainable world. UCP students were asked to reflect on their SL experience in the middle and at the end of the semester, based on structured reflection prompts. Based on these reflections, the present study aimed to understand the perceived impact of the SL experience on UCP students, particularly on their understanding of sustainable development (e.g., knowledge of SDGs), and the recipients (e.g., knowledge of strategies to achieve SDGs). Qualitative analysis was performed through NVIVO software. The results showed an impact not only on the academic learning and the UCP students' personal and professional domains, but also on their literacy about the SDGs. According to the UCP students' perceptions, the SL experience was particularly helpful in promoting SDGs awareness in the recipients and predisposing them to change attitudes and behaviors. Therefore, we conclude that the SL project accomplished its purpose of promoting awareness of the SDGs among the recipients. The implications of these findings are discussed in the context of the role of higher education institutions and SL experiences in sustainable development.

KEYWORDS

sustainable development, higher education, students' perceptions, interdisciplinary, reflection

Introduction

The 2030 Agenda for Sustainable Development represents a landmark transformation by assuming an ambitious project with a universal vision, common principles, an implementation strategy, and a global review framework involving 17 Sustainable Development Goals (SDGs) to eradicate poverty and enhance sustainable development (United Nations, 2015; Osman et al., 2017; Chofré et al., 2021). To that purpose, the 17 SDGs are hinged on collaborative action for people, planet, prosperity, peace, and partnership (the 5Ps of sustainability). As a response to the 2030 Agenda, education for sustainable development has been pointed out as a key response to address sustainability (Pauw et al., 2015), since it can be a vehicle to promote collaboration among people to achieve a more sustainable environment (Lim et al., 2022). The change in behaviors towards greater sustainability is essential in order to address challenges such as climate emergency, one of the hindrances to attainment of the 17 SDGs (Tian and Liu, 2022). In this regard, it is important to highlight that pro-environmental behaviors and attitudes are influenced by contextual factors, such as characteristics of local environments and community characteristics (Tian and Liu, 2022).

Within the scope of sustainable development, one of the most significant debates concerns the need and urgency to incorporate the SDGs in education and, more specifically, in higher education institutions (Alcántara-Rubio et al., 2022). According to Brundiers et al. (2020), there has been an increase in the number of sustainability programs implemented in universities and schools worldwide. However, Fields et al. (2022) suggested that awareness of the SDGs is still low, and the uptake of the SDGs is sporadic in higher education. Nevertheless, when analyzing the literature, there is an exponential increase in the research on sustainable development, specifically around the SDGs in higher education (cf. Wu and Shen, 2016; Bautista-Puig et al., 2021; Alcántara-Rubio et al., 2022; Lim et al., 2022; Serafini et al., 2022). Furthermore, a systematic review, from 2010 to 2014 (Wu and Shen, 2016), reported that researchers had highlighted “the concept of integration applied to education for sustainable development, the promotion of citizenship, the importance of education for sustainable development in business schools, and performance evaluation in education for sustainable development” (p. 13). According to the systematic review by Alcántara-Rubio et al. (2022), most of the published studies refer to universities in Europe (specifically, Spain and the United Kingdom) or Latin America, although the SDGs are being implemented in universities all over the world. From 2015 to 2020, the most common practice developed by the universities was the integration of the SDGs in the curriculum, with more work being done in some specific areas (e.g., research, education and learning, social leadership, and management and governance) (Alcántara-Rubio et al., 2022).

Universities are key institutions expected to intentionally promote the achievement of the SDGs of the 2030 Agenda (Arquero-Avilés et al., 2020), and they can play a highly important role in the transition to a sustainable society (Aramburuzabala et al., 2015; Osman et al., 2017; Finnveden et al., 2019; Wilhelm et al., 2019; Lim et al., 2022), because universities train the next generations of professionals who will make social, ecological, and economic decisions and hence require the values and attitudes needed for people to become responsible global citizens capable of respecting human rights, gender equality, and environmental sustainability (Osman et al., 2017).

Therefore, higher education institutions are responsible for creating the necessary conditions for the sustainable development of students, particularly through the development of skills, knowledge, attitudes, and values that enable them to deal with climate change, loss of biodiversity, global overpopulation, poverty, social inequalities, cultural diversity, and peace and human security (Aramburuzabala et al., 2015; Wu and Shen, 2016). However, integrating sustainability into higher education constitutes a challenge for universities (Brower, 2011; Arquero-Avilés et al., 2020; Leal Filho et al., 2021), as it implies changes in the teaching practices (Wu and Shen, 2016; Cebrián et al., 2021), empowering students to become change agents (Cavicchi, 2021; Jamison and Madden, 2021), approaching problems holistically and systematically (Pauw et al., 2015; Osman et al., 2017; Gobbo et al., 2021).

Service-learning

In order to achieve the SDGs, it is necessary to change the academic paradigm (Backman et al., 2019; Fields et al., 2022), implementing pedagogies promoting students' agency and learning outcomes likely to contribute to the stimulation of students' motivation and critical thinking regarding the area of sustainable development (Wilhelm et al., 2019). According to González-Sánchez et al. (2022), developing educational programs or curricula contributing to the SDGs requires a set of skills from students that cannot be achieved through theoretical training alone. To promote technical and social skills acquisition, universities are expected to use methodologies combining learning with practice (García Laso et al., 2019). Service-learning (SL) methodology emerges as a relevant tool since it is one of the most effective teaching methodologies for the development of sustainability competencies (Brower, 2011; Kioupi and Voulvoulis, 2019; Hernández-Barco et al., 2020; González-Sánchez et al., 2022), and because it enables the development of new forms of civic participation that allow co-constructing social and educational spaces (Opazo and Aramburuzabala, 2019). According to Bringle and Clayton (2012), SL can be defined as “a course-based, credit-bearing educational experience in which students (a) participate in mutually identified and organized service activities that benefit the community, and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility” (p. 105). This definition is supported by Salam et al. (2019), who define SL as: “a type of experiential learning which provides opportunity for learners to enhance their understanding of concepts and theories in [sic] practical environment” (Salam et al., 2019, p. 573). The literature (e.g., Opazo et al., 2019; Opazo and Aramburuzabala, 2019) defines three elements that characterize a SL project as distinguished from volunteering, internship, or community service: (a) the students are the main characters of the learning and solidarity action; (b) the service developed intentionally responds to a real need of a community; and (c) the service developed must be articulated with the curricular contents. Therefore, SL methodology intertwines student participation in a community-based service activity with curricular learning, which allows students to apply what they have learned in the classroom context to serve in and with the community, and to better understand how to create sustainable community change (Brower, 2011; Hernández-Barco et al., 2020). Salam et al. (2019)

conducted a systematic literature review and reported that SL is being integrated and implemented in higher education institutions in several ways. These include integrating SL into specific courses, offering online SL courses, implementing SL programs at the international level, and incorporating SL into interdisciplinary programs. Furthermore, SL is also being applied in teacher education programs (Salam et al., 2019).

According to Bringle and Clayton (2021), SL can facilitate students' academic learning, civic learning, and personal growth. In addition, SL has been identified as a means of promoting sustainability competencies in higher education (Cavicchi, 2021; Martín-Sánchez et al., 2022), including both knowledge of sustainability and practical skills associated with sustainability action (Cebrián et al., 2019; Castro et al., 2020; Chofré et al., 2021; González-Sánchez et al., 2022). Castro et al. (2020) conducted a study that demonstrated the positive impact of SL on the development of general skills among university students, including communication, teamwork, personal autonomy, critical thinking, self-assurance, self-esteem, problem-solving skills, empathy, sense of responsibility, creativity for helping others, and increased tolerance and reduced prejudice. Additionally, the study found that students developed environmental skills, such as reducing the impact of human activities, promoting eco-friendly behaviors at home, designing sustainable products, devising solutions to protect the planet, and considering the circular economy. Arquero-Avilés et al. (2020) have also reported the potential of SL methodology to enhance students' literacy of SDGs. The authors found that after participating in SL projects, students were more likely to consider the SDGs as a framework for their future professional and career endeavors.

Kolb's experiential learning theory

Theoretically, this study was framed using Kolb's Experiential Learning Theory. Kolb's learning cycle suggests that learning occurs through a four-stage cycle, which includes concrete experiences, reflective observation, abstract conceptualization, and active experimentation (Bringle and Hatcher, 1995; Miller et al., 2012; Quesada-Pineda and Haviarova, 2014; Kolb and Kolb, 2017; Long and Gummelt, 2020; Algurén, 2021; Marx et al., 2021). For Kolb (1984), learning is a continuous process that occurs over different learning cycles, in which students acquire knowledge through lectures; engage in new experiences; reflect on what they have learned; and apply the new knowledge to solve problems/situations or to engage in future activities (Quesada-Pineda and Haviarova, 2014). Therefore, Experiential Learning Theory (Kolb, 1984) can be considered a promising approach to sustainable development education (Quesada-Pineda and Haviarova, 2014; Backman et al., 2019; Algurén, 2021) in higher education. Kolb and Kolb (2005) argued that rather than simply transmitting cognitive content, the educator should create opportunities for learners to have meaningful experiences, reflect on these experiences and their own contributions, develop theories based on their reflections, and ultimately experiment with new ideas and behaviors to promote change. Therefore, experiential approaches have the potential to promote new learning outcomes, skills development, and behavioral changes (Backman et al., 2019). Backman et al. (2019) claimed that sustainability education needs to move beyond traditional classroom-based teaching methods and adopt a more experiential

approach that integrates sustainability concepts with real-world experiences.

Kolb's model of experiential learning presents an effective conceptual and practical framework that can be applied to SL initiatives (Petkus, 2000; Kenworthy-U'Ren and Peterson, 2005; Miller et al., 2012; Burke and Bush, 2013; Salam et al., 2019). For example, according to Cone and Harris (1996), "Kolb's model has helped service-learning educators develop an awareness of the role of reflection in relating the world of concrete experiences to abstract theories" (p. 45). SL pedagogy should involve the four aspects of the experiential learning cycle (Cone and Harris, 1996; Petkus, 2000; Currie-Mueller and Littlefield, 2018) since learning and development can be enhanced when the learner employs all aspects of the experiential learning cycle.

Implementation of SDGs in higher education

Although higher education institutions recognize the importance of sustainable development, its inclusion in the curriculum remains below desirable levels, especially in Portugal, a southwestern European country, where universities still do not prioritize the implementation of the SDGs (Aleixo et al., 2018). Therefore, the development of policy actions can encourage universities to engage in sustainability reporting, which can make a difference in the practices adopted by higher education institutions (Lim et al., 2022). Nevertheless, Farinha et al. (2019) have shown that Portuguese higher education institutions have already started to integrate sustainable development into their educational policies and practices, as supported by Aleixo et al. (2020). Portuguese universities implement sustainability through multiple actions, mainly by establishing partnerships with other society stakeholders, implementing policies that promote sustainable development for students and staff, and by committing to and signing declarations, charters, and initiatives within sustainable development. There are several ways to integrate sustainable development into higher education institutions. Some examples of how SDGs can be integrated into faculties include: (a) enabling students to take classes at another faculty; (b) introducing sustainable development-focused courses: faculties can offer courses that specifically address the SDGs; these courses can focus on the theoretical and practical aspects of sustainable development, as well as the challenges and opportunities related to achieving SDGs; (c) integrating SDGs into existing courses: faculties can integrate the SDGs into existing courses across different programs, and this can be done by incorporating SDGs-related topics or examples into course materials, lectures or assignments; (d) offering optional sustainable development courses; (e) developing interdisciplinary programs that combine different courses to address sustainability challenges; and (f) training teachers on the SDGs: to ensure the effective integration of SDGs into faculties, teachers may need training and support; this can involve workshops, seminars, or other professional development opportunities that focus on SDGs, sustainable development, and related teaching methodologies (Lozano et al., 2015; Wu and Shen, 2016; Leal Filho et al., 2019; CLAYSS, 2021). In addition to these practices, it is also important to strengthen collaboration and discussion of the sustainability topic among higher education institutions themselves (Lim et al., 2022). Alongside this, politics can also play a role in universities' promotion of sustainability.

Purpose of the study

Considering the relevance and urgency of the 2030 Agenda and the 17 SDGs as discussed by many authors such as [Arquero-Avilés et al. \(2020\)](#), [Bautista-Puig et al. \(2021\)](#), [Cavicchi \(2021\)](#), [Chofré et al. \(2021\)](#), the role that higher education institutions can play in this process has been emphasized which has resulted in an increase in programs focused on sustainable development among university students. However, knowledge about the SDGs is still low among students ([Arquero-Avilés et al., 2020](#); [Chofré et al., 2021](#)). Despite the various studies showing the effectiveness of SL, [González-Alonso et al. \(2022\)](#) warned about the need and relevance of further research on the SDGs based on SL experiences, because there are still few studies that relate SL to the promotion of students' sustainable development. Moreover, despite the recognized effectiveness of SL in promoting sustainability skills, the difficulty lies in the practical and concrete integration of the SDGs into the curriculum of universities ([Leal Filho et al., 2019, 2021](#)), especially in Portugal where the inclusion of sustainable development in the curriculum of universities is still poor ([Aleixo et al., 2018, 2020](#)). Therefore, in this case study, we present a SL experience titled "Educating for Sustainable Development Goals (SDGs)," seeking to introduce an example of how a SL project focused on the SDGs can be implemented in higher education, guided by Kolb's model of experiential learning ([Kolb, 1984](#)). This experience is part of a project that aims to institutionalize SL at a Portuguese university and was aligned with target 4.7 of SDG 4: "Quality education: By 2030, ensure that all students acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles" ([United Nations, 2015](#), p. 6). In the SL project, 15 university students from different programs were challenged to train other students about the SDGs. The main aim of the SL project was to raise awareness about the SDGs among the recipients (200 high school students, 20 students from a University in Angola and 40 from a University in Brazil). Besides developing UCP students' soft skills, the learning objectives also focused on training socially responsible citizens willing to incorporate the SDGs into their future professions in ways that contribute to creating a better and more sustainable world.

Research questions were defined as follows.

According to students' perceptions:

- 1) How did the SL experience impact the UCP students?
- 2) How did the SL experience contribute to UCP students' understanding of sustainable development?
- 3) How did the SL experience impact the recipients (high school students and university students from Angola and Brazil)?

Materials and methods

The study took place at the *Universidade Católica Portuguesa* (UCP), a Portuguese humanistic university focused on the production of transformative research and the formation of educated and competent citizens and professionals, able to anticipate and lead the transformations of the future. It is established by the Congregation for Catholic Education and recognized by the Portuguese government. In this higher education institution, which comprises four campuses in

four different regions of the country, a larger project to institutionalize the SL methodology (the CAPS project) is being developed. The main aim of the CAPS project is to contribute to the implementation and dissemination of SL at the *Universidade Católica Portuguesa* and in other higher education institutions in Portugal, promoting pedagogical innovation and social responsibility. The SL project presented in this article was developed at only one of the university campuses, in the north of Portugal (UCP-Porto). This campus comprises seven faculties: Católica Porto Business School, Faculty of Biotechnology, Faculty of Education and Psychology, Faculty of Law, Faculty of Theology, Institute of Health Sciences, and School of Arts. It offers bachelor's and master's degrees in different areas, such as: bioengineering, conservation and restoration, double degree in law and management, economy, law, management, marketing, microbiology, nursing, nutrition sciences, psychology, sound and image, and theology.

Participants

This study's sample comprised 15 Portuguese university students who participated in a SL project, 13 female (86.7%), aged between 19 and 21 ($M=20.33$; $SD=0.62$). Most of the students ($n=11$) were attending bachelor's degrees in such areas as psychology (35.7%), law and management (double degree; 14.3%), bioengineering (7.1%), law (7.1%), economy (7.1%), and management (7.1%). The remaining students ($n=3$) attended a master's degree in psychology (14.3%) or applied microbiology (7.1%). All students had previous experience of being volunteer in a project or institution, but just one (7.1%) reported previous SL experience. It should be noted that the sample was constituted by a group of students with particular characteristics that distinguish them from the typical university students. The participants of this study were young people with extensive experience in associative activities (e.g., students associations) and actively involved in several extracurricular academic activities. To allow good follow-up by the teachers and mentors of the project to the university students involved in this experience and to promote the active participation of all the students, the project had a limit of participants. As such, it was decided to advertise the project only to the students who had participated in extracurricular academic activities (e.g., volunteering, student associations, academic groups), as these were the students who might be most interested in participating in this extracurricular SL project. Of all the students involved in the extracurricular activities mentioned above, 15 decided to participate in the project.

Description of the experience

The main purpose of "Educating for Sustainable Development Goals" was to raise awareness about the SDGs among the UCP students and a specific group of young people and – namely high school students from four Portuguese schools and students from a University in Angola and from a University in Brazil (considered as recipients). The UCP students chose these four schools because they had previously studied there and had established relationships with the teachers, making it easier for them to arrange sessions. As for the universities of Angola and Brazil, these were already UCP-Porto's partners in the volunteering office.

Besides developing soft skills, the learning objectives focused on training socially responsible citizens willing to incorporate the SDGs into their future professions and hence opening up opportunities for creating a better and more sustainable world.

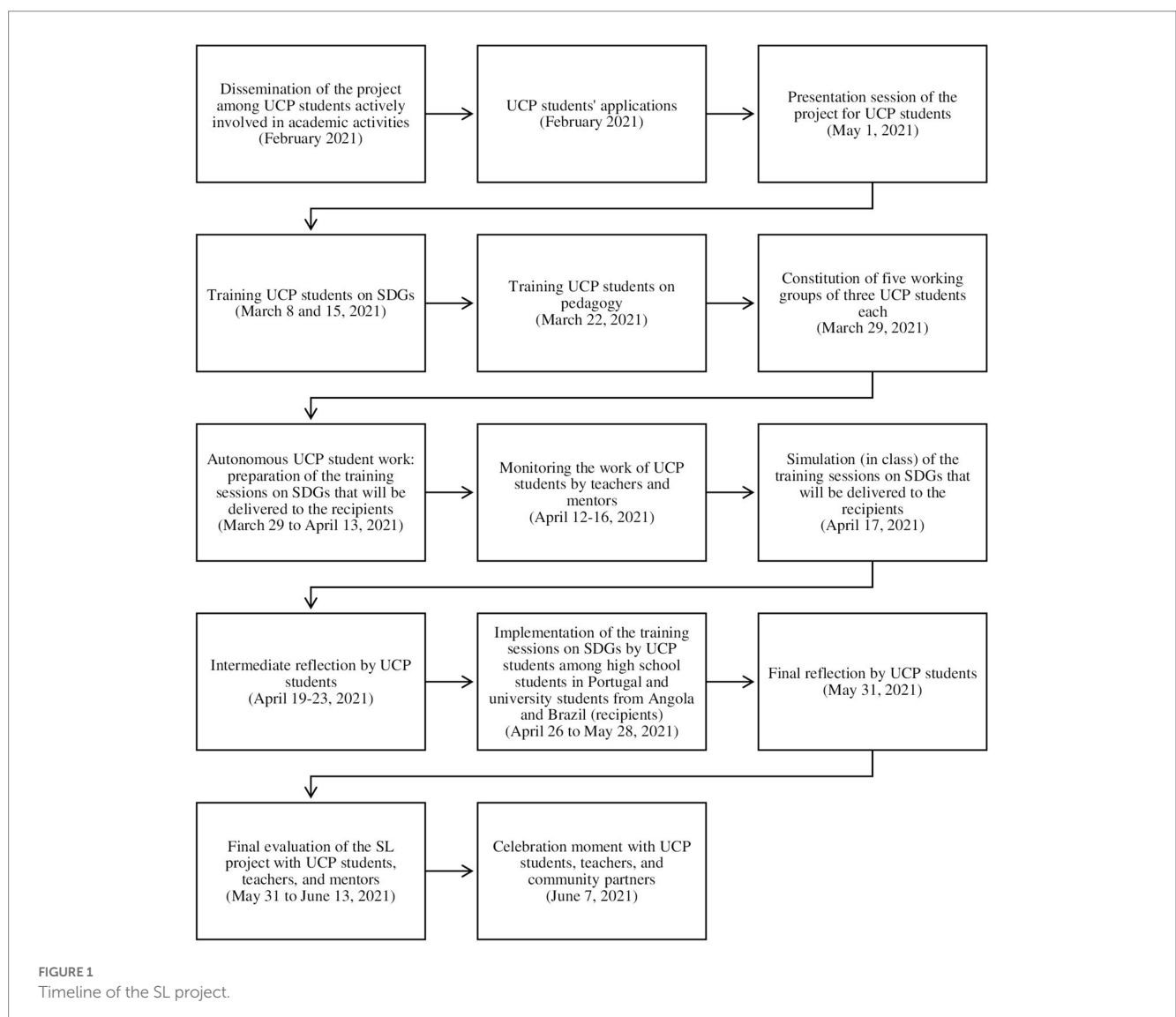
This project was created by *CASO-Católica Solidária* (Solidary Catholic), volunteer office at the UCP-Porto, in the academic year 2020/2021, during the COVID-19 pandemic, as an opportunity for online and extracurricular SL experience for students. The project also had the scientific support of the Faculty of Education and Psychology and the Católica Porto Business School. Thus, the SL project was supervised and conducted by two teachers (one from the Faculty of Education and Psychology and other from the Católica Porto Business School) and two mentors (the coordinator and a member of the volunteer office). [Figure 1](#) shows the timeline of the SL project.

Fifteen students from UCP-Porto attending six bachelor's and two master's degrees from different academic units engaged in the project voluntarily. Firstly, as shown in [Figure 1](#), the students who enrolled received training in SDGs and pedagogy to learn and raise awareness about SDGs, and plan, conduct, and evaluate a training session. In a

second phase, the 15 students were divided into five groups of three persons each. Every group was challenged to prepare, implement, and evaluate SDGs training sessions. More precisely, three groups of students implemented three sessions at UCP-Porto, involving 20 other university students as recipients; five groups held a total of 10 sessions in Portuguese high schools, involving 200 secondary school students as recipients; three groups developed three sessions directed to a university in Angola, involving 20 students as recipients; and, finally, two groups held two sessions addressed to a university in Brazil, involving 40 students as recipients. Thus, a total of 18 training sessions were developed by the UCP students, with a total of 280 recipients involved. Due to the COVID-19 pandemic, most of the training sessions were online (only two were performed in person).

The project lasted one academic semester for a total of 44h, divided as follows: 15h of classroom work, 23h of autonomous work (individual study time; group works to prepare the training sessions), and 6h of contact with the recipients (three training sessions of 2h each).

[Figure 1](#) presents a summary of how the entire SL project was developed: after the dissemination of the project and the students'



applications (as previously explained), the responsible teachers and mentors performed an online presentation session, in which the SL project and methodology were discussed; subsequently, training of UCP students took place: the students had two sessions on the SDGs, empowering them to the theme, and a session on “How to run training sessions,” empowering students in tools and strategies to lead training sessions; afterwards, the students were organized into five groups of three persons each; group work moments/sessions were provided, in online classes, with supervision from teachers and mentors; students simulated the training sessions in class; students answered the intermediate reflection prompt; students implemented training sessions on the SDGs among the recipients; students answered the final reflection prompt; the final evaluation of the SL project was done with the teachers and mentors; a final celebration moment was held among students, teachers and guests to present the project results.

The UCP students were evaluated through attendance, individual final report, a poster of each group on the project, and feedback from the recipients regarding the training sessions. In the end, the experience was registered in the student’s academic management system as an Extracurricular unit present in the final diploma of the study cycle. Each student was given a participation certificate issued by the UCP-Porto.

Throughout the entire process, the project intended to provide opportunities to develop the following skills in the UCP students: ability to analyze and synthesize information; ability to organize and plan; written and oral communication; ICT knowledge; teamwork and interpersonal relationships; critical thinking; leadership and creativity; autonomy; knowledge about the SDGs and applicability of the SDGs in their professions. More information about how each one of these skills was stimulated can be seen in [Table 1](#).

The present study has the particularity of presenting a SL experience in which two formal moments of reflection occurred, allowing participants to attribute meaning to the community-based activities ([Bringle and Hatcher, 1995](#); [Bringle et al., 2016](#)). Aligned with Kolb’s experiential learning theory ([Kolb 1984](#)), these moments are particularly important to promote students’ personal, academic, social, moral, and civic development, and providing multiple moments of reflection can enhance the students’ outcomes ([Hatcher et al., 2004](#)).

According to [Bringle and Hatcher \(1995\)](#), reflection is essential in defining an experience to be considered SL; it has to fulfill requirements, including integrating a reflective component ([Bringle and Hatcher, 1995, 1999](#)). According to [Bringle et al. \(2016\)](#), reflection activities, which should be regular and structured, are important in helping students make meaning out of their community activities. Thus,

The presumption is that the educational benefits embedded in community service are best realized through reflection activities that link the service experience to learning objectives. Establishing the key role of reflection as well as discussing specific reflection techniques is important to successfully implementing service-learning ([Bringle and Hatcher, 1995](#), p. 115)

Based on the relevance of the reflection component, in this SL project we tried to create favorable moments for the students’ reflection. As such, two formal moments of reflection occurred: one

TABLE 1 Summary of the skills that the SL project intended to develop in UCP students.

Skill	How it was stimulated
Ability to analyze and synthesize information	Students had to analyze a lot of information about SDGs and then synthesize and include it in the training sessions plan
Ability to organize and plan	Skills stimulated as a result of the task of planning, implementing, and evaluating the training sessions
Written and oral communication	Skills stimulated throughout the process and – in the session’s preparation; in the implementation of the training sessions; in the evaluation moment and in the reflection moments
ICT knowledge	Students had to prepare virtual training sessions, using attractive and clear materials
Teamwork and interpersonal relationships	Students worked, throughout the process, in interdisciplinary small groups; they conducted training sessions for young people
Critical thinking	All sessions about the SDGs tried to stimulate this ability, raising awareness in the students; they were invited to reflect about all the process of planning, implementing, and evaluating training sessions
Leadership and creativity	Skills stimulated by the assignment of preparing and leading training sessions; students had to produce different options regarding learning materials for the sessions
Autonomy	Throughout the whole process, students’ autonomy was stimulated by challenging them to design training sessions and to implement them by themselves
Knowledge about the SDGs and applicability of the SDGs in their professions	Contents approached in the sessions

in the middle of the experience and another at the end of it. We believe that these two moments of reflection were inspired in the DEAL Model of Critical Reflection ([Ash and Clayton, 2009](#)), since, based on the structured reflection prompts, the students were asked, in general lines, to: (a) describe the SL experience (which informed who the recipients were, what happened, where it happened, and how it happened); and (b) reflect on the impact of the experience; on the relationship between the curricular contents and the SL experience; on the importance of the service experience for understanding the course contents; and also on the applicability of their learning ([Bringle and Clayton, 2022](#)).

Instruments

For data collection, two structured reflection prompts were administered to students. The intermediate reflection was composed of 10 structured questions, related to the following topics (one question per topic): (a) description of the SL experience; (b) needs of

the community (in this case, high school students from Portugal and university students from Angola and Brazil); (c) meaning/impact of the experience; (d) most and least positive aspects of the experience; (e) unforeseen event or conflict which occurred; (f) what was lacking in the SL project in terms of training, management, and communication; (g) relationship between the contents of the curricular unit/course and the SL experience; (h) usefulness of the service experience for understanding the contents of the course; (i) applicability of the learning arising from the SL experience to other curricular units/courses; and, (j) applicability of the learning arising from the SL experience to other life situations. The script used for the final reflection was developed following [Bringle and Hatcher's \(1999\)](#) three-part journal model. Thus, the final reflection was composed of three open-ended topics: (a) contextualization of the SL experience; (b) curricular context of the SL experience (in this case, the SDGs topic); and (c) outcomes of the SL experience.

Data collection procedures

UCP students were asked to reflect on their SL experience in the middle of the SL and at the end. Thus, two reflection moments occurred over the semester, in an online classroom context, with the support of teachers.

To ensure ethical and deontological issues, the students' informed consent was obtained, and their participation was voluntary. Participants were previously informed about the study's aims and that data confidentiality was ensured. The study obtained ethical approval from the Ethics Committee in Technology, Social Sciences and Humanities.

Data analysis procedures

Data were analyzed in three stages: pre-analysis, material exploration, and data processing and interpretation ([Bazeley and Jackson, 2013](#)). Firstly, to facilitate the data analysis process, a floating reading of the students' reflections was conducted to establish contact with the documents to be analyzed and obtain general information about the phenomenon under study ([Bazeley and Jackson, 2013](#)). The students' intermediate and final reflections were qualitatively analyzed in a second moment through NVivo® software. Given the research questions previously defined, we examined the students' answers in the following topics of the intermediate reflection: meaning/impact of the experience; usefulness of the service experience for understanding the contents of the course; applicability of the learning arising from the SL experience to other curricular units; and applicability of the learning arising from the SL experience to other life situations. In the final reflection, we examined the students' answers in the topic related to the outcomes of the SL experience. In addition, statements in which the students referred to aspects clearly related to the impact of the experience on themselves and on the recipients/community were also considered, even if they appeared in the other topics: description of the SL experience, needs of the community to which the experience responds; most and less positive aspects of the experience; unforeseen event or conflict which occurred; what was lacking in the SL project in terms of training, management, communication; the relationship

between the contents of the curricular unit/course and the SL experience; contextualization of the SL experience; and, the curricular context of the SL experience.

Results

The codification of the intermediate and final reflections is presented in [Table 2](#). For a better understanding of the hierarchy of categories during the presentation and discussion of results, in the following section, main categories/parent codes are written in bold, and the subcategories are underlined or in italic. The categories are presented with examples from the students' answers, safeguarding confidentiality and anonymity.

Q1. According to students' perceptions, how did the SL experience impact the UCP students?

In the intermediate and final reflections, the UCP students highlighted that the SL experience had an impact on them in three themes: **academic learning**; the **professional domain**; and the **personal domain**.

In the intermediate reflections, all students perceived the experience as one that impacted their **academic learning**; however, in the final reflection this impact on academic learning was not frequently mentioned, being reported by just five of the 15 students. According to data from both reflections' moments, the students considered that this SL experience contributed largely to the consolidation of the contents learned in the program, as can be seen in the following examples:

All this SL experience has strengthened what my course has taught me: the importance of empathy, mutual help, respect for others, and their life story and idiosyncrasies. Thus, I consider that the Service experience has contributed to various aspects of how I consolidate, observe, and understand the contents I have been acquiring in my course. (Intermediate reflection)

Now that I have finished the SL experience, I can confirm that this experience, besides consolidating the learning I acquired during my course, has demonstrated the impact that everyone can have on the world. (Final reflection)

Besides the consolidation of contents, the students considered, in their intermediate reflections, that the experience was an opportunity to apply the contents approached in the service (SDGs topic) to other courses. However, this aspect was not mentioned by the students in the final reflections, after the SL, and no reference was made to the possibility of applying the contents addressed in the SL experience to other courses.

(..) much of what I learned in the project also applies to the curricular unit of Psychology of Education and Lifelong Learning, which seeks the development and empowerment of all, and I believe that this is exactly what this project conveyed. (Intermediate reflection)

I feel that the curricular unit where I can apply the knowledge acquired from SL experience the most is Final Project-Management and Economics, since it is the only one where I have more moments

TABLE 2 Codification for intermediate and final reflections (summary table) N = 15.

Codes	Intermediate Reflection			Final Reflection			
	Name	Files	Ref.	%*	Files	Ref.	%*
<i>1. Impact on UCP students</i>							
Academic learning	15	48	100%	5	12	33%	
Application of the contents approached in the service to other courses	12	15	80%	–	–	–	
Consolidation of the contents learned in the program	10	18	67%	3	6	20%	
Put into practice knowledge and skills acquired throughout the program	6	7	40%	3	4	20%	
SDGs not related to the program contents	4	5	27%	–	–	–	
Increased academic motivation	2	3	13%	–	–	–	
Development of skills and knowledge close to the real context	–	–	–	1	1	7%	
Development of a critical view on the program contents	–	–	–	1	1	7%	
<i>Professional domain</i>							
Development of skills associated with professional practice	8	12	53%	6	14	40%	
Increased motivation to incorporate the SDGs in future professional practice	4	4	27%	7	10	47%	
SDGs have no applicability to professional future	1	1	7%	1	1	7%	
<i>Personal domain</i>							
Development of soft skills	7	7	47%	10	21	67%	
Promotion of personal growth and self-reflection	5	6	33%	1	1	7%	
Increased motivation to do volunteer work/develop a social project	3	3	20%	–	–	–	
Encouragement of an active participation in society	3	3	20%	1	1	7%	
<i>2. Impact on UCP students' understanding of sustainable development</i>							
Change in attitudes and behaviors	12	32	80%	11	22	73%	
Increased SDGs literacy	8	9	53%	14	33	93%	
Greater awareness of SDGs and the urgent need to achieve them	7	12	47%	8	18	53%	
Increased knowledge of strategies to achieve the SDGs	3	4	20%	6	7	40%	
Increased knowledge about the practices country and companies have been implementing	–	–	–	5	5	33%	
Desire to know and research more about SDGs	–	–	–	2	2	13%	
<i>3. Impact on the recipients</i>							
Increased literacy and awareness of the SDGs	3	3	23%	7	12	88%	
Increased knowledge of strategies to achieve the SDGs	–	–	–	4	8	50%	
Greater predisposition to change practices	–	–	–	3	5	38%	

*Percentage values were calculated by dividing the number of files coded by the number of participants (N = 15).

of exposure and opportunity for less analytical thinking. All the others have much mathematics or are very abstract, which makes it difficult to apply this new learning model. In History of Economic thought, I think it is possible to make an interesting articulation insofar as social issues assume an increasingly relevant role in today's society. (Intermediate reflection)

This demonstrates that the SL experience provided a practical and meaningful way for the students to connect the theoretical knowledge gained in their courses with real-world issues related to the SDGs. Additionally, the students' ability to transfer their knowledge to other courses suggests that the SL experience may have contributed to a deeper and more integrated understanding of the course material. Overall, the impact of the SL experience is that it facilitated the students' ability to connect and apply their

learning to multiple contexts, thereby enhancing their learning outcomes.

Some students perceived that the SL experience allowed them to put into practice the knowledge and skills acquired throughout the program, and a few reported that it contributed to the development of skills and knowledge close to the real context, as mentioned:

(..) the fact that we know more about human behavior and its development, as well as the empathic capacity that we work on throughout the course, are key concepts that can be applied in the service context (...). It has also allowed us to work on the experience of developing a training session, i.e., even though in my course we have the opportunity to develop two training sessions, the SL experience has allowed me to work on my peace of mind, flexibility and agility in this process. (Intermediate reflection)

Thus, this experience enables the development of skills and knowledge closer to the real context, allowing us to understand in a more particular way the real needs of the populations with whom we will later be able to work. (Final reflection)

Still, within the theme of **academic learning**, some students' perceptions referred to increased academic motivation when reflecting in the middle of the experience (an aspect that did not emerge in the final reflections):

This past semester, I noticed a difference in the way I study the subjects in class. Moreover, I retain from the classes what I can innovate in society with that subject instead of only retaining the subject. This mental exercise of being able to perceive a future in that class, makes topics that previously didn't interest me much more interesting. (Intermediate reflection)

Nevertheless, in the middle of the experience, four students stated that the SDGs were not related to the program contents; however, this perception did not emerge in the final moment of reflection.

In addition to the perceived impact on the academic learning theme, students considered, as already mentioned, and shown in [Table 2](#), that the SL experience had an effect on the **personal and professional domains**. This SL experience contributed, according to the students' perception, to the development of skills associated with future professional practice, as well as an increase in motivation to incorporate the SDGs in future professional practice:

In my program, Psychology, the practice of training sessions is very common, so it is a common point with the experience. So, this ends up being another opportunity to experience what may be a daily practice in my professional future in terms of preparation or dynamization. (Intermediate reflection)

Through the Service experience, I understood the importance of my role as a future psychologist in the community. (Final reflection)

The SL experience allows me to project my future professional practice. It motivates me to work directly in areas that allow me to help achieve the goals designed to meet the needs of communities. (Intermediate reflection)

This experience in addressing the SDGs alerted me to the possibility of integrating the different goals established in my professional area, in which I try to find solutions to improve human health. (Final reflection)

According to the UCP students' perceptions in the intermediate reflections, this SL experience had an impact on them from a more personal point of view, having enhanced the development of soft skills, personal growth and self-reflection, and motivation to do volunteer work or to develop a social project. The first two aspects were identified in the intermediate and final reflections, while the motivation to do volunteer work or to develop a social project was identified only in the intermediate moment. Examples from the students' discourse referring to the impact of the SL experience on the **personal domain**:

My SL experience translates essentially, and very positively, into skills development. Whether they are more transversal skills – for

example, developing communication skills, stress management, dealing with frustrations or things that go less well, managing anxiety and nerves. And, therefore, I think it is increasingly important to continually work on these skills to be better prepared to deal with adversities that arise in our lives. (Intermediate reflection)

The SL experience allowed me to develop various skills, such as empathy, communication skills, problem-solving, time management, flexibility, creativity, discipline, and productivity. (Final reflection)

In terms of impact, I feel that ... it is awakening in me an interest in doing volunteer work (which until now I have been putting off). By this I don't mean that I'm going to join an association, but little by little I'm thinking that in the next few years I'm going to dedicate my time to some volunteer activity of a lasting nature. (Intermediate reflection)

SL gave me the motivation I needed to develop an idea for a social project in the field of education (Intermediate reflection)

The students' intermediate and final reflections indicated that they were able to develop a range of skills, such as communication, empathy, problem-solving, time management, flexibility, creativity, discipline, and productivity. Additionally, the SL experience motivated some of the students to pursue volunteer work or develop a social project related to education. Overall, the impact of the SL on the personal domain is that it provided the students with an opportunity to develop and apply a wide range of skills and to engage in self-reflection and personal growth.

Q2. According to students' perceptions, how did the SL experience contribute to UCP students' understanding of sustainable development?

Regarding the impact of SL on students' understanding of sustainable development, students' final reflections were much richer than their intermediate ones. After the SL experience, students were better able to report on the contribution of the SL experience to their understanding of sustainable development. Based on two moments of reflection, the students considered that the SL experience had contributed to an increase in literacy towards the SDGs and, consequently, to a change in attitudes and behaviors. Although we cannot determine the causal role of the SL experience in producing outcomes, because we did not measure change (which would require measurement of the same attitude at two different times), the reflection products provided evidence of the students attributing learning and outcomes to their SL experience. Their statements were taken as having content validity for how and in what ways they said the SL experience resulted in learning outcomes.

The changes in attitudes and behaviors were diverse, and students, as a result of the SL experience, tended to make people around them aware of the SDGs and to adopt more sustainable practices; reduce water consumption; recycle; adopt practices to combat gender and/or social inequality; respect the rights of others (aspects mentioned in the intermediate reflections). In the final reflections students also reported that, due to the SL experience, they now tended to buy goods from companies with sustainable practices. In addition, the students gained a greater awareness of the impact of individuals on the world and have developed a sense of responsibility towards achieving the SDGs. Some examples from the students' discourse that can refer to the change in attitudes and behaviors:

We need people to work together to make a united world, where there are equal opportunities, where everyone has access to health, to education, and free of discrimination. (Final reflection)

In fact, the SDGs will only be accomplished if we all actively participate in achieving them. If we maintain a passive posture, they will only exist, and we will not achieve the necessary end. (Final reflection)

I have, then, as a personal goal to contribute to Gender Equality in all aspects of my life and specially to demonstrate that men and women have equal abilities in science. (Final reflection)

All this has given me a greater motivation to encourage those around me to implement small changes in their lives to contribute to a better world. (Intermediate reflection)

The SL experience also contributed, from the students' perspective, to a greater awareness of the topic and an awareness of the urgent need to achieve the SDGs.

This opportunity has brought to my attention how urgent it is for each of us to do something, no matter how small, to make the place we live in a better and more sustainable place. (Intermediate reflection)

... helped me realize how important it is to make the world a better place. (Intermediate reflection)

The SL experience promoted increased knowledge of strategies that students can adopt to achieve the SDGs and enabled students to learn about practices that the country and companies have been implementing to achieve the SDGs at the end of the experience.

We now know how to apply certain actions and the importance of maintaining some that we already practiced. The SDGs show several individual actions that we can take in the everyday context of our lives. This experience reinforced the importance of these actions, so I believe this fact will not be forgotten. (Final reflection)

Knowing which are the priority SDGs for Portugal, knowing the policies that Portugal adopted to achieve the SDGs, and knowing some policies that national companies adopted were some deeper knowledge that this experience gave me. (Final reflection)

Q3. According to students' perceptions, how did the SL experience impact the recipients (high school students and university students)?

According to the UCP students' perceptions, the SL experience impacted the recipients in terms of their understanding of sustainable development, which was expected considering the aims of the SL project. Once again, we cannot determine the causal role of the SL experience in producing outcomes, because we did not measure change in the recipients. However, the reflection products provided evidence of the UCP students attributing learning and outcomes to the recipients. Based on the content analysis performed, the students' final reflections were much richer for understanding the students' perception about the impact of the SL project on the recipients than the intermediate ones. It was in the reflections made at the end of the

project that the students were more detailed about the benefits of the SL project on the recipients. In the intermediate reflections, the benefits of the SL project were related to increased literacy and awareness of the SDGs, as mentioned:

I think that the interventions that I made contributed essentially to alerting all participants to what the SDGs are, why they were created, and how we can all work to meet and enforce them. (Intermediate reflection)

There are still many stigmas in today's world that hinder the development of society. Through my experience and as a group, we tried to alert the present students of situations that we consider trivial, but which are the basis or even the barriers to development. (Intermediate reflection)

Despite the subtheme increased literacy and awareness of the SDGs being also present in the final reflections, several new categories emerged. UCP students considered that the SL experience was essential to increase the knowledge of strategies to achieve the SDGs and, consequently, to predispose the recipients to change their practices.

Regarding the impact on the community, I think that the training given to the different groups, in this case, Portuguese high school and college students and university students from Brazil, allowed to transmit the SDGs relevance and allowed the target audience to acquire some tools so that they can contribute to the achievement of the different goals established. (Final reflection)

Specifically, in the training with Brazil, I felt that the impact was greater since it was a group of young people very interested and actively seeking ways to combat injustices and inequalities experienced in their country. (Final reflection)

Discussion

This study presented a SL experience developed within the scope of a process of institutionalization of the SL methodology in UCP in Portugal, which had the main goal of increasing awareness of the SDGs among the UCP students, Portuguese high school students, and students from a University in Angola and from a University in Brazil. As such, the present study aimed to understand UCP students' perceptions regarding the impact of a SL experience on themselves, how the SL experience contributed to their understanding of sustainable development, and how the SL experience impacted the recipients. According to the UCP students' perceptions, the SL experience impacted their self-reported academic learning, professional domain, personal domain, and understanding of sustainable development.

The benefits of the SL methodology among university students are well documented in the literature (e.g., [Gregorová and Heinzová, 2019](#); [Ilic et al., 2021](#); [Aláez et al., 2022](#)), highlighting the impact on academic and cognitive dimensions, as well as the impact on social, emotional, and behavioral development. The present study's results align with those of [Gregorová and Heinzová](#)

(2019) and Ilic et al. (2021), as they found that the SL experience contributed significantly to the understanding and consolidation of the curricular content covered throughout the program. Furthermore, the results of the present study suggest that SL promotes the holistic development of the student, beyond the academic content and integrating the development of specific and generic skills while students provide a service to the community, as identified by Bringle and Hatcher (2000).

According to the UCP students' perceptions, this SL experience contributed to the development of core competencies and key aspects identified by Osman et al. (2017), such as: (a) envisioning and – data showed that students believed in and could imagine a better future; (b) critical thinking and reflection and – data showed that students developed the ability to critically think about one's own belief system and to critically analyze economic, environmental, social, and cultural structures; (c) identifying relevance and meaning to different people and – this SL experience not only increased the SDG awareness among UCP students, but also increased it in the recipients who were, in part, students from different countries; (d) exploring how to achieve change, promoting alternative ways of thinking and developing metacognitive awareness – according to the students' perceptions, the SL experience increased their and the recipients' literacy about more sustainable strategies; and (e) empowered students to take action – as a consequence of increased literacy and awareness, students have developed skills for changing practices.

Regarding academic learning, in the intermediate reflections, four UCP students considered that the SDGs were not related to the content of their program, but most UCP students did. However, this perception did not emerge in the final reflections. In the final reflections, students perceived a relationship between the SDGs and their program and professional field (e.g., students reported increased motivation to incorporate the SDGs into their future professional practice). Therefore, students' perceptions about the relevance of the SDGs to their academic program and professional field changed over the course of the SL project. This suggests that the SL project may have played a role in raising awareness among the students about the importance of the SDGs and their relevance to their program and future professional practice, leading to a shift in their perceptions and attitudes towards sustainability. The disparities observed between the intermediate and final reflections could be due to the temporal progression of the SL project. The intermediate reflections captured the initial impressions and perceptions, and the final ones encompassed a more comprehensive understanding of the SL project. Besides, throughout the SL project, students may have encountered new challenges or opportunities that shifted their priorities and focus. Initially, the students may have emphasized, for example, the impact on their academic learning, as they were consolidating and applying course content to the SL project. However, as the project continued, other aspects, such as personal and professional development, may have assumed greater significance in their reflections. Moreover, the structured reflection prompts may have also influenced the differences between intermediate and final reflections. The prompts guided the students to focus on specific aspects of the SL project at different stages, thus contributing to variations in their responses. The interaction with the recipients may also have influenced the students' reflections. Feedback received and the observed impact of their efforts on the recipients could have influenced their perceptions and comprehension of the SL experience.

The experience contributed significantly to the understanding of sustainable development of UCP students through increased literacy on the SDGs and attitudes and practices in favor of greater sustainability, as the results have shown. Similar to the studies of Arquero-Avilés et al. (2020), Castro et al. (2020), Cebrián et al. (2019), and Chofré et al. (2021), the present study showed that SL projects developed in higher education, in addition to promoting the development of general skills, can play an important role in increasing students' literacy about the SDGs. For example, the results of the present investigation are in line with those of the study of Cebrián et al. (2019), because both studies demonstrated that the SL methodology had an impact on the understanding of sustainable development of university students, particularly in increasing their knowledge about sustainability. Moreover, in both studies the students were more aware of the topic of sustainability after the SL project. It should be noted that the impact of SL on students' commitment with sustainability depends on the focus of the SL projects (Cebrián et al., 2019). The aim of SL projects is, in general, to foster the acquisition of ethical values and attitudes of social and environmental commitment, as highlighted by Cebrián et al. (2019), promoting values such as social justice and reinforcing a planetary and humanitarian consciousness (Aramburuzabala and Lázaro, 2020).

The SL project presented in this article is specifically focused on the SDGs, with one of the main goals being to promote literacy about the SDGs among the participating students. The UCP students were trained on the SDGs, and they were responsible for implementing SDG trainings, increasing their own and the recipients' literacy on the sustainability topic. The participants of the current study considered that the SL experience contributed to the change of practices towards greater sustainability, which is in line with the results of the study by Castro et al. (2020). In both studies, university students developed environmental skills related to identify new solutions to protect the planet and reduce the impact of human activity.

Finally, UCP students consider that the SL experience contributed to increasing the recipients' awareness and literacy about the SDGs and strategies to achieve the SDGs and, consequently, to a greater disposition to change practices in favor of sustainability. With this, it is possible to verify that the SL project met its aims of promoting SDG literacy in the recipients.

Consistent with Cebrián et al. (2019), the present study reinforces the importance of including courses in the curriculum of universities concerning education for sustainability in which active learning methodologies such as SL are used. As such, this study can be considered a contribution on how the SL methodology can be implemented in higher education institutions to promote students' sustainable development. Between 2015 and 2020, the most common practice among universities was integrating the SDGs into the traditional curriculum (Alcántara-Rubio et al., 2022). SL experiences can be integrated into mandatory or extracurricular subjects. However, implementing SL in optional subjects seems to have a greater and positive impact than implementing it in mandatory courses (Cebrián et al., 2019). When students choose to participate in a SL project focused on the SDGs in an optional course, as was the case in the present study, they show a greater predisposition towards sustainability. According to Osman et al. (2017), educational institutions' curriculum must ensure the conditions for students to explore, analyze, and connect with the environment and the world around them. Through this exploration and relationship with the

environment, the knowledge and skills needed to understand and deal with issues that affect the environment and society are enhanced (Osman et al., 2017). Therefore, it becomes extremely relevant that higher education institutions gradually and systematically start addressing the SDGs with SL (Aleixo et al., 2020). To that end, it is important to include the topic of SDGs and SL in the training curriculum of teachers, so that they can work better with their students on this topic.

According to Backman et al. (2019), sustainability education needs to move beyond traditional classroom-based teaching methods and adopt a more experiential approach that integrates sustainability concepts with real-world experiences. Kolb's model of experiential learning can be applied to SL initiatives (Petkus, 2000; Kenworthy-U'Ren and Peterson, 2005; Miller et al., 2012; Burke and Bush, 2013; Salam et al., 2019). The results support the recommendation that the design of SL experiences include all four aspects of the experiential learning cycle (Cone and Harris, 1996; Petkus, 2000; Currie-Mueller and Littlefield, 2018). Thus, experiential learning theory (Kolb, 1984) can be considered a promising approach to sustainable development education (Quesada-Pineda and Haviarova, 2014; Backman et al., 2019; Algurén, 2021) in higher education. Kolb and Kolb (2005) argued that rather than simply transmitting cognitive content, the educator should create opportunities for learners to have meaningful experiences, reflect on these experiences and their own contributions, develop theories based on their reflections, and ultimately experiment with new ideas and behaviors to promote change. We believe that students, at the end of the SL experience, were able to answer the questions considered essential by Bringle and Clayton (2022): "What did I learn?," "How did I learn it?," "Why does this learning matter?," "What will I do in the future in light of this learning?." However, we identify some limitations in this study, such as: how deeply the moments of reflection of this SL experience supported the centrality of reflection to make meaning from the service experiences. On the one hand, conditions were created for students to reflect on their service experiences by asking several open-ended questions. On the other hand, students may not have actually constructed meaning from experience, but only answered what they thought was expected. Moreover, the moments of reflection could have been emphasized even more, with students sharing their learning and the meaning of their service experience with each other.

Despite the perceived impact of the SL experience, some of the students did not report impact in particular aspects. Some aspects emerged in the perceptions of a minority of students, namely: the development of skills and knowledge close to the real context; the development of a critical view on the program contents; increased motivation to do volunteer work or to develop a social project; encouragement of active participation in society; and the desire to know and research more about SDGs. The SL project was developed during COVID-19 pandemic, in a period of lockdown. In this period, the face-to-face interaction with the community was limited, which may have significantly influenced the students' perceptions about the impact of the SL experience, particularly on their civic learning, as they were facing quite a few limitations in participating actively in the community. It should also be noted that the data are based on students' self-reports and perceptions, and the elaboration of their answers depends on their metacognitive ability and their level and commitment to reflection. This leads us to reflect on whether the SL project did not have an impact at this level or if, on the other hand, the

students did not perceive this impact. Another limitation of this study is the small number of participants, which may not have allowed the achievement of theoretical saturation, and self-selection of students voluntarily enrolling in a SL experience focused on SDGs. We are aware that a larger number of participants would allow a richer qualitative analysis; however, the present study was based on an SL project in which only 15 students participated. Nevertheless, with this sample of students, it does demonstrate the potential that SL can have for advancing understanding of the SDGs. Another limitation of the study is the absence of a control group, making it impossible to verify if the results were related to the SL project. Future studies could use mixed methods and combine qualitative data with quantitative data in a pre and post-test design with a control group. More investigation is needed involving the SL recipients. It would be relevant to conduct follow-up interviews with students to understand the impact of SL projects on their sustainable development and to explore how students integrate the SDGs into their professional lives.

The results supported the assumptions that programs designed based on Kolb's theory produced expected results. Given the specificities of this SL project, the research demonstrates that teaching others is a good way of learning about a topic; active learning about SDGs produced important academic and personal outcomes; providing SL opportunities to students can complement other pedagogical approaches to teaching about SDGs; student autonomy in deciding how to design the educational experiences for others is important; active learning methodologies like SL can broaden the learning objectives beyond only learning about the academic content; and students value the professional contribution that the SL experience provided.

We believe that "if students are provided with a quality education, their knowledge and skills, networks, and opportunities will support them to have a greater impact on humanity" (Jamison and Madden, 2021, p. 147). SL has this potential; therefore, it is to be continued in order to spread its impact to other university students and the community.

Data availability statement

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

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee for Technology, Social Sciences and Humanities (CETCH). The patients/participants provided their written informed consent to participate in this study.

Author contributions

LMR, CT, and HG contributed to the conception and design of the study and were responsible for data collection. LMR and FM were responsible for data analysis and interpretation of data with valuable inputs from HG. LMR, FM, and HG wrote the manuscript with valuable inputs from the remaining authors. RGB, PR, and PA made important intellectual contributions to the paper. All authors agreed on all aspects of the work and approved the version to be published.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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