

## International Service-Learning for forest fire management and employability in higher education: a qualitative research

### Service-Learning internazionali per la gestione degli incendi boschivi e l'employability nell'alta formazione: una ricerca qualitativa

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#### Abstract

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The paper introduces exploratory research that examines the effects of participation in interdisciplinary and international service-learning in forest fire management. Service-learning was interpreted as an educational device capable of supporting employability pathways within higher education. This theoretical proposition informed qualitative research that collected students' perceptions of their service-learning experience. The research findings confirm the positive relationship between service-learning participation and the development of key soft skills. Moreover, the findings indicate how service-learning participation fosters labor market knowledge and skills, and opportunities for identifying and exploring academic and professional opportunities and cultivating authentic relationships.

**Keywords:** soft skills; forest fire management; interdisciplinary approach.

#### Sintesi

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Il contributo presenta una ricerca esplorativa che esamina gli effetti di partecipazione a progetti di service-learning interdisciplinari e internazionali sulla prevenzione degli incendi. Il service-learning è qui interpretato come un dispositivo educativo capace di sostenere percorsi di *employability* all'interno di contesti europei di alta formazione. Questa prospettiva teorica è il punto di avvio di questa ricerca qualitativa che ha raccolto le percezioni degli studenti sull'esperienza di service-learning a cui hanno partecipato. I risultati dello studio confermano il rapporto positivo tra la partecipazione al service-learning e lo sviluppo di *soft skills*. Viene inoltre rilevato come questa partecipazione possa favorire l'acquisizione di conoscenze e competenze sul mercato del lavoro, per identificare ed esplorare opportunità accademiche e professionali post-laurea e coltivare relazioni autentiche utili alla pianificazione continua del proprio percorso professionale e personale.

**Parole chiave:** competenze trasversali; gestione incendi boschivi; approccio interdisciplinare.

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## 1. Introduction

The ample scientific literature on S-L indicates that it is a widely utilized training opportunity in higher education which generates positive effects on students' civic responsibility, academic commitment, learning process, self-efficacy, and personal and professional growth (Astin, Vogelgesang, Ikeda, & Yee, 2000; Smith, Sturtevant, Bullough, & Stanworth, 2019). In recent years, in response to empirical evidence and research, the scientific debate has mainly focused on the ability of S-L to promote the development of students' skills. These studies have investigated the achievement of disciplinary knowledge and skills (Hart, 2015) and soft skills (Holmes, Webb, & Albritton, 2022; Malinin, 2017), including skills related to employability pathways (Santos Rego, Sáez-Gambín, González-Geraldo, & García-Romero, 2022).

Nevertheless, the scientific community has not reached a consensus regarding the definition of S-L, which tends to vary according to the dimension or key aspect on which it focuses. Among the most widespread definitions, we find S-L understood as an experiential learning process linked to the participation of students in activities aimed at responding to the needs of a community. In this sense, S-L is qualified by the following key elements: strong connection between the activities and the academic curriculum, reflection on action and practice as a fundamental learning strategy, and reciprocity activated by social relations with and between students and all of the other subjects involved (Jacoby, 2014).

More recent definitions shift the focus from learning to the educational dimension, understanding S-L as a training strategy that combines theoretical and practical knowledge through the provision of services to the community (Pérez-Pérez et al., 2019); or a methodological perspective that combines active methods in the constructivist theoretical framework.

According to this definition, experiential learning and action at the service of a community are united in a single project which is able to link the educational dimension with practice and application in the field (Sotelino-Losada, Arbués-Radigales, García-Docampo, & González-Geraldo, 2021). Still, other definitions underline how S-L is considered an innovative pedagogical response which can provide useful stimuli for structuring personal and professional identities within the current historical-social context characterized by thorough crises that affects all human dimensions (Culcasi, 2020).

The framework briefly described above allows us to place the object of the exploratory research presented in this paper, S-L experiences, within the ongoing scientific debate. These experiences have taken place within the European project funded by the Erasmus+ program *Facing Fire: Service-Learning to improve training and employability in wildfire management in Southern Europe* (2021-ongoing). Facing Fire involves universities, research and vocational training centers, local authorities, forestry organizations, etc. of the European regions most prone to forest fires: Spain, Portugal, Italy and Greece. The overall aim of the project is to encourage social engagement among students to improve capacities in forest fire management by introducing S-L in areas impacted by wildfires. This objective is pursued through the development of international training projects that involve students from different European countries and various degree courses – (education, forestry, communication, geology and geomorphology, agriculture, chemistry, biology, engineering sciences, etc.) – in service delivery in which the academic knowledge gained is applied to generate positive change in the community and on students' employability (Ramson, 2014; Santos Rego, Sotelino, & Lorenzo, 2015). The training projects follow an interdisciplinary

and international approach, and are focused on implementing initiatives for the prevention and mitigation of fire risk and for post-fire recovery.

With regards to the training proposed, the S-L experiences engage students in real-life cases, practical experiences and specific problems in the community with the aim of increasing their disciplinary and transversal skills and developing their employability. Moreover, in accordance with a community-based educational paradigm (Naval & Arbués, 2016), the S-L projects aim to meet the needs of the community involved by way of updating and developing the knowledge and skills of all stakeholders (technical, procedural, and scientific progress). In addition, Facing Fire represents an opportunity for the partner universities to verify the conditions for institutionalizing S-L as a permanent training proposal to support students' professionalization and employability processes. This verification processes is also sustained by reflecting on the organizational methods necessary for the activation of S-L and, more generally, on the role of the university in and for society.

Starting from these premises, the paper introduces an exploratory research which aims to understand the contribution of S-L in forest fire management for students' employability and the development of disciplinary and transversal skills. This exploratory research is an integral part of a broader research project currently underway which aims to define a S-L model dedicated to the prevention and mitigation of fire risk and recovery of post-fire areas. In particular, the broader study comprises the following three research trajectories:

- rethinking S-L as an employability device;
- understanding the potential of S-L to activate institutional innovation processes in HE;
- re-imagining the role of universities in society in general.

Pursuing these trajectories means adopting a vision of S-L that goes beyond that of providing a service, including an educational service, towards a perspective that embraces the idea of education being able to enable organizational and social transformations through the promotion of active citizenship, and transversal and disciplinary knowledge and skills to face the challenges of sustainability (Sotelino-Losada et al., 2021).

In other words, the analytical perspective adopted in the study adopts the category of *training device* (Bernstein, 1990; Federighi, 2018) to read and interpret S-L experiences as employability pathways. We use this category in an analytical-descriptive way to account for the three main rules – distribution, re-contextualization and evaluation – which underly any educational experience, in order to understand its ability to guarantee access to opportunities for growth and development for the subjects involved (Bernstein, 1990). This category also makes it possible to identify the strategic elements for the training design of S-L, including focusing on the main dimensions that regulate relations – especially power relations – between the various components involved to guarantee the quality of the experience (Federighi, 2007).

Furthermore, the construct of employability defined in pedagogical terms is a process which at the individual level, includes personal growth and the development of skills as one of the key components of an *employable self* capable of navigating transitions and cultivating professional pathways (Yorke & Knight, 2003; Boffo, 2020). Engaging students in meaningful experiences and relationships via S-L activities could help them explore and articulate their professional, academic and personal paths post-graduation (Dey & Cruzvergara, 2014).

While some models of employability are based on approaches to teaching and intentionally developing components of employability within curricula and teaching practice (for example, the USEM model of employability takes into account four interrelated factors: understanding of subjects or academic disciplines, efficacy belief, metacognition and *skillful practice* using approaches throughout the whole curriculum, in the core curriculum, work-based and work-related learning and so on; Yorke & Knight, 2006), in the age of technology and in light of today's complex social-labor landscape, it is also important to emphasize the importance of relationships for developing employability (Dey & Cruzvergara, 2014).

With this theoretical framework in mind, this paper will introduce the findings related to the present exploratory study within the first of the aforementioned research trajectories that deals with understanding:

- how students perceived the effects of S-L participation on the development of key soft skills;
- how participation in S-L informed students' ideas and plans for the post-graduate transition.

## 2. Method of research

The empirical research on S-L to date suggests a positive correlation between the participation in S-L activities and the development of key soft skills, such as communication, teamwork, leadership and more (Astin & Sax, 1998; Eyler & Giles, 1999; Simons & Cleary, 2006; Bornatici & Vacchelli, 2021; Santos Rego, Mella Núñez, Naval, & Vázquez Verdura, 2021; Santos Rego et al., 2022). Previous research has also connected S-L participation to building relationships with peers, faculty and the community (Simons & Cleary, 2006; Mitchell & Rost-Banik, 2019, Bornatici & Vacchelli, 2021). In addition, S-L is a high impact learning practice (Kuh, 2008) and as such, has the potential to be influential for students' career development (Zunker, 2016).

Given this framework, the present exploratory research posed the following research question: "How do students involved with 'Facing Fire' perceive the effect of S-L participation on their employability pathways?" The research strategy selected was a single-case study (Yin, 2014) using qualitative methods. The unit of analysis was the group of university students who participated in the S-L activities of the project during the 2021-2022 academic year. Within the realm of empirical inquiry, case study research is observational in nature and allows for the in-depth investigation of a contemporary phenomenon – the case – in its real-life context, especially when a *how* or *why* question is being asked (Yin, 2014). Qualitative methods were an appropriate choice for this exploratory research which aimed at obtaining soft data rich in meaning and depth about the subjective, lived experiences of students who participated in S-L and the significance they attributed to their experience (Corbetta, 2014). Moreover, in the scientific literature reviewed, there was a precedent for using qualitative methods to investigate the impact of S-L participation on professional pathways (Mitchell & Rost-Banik, 2019).

The first step foreseen by the research design was a literature review which focused on scientific literature regarding soft skills, S-L and employability. This step helped clarify the criteria and theoretical propositions which would be used to guide data collection and analysis (Yin, 2014). Case study research "benefits from prior development of theoretical propositions" to help bound the case, and inform data collection and analysis "because

phenomenon and context are not always sharply distinguishable in real-world situations” (ivi, p. 17).

The second step was data collection via the instrument of the in-depth interview which focused on producing knowledge of the phenomenon by stimulating students’ in-depth descriptions and re-elaboration of their S-L experience. A flexible interview guide with twelve open-ended questions was developed which covered three thematic areas: background information, soft skills and employability. While the use of a flexible interview guide is considered by some social scientists as a determining factor between semi-structured interviews and unstructured or in-depth interviews, Tusini (2006) suggests that this is not always the case as a degree of structure can also be present in in-depth interviews which have a focus yet are not rigid. Such is the case of the instrument used in this research as the predetermined guide was flexible, allowed the interview to unfold in a conversational manner, posed open-ended questions and encouraged the interviewee to freely elaborate on their responses, including pursuing topics that were not foreseen by the researcher ex-ante and emerged from the subject’s description and re-elaboration of their experience (Longhurst, 2009). The interviewee’s stories, explanations, views, perceptions and evaluations of their lived experience were at the center of the researcher’s attention throughout the interview process (Bichi, 2007).

In this specific case, we could consider the instrument as an in-depth, semi-structured interview since the dialogue between the researcher and the interviewees that was facilitated through the flexible guide allowed for the discussion of certain pre-established themes, yet allowed ample time and space for the interviewee to freely narrate and re-elaborate the S-L experience that is the object of the present research.

With regards to the development of the flexible guide for the semi-structured, in-depth interview, it is important to note that within scientific literature, there is no universally agreed upon categorization of soft skills, and different entities have proposed their own versions of lists and classifications. For the purposes of this inquiry, the researchers utilized the COMGAU Generic Competency Scale as a point of reference for the operational definition of soft skills which helped formulate some of the questions posed in the second part of the interview. The COMGAU groups 17 skills into five competency groups and is related to micro, meso and macro dimensions of employability (Regueiro, Rodríguez-Fernández, Crespo, & Pino-Juste, 2021). These resources were developed within the context of research projects on S-L, employability and higher education coordinated by researchers of the ESCULCA Research Group at the University of Santiago De Compostela.

The third step consisted of computer-assisted data processing and analysis utilizing ATLAS.ti, a software which assists with qualitative data analysis. Interviews were recorded and transcripts were inputted into the software. The coding and code manager functions were utilized to analyze and tag the data whereas the comments and memos functions were used to annotate the data with research notes and observations. The responses were loosely categorized into three macro-categories before the coding process began. These macro-categories are background information, soft skills and employability, corresponding to the thematic groups covered in the semi-structured, in-depth interview which served as a first form of data classification. In most cases, codes for the data were derived from the interview questions, themselves informed by theoretical propositions and scientific literature (top-down approach). In some cases, however, codes emerged from the interviews (bottom-up approach), utilizing scientific literature when appropriate to help

accurately identify and name the code. The coding was done line by line, paying attention to explicit and implicit references.

### 3. Research Results

For this exploratory research, nine university students who participated in Facing Fire S-L activities in the 2021-22 academic year were interviewed between October and November 2022. The interviewees were identified with the help of professors who serve as faculty supervisors of the S-L activities. The sample included students from three European universities who are partners in the project:

- the University of Florence (3 students);
- the University of Santiago De Compostela (3 students);
- the University of Athens (3 students).

The sample represents approximately one fifth of S-L participants as of November 2022 (the project will conclude in August 2023). There was a 2:1 representation of males to females in the sample (also note the overrepresentation of males in forestry and STEM fields) and the median age was 23 ½. Given the interdisciplinary nature of the S-L implemented in the context of Facing Fire, the sample included students from diverse areas of study: forestry and agriculture (4), geology and geomorphology (3), biology and chemistry (1), and education science (1).

The analysis generated 44 codes corresponding to three code groups and 358 quotations (Figure 1). The code groups correspond to the three macro-categories of the flexible interview guide (Figure 2).

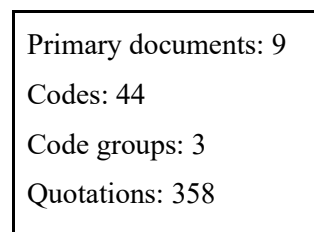


Figure 1. Analyzed documents.

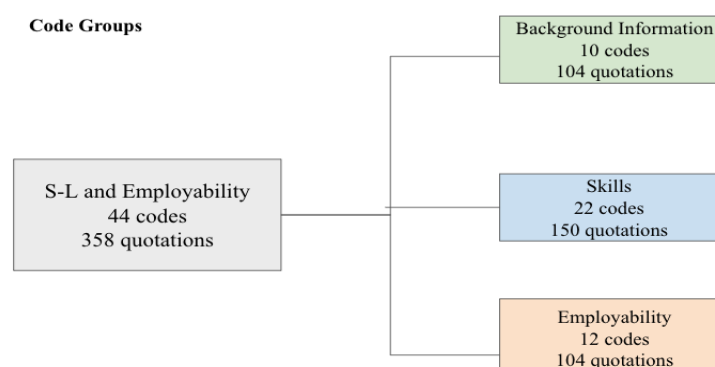


Figure 2. Code Groups.

The first part of the interview was dedicated to obtaining general data on the S-L experience, as well as stimulating recall and critical reflection as part of the semi-structured, in-depth interview process. In terms of background information, it emerged that the majority of the sample had undertaken at least one previous work and/or volunteer experience prior to participating in S-L activities. Data also was collected on the type of S-L activities that the sample participated in. Direct, Indirect, Advocacy and Research S-L (Berger, 2003) were detected in the responses as well as Planning (Tapia, 2020), in which students were engaged with stakeholders and participated in the design and planning of the project. Research-based activities had the greatest frequency in the data. In research-based S-L, students collaborate with professors and university stakeholders on research aimed at gathering and analyzing information on problems and topics relevant to public interest with the goal of helping the community improve their response (Berger, 2003). Examples of actions detected in the interviews include qualitative and quantitative data collection about the community's response to fire events via interviews and questionnaires, and field surveys of fire-affected areas. In addition, all of the informants reported an international experience or dimension to the S-L activities.

The second part of the interview focused on students' perceived skill gains as a result of S-L participation. Students were asked to reflect generally on perceived gains in terms of soft skills and subject-specific learning outcomes. Then, students were asked about perceived skill gains in relation to the five competency groups from the COMGAU Generic Competency Scale: leadership ability, interpersonal skills, intercultural ability, digital collaborative skills and analysis and summary skills (Regueiro et al., 2021). Whereas these codes were largely derived from theory and previous research (top-down approach), it is also important to highlight the two codes which emerged from the data (bottom-up approach), namely training needs self-analysis and interdisciplinary vision (Figure 3).

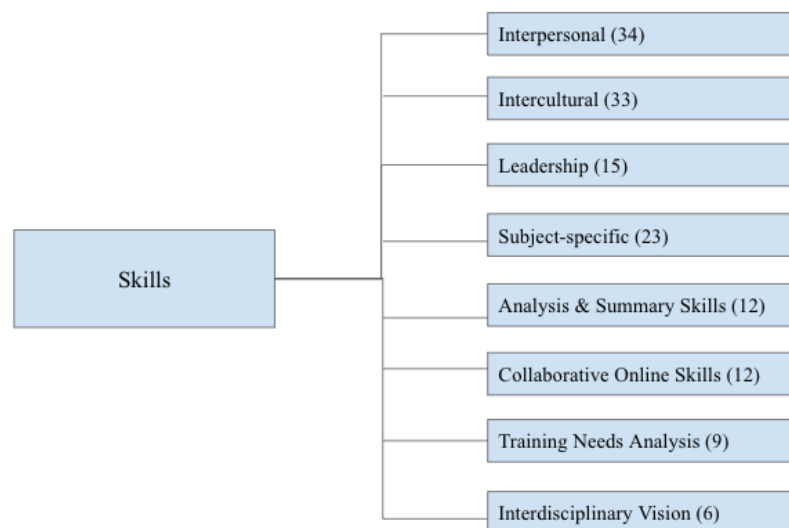


Figure 3. Skills code group frequencies.

The competency groups with the highest frequencies were interpersonal and intercultural skills. According to the COMGAU Generic Competency Scale mentioned previously, the interpersonal skills group is comprised of skills related to social interaction: oral and written communication, the ability to negotiate effectively (including in teamwork

settings), and the ability to present products, ideas and reports in public (Regueiro et al., 2021; Santos Rego et al., 2022). Intercultural skills refer to “basic general knowledge (general culture), the ability to write or speak in other languages, the ability to work in an international setting, and knowledge of cultures and customs in other countries” (Regueiro et al., 2021, p. 14). Many responses referenced working in groups characterized by members of diverse disciplinary and country backgrounds as the stimulus for perceived gains in interpersonal and intercultural skills. For example:

- “Sometimes we have different perspectives about the same subject. Here [in my country] we always do the same activities and we know how it works. In my team, I listened to others and other activities and ideas, and I had never thought about that. They can work”;
- “We had to communicate with people from other countries and give a speech in English, and communicate with them in English. It forced us to use a different language and I feel quite confident”.

In addition, the data indicated self-reported gains in subject-specific knowledge and skills. The subject with the highest frequency was forestry, however, educational sciences, biology, chemistry and geology were also detected.

In terms of the codes which emerged from the data, training needs self-analysis was detected in reference to students utilizing and reflecting upon the S-L experience to identify personal learning and training gaps. Many of these were centered around foreign language communication abilities. Interdisciplinary vision can be classified as a skill in that it involves the ability to cultivate and put into practice a shared vision with group members “with largely non-overlapping training and core expertise to solve a problem” which is not solvable by a single scientific approach (Cech & Rubin, 2004, p. 1166). Moreover, interdisciplinary vision implies that the team is integrated, can communicate openly, and that the group members and project itself are enriched by diverse perspectives (Prokopy et al., 2015). Interdisciplinary vision was detected in six instances; however, it deserves mention among the findings because, according to experts in the STEM and adult education fields, interdisciplinary science/vision/collaboration is key to solving complex socio-environmental problems in the 21st century (Goring et al., 2014; Prokopy et al., 2015; Galeotti, 2020). The following statements are examples of interdisciplinary vision detected in the data:

- “We were used to our team in our subject, and then we moved to another completely different atmosphere with [forestry] engineers, education students, etc. and it was good to see different points of view and to learn skills of how to socialize or how to express our opinion and see different types of views”;
- “It’s [the problem of wildfires] more social, something that us foresters... I mean, it’s not just forest management [...] but a human aspect. It’s not that you manage the forest by cutting certain plants or not, but you manage it also by working with people who live nearby and analyzing aspects from diverse angles”.

The third and final portion of the interview focused on investigating the perceived effect of S-L participation on students’ knowledge of the labor market, academic and professional plans, and ideas about the connections between university and the world of work (Figure 4). The data indicated that students increased their knowledge of professions related to their fields of study via direct and quality interactions with professionals during S-L activities. The professions in question were mainly non-academic, however, some students indicated learning about academic professions such as university professor and researcher. S-L also provided students with an opportunity to learn general information about the labor market



in relation to their field of study and area of interest. Exposure to the world of work and knowledge of professions occurred during formal and informal interactions in the field and during research-based activities. It is important to note, however, that the perceived gains were not detected universally. Some students reported that knowledge of the labor market obtained through S-L activities did not represent new information or was not in line with their field of study and/or personal interests.

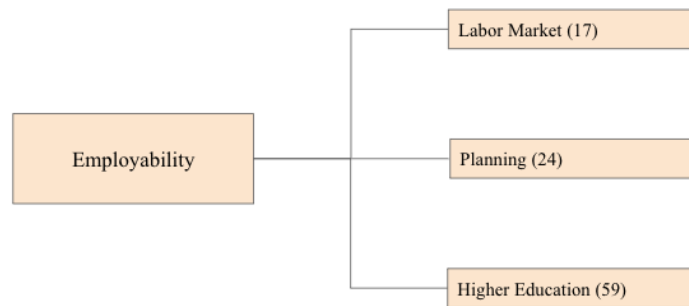


Figure 4. Employability code group frequencies.

The data also indicated that S-L participation had an effect on students' academic and professional planning. Examples of S-L affecting students' academic plans included developing research interests and topics for their final degree project, orienting their choice of future study paths and pursuing internships in line with the S-L topic. In terms of professional plans, the data gathered indicates that S-L participation helped students clarify and develop ideas about professional pathways that could satisfy their academic, professional and personal interests. Other students had already taken more concrete steps at the time of the interview, such as applying for internships and pursuing additional professionalization opportunities in forest fire management.

Finally, students indicated that participating in S-L helped them form relationships with professors, professionals and peers. An analysis of the data suggested that students are using or plan to utilize this network as a resource for obtaining guidance, advice and support to realize their future plans. As one student who is preparing to continue on to further study reported, "I keep in contact with some of the experts and professors that taught us and they are helping me." Moreover, several students stressed during the interview that S-L represented the first known opportunity within their degree program (aside from internships) which allowed them to engage with a professional sector associated with their field of study. One student noted that for his course, for example, internships are available but are not mandatory. Other students reported that their program foresees hands-on exercises in the field connected with technical subjects (field surveys or on-site investigations), however, these activities are conducted as a class group without interactions or involvement of professionals, and thus do not represent a possibility to gain direct knowledge of labor market possibilities from privileged informants and/or establish relationships with potential employers.

Indeed, the data revealed that students had many ideas about the importance of cultivating connections between higher education, the labor market and the community or social sector. An analysis of the data revealed that students had a positive impression about the

potential of S-L to serve as a device for both improving training outcomes within courses of study and providing guidance. Two examples from the interviews are:

- “Between academics and the application of this knowledge there is a world between and no one really teaches you how to take your knowledge and apply it to something real. I think with this connection you can have better professionals”;
- “In the last year of a bachelor’s degree it [S-L] allows students to make a more informed choice of master’s degree. It’s one thing to read about the courses that you will have to take. It’s another thing to experience the professional realities of that speciality. That allows you to have more knowledge and information”.

These reflections were, in many cases, directly connected with criticisms students had of their higher education experience when it comes to preparing graduates for professional realities: “At the end of the day, if you don’t want to do research and become a professor, the purpose of university is to find work. So if the university only gives you competencies without introducing you to the world of work, in my opinion, it has gotten something wrong”.

The data also revealed that while students perceived S-L as a beneficial educational device for professionalization and guidance, more synergy is needed within the university to offer these opportunities and communicate them to students.

Finally, students were asked to reflect on the strengths and weaknesses of the S-L experience. In terms of strengths, the responses highlighted the following:

- the interdisciplinary nature of the S-L activities and added value of working with peers from different academic and national backgrounds in terms of improving soft skills like communication and collaboration;
- the possibility of connecting theory with practice, and investigating the topic of forest fires and risk mitigation more in depth compared to what is possible in the classroom;
- direct contact and exposure with professionals who work in the field of forest fire management.

In terms of perceived weaknesses, the responses highlighted communication challenges between students and professors and obstacles in obtaining formal recognition of their S-L participation within their course of study. Students connected these challenges to the novelty of S-L within their university context and the need to improve guidelines and procedures.

#### **4. Discussion**

As mentioned previously, the research on the effects of S-L has demonstrated a positive relationship between participation in S-L and the development of key soft skills. This result is also confirmed by our research, according to which students indicated that they had achieved learning related to the five generic skill areas defined by COMGAU: leadership skills, relational or interpersonal skills, intercultural skills, digital collaboration skills, analysis and summary skills (Regueiro et al., 2021). Our research findings are also in line with what was observed in previous studies about the positive effect of S-L on academic learning and social capital (Santos Rego et al., 2018). The skill areas detected are linked to the clear pedagogical approach adopted in the design of the training experiences which assumes the S-L as an employability device.

In addition, the added value of our research is that it highlights two other areas of skills, interdisciplinary vision and self-analysis of training needs, which have not yet been mentioned in the sector literature or in previous studies dedicated to training gains related to S-L participation (Smith et al., 2019).

With respect to interdisciplinary vision, it is important to emphasize the presence of different disciplines working together on S-L projects to tackle the issue of forest fire management from multiple points of view. Integrating diverse perspectives and approaches led to a variety of activities including technical interventions in fire-affected areas, community education and training of specific target groups, and the analysis of needs and resources available for planning and future action.

The significance attributed by students to acquiring interdisciplinary vision included being able to pair their technical background with an improved ability to work collaboratively with communities affected by environmental problems due to an enriched perspective which embraced both technical and social dimensions. These findings seem to relate to the research by Mitchell and Rost-Banik (2019) which suggests that S-L can contribute towards preparing students for meaningful professional pathways, especially in lines of work which involve actively working for the public good, as is the case with professions associated with fire risk management and mitigation.

Overall, the study confirms the positive relationship between S-L participation and employability with regards to the development of soft skills required by the labor market, and for acquiring knowledge and skills related to the contexts and areas of future employment. The potential of S-L to foster students' ideas and plans for the postgraduate transition is also connected with the capacity of self-analysis of training needs related to their own professional development.

This aspect introduces a new element to the reflection on S-L which does not seem to emerge from previous research that has collected the perceptions on the skills acquired through S-L participation (Omar, Md Khambari, Ma'arof, & Razali, 2022; Paul, Abdullah, & Liaw, 2022; Salam, Awang Iskandar, & Ibrahim, 2019; Santos Rego et al., 2022).

With regards to the limitations of this study, it is important to underline how the small number of interviews can be a critical issue even if partially overcome by the type of research realized and the orientation towards soliciting in-depth details, narrations and peculiarities of the training experience lived by the interviewees.

Finally, in terms of future research developments, the study presented in this paper is part of a larger study currently underway which aims to understand how S-L training experiences affect the organizational dimension of degree courses and redefine the role of universities within society.

## **5. Conclusion**

The S-L experiences carried out within the European project Facing Fire offer a window into understanding and deepening the educational and transformative potential of this device to build professionalization pathways and to renew the role that HE can have for society as a whole (Bringle, Santos Rego, & Regueiro, 2022). A significant aspect highlighted by this research is the participants' acquisition of awareness of the social value linked to their future professions and academic studies. Using the words of an interviewee: "I think universities must train technical professionals with a very precise social vision. I

think more and more we are realizing that it's not enough to remove the problem after a fire event occurs. We must understand the structure that allows this to continually happen year after year. And this is the role of the universities, to train us for that. We need professionals, but with interdisciplinary vision about their subjects.”

This dimension opens up opportunities for S-L to help redefine and redesign the relationships between universities and territories. These opportunities would offer students experiential learning and mechanisms to connect theory and practice (as noted by the literature on S-L), as well as avenues to pursue a collaborative and community-based engagement of stakeholders for facing complex socio-environmental challenges such as fire risk prevention and mitigation (Păunescu, Lepik, & Spencer, 2022).

Moreover, the participation of subjects external to the university institutions in the development of S-L projects necessitates further exploration of how the implementation of this educational device can serve as a product of inter-professional collaboration (Lotti & Orlandini, 2022) and of multi-agency work (Forbes, 2018).

A further aspect which emerges from the study is the need for skills of an educational nature within the professions related to forestry, especially to help activate effective strategic outreach, community engagement and education processes of citizens.

These are some of the key points of departure from which to define an interdisciplinary S-L model in forest fire management, which is the final output foreseen by “Facing Fire” and the research carried out in within the project.

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