

E-Service-Learning in Higher Education: Modelization of Technological Interactions and Measurement of Soft Skills Development

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Abstract

Current higher education policies require universities to prepare students for integration into an ever-changing society where knowledge and hard skills rapidly become obsolete. Soft skills are the new alphabets of the 21st century. Service-learning is a pedagogical approach that has positive effects on soft skills development. What about its virtual version, e-service-learning (e-SL)? Can students develop soft skills through technology? This research closes the literature gap on the potential benefits of e-Service-Learning Hybrid Type II during the pandemic scenario. This study also presents a new categorization of technological interaction types in e-SL related to students' skill levels. The findings provide insights into the benefits of e-Service-Learning Hybrid Type II as a suitable strategy for students' personal skills development in leadership and self-evaluation. Our results also show how e-service-learning is useful in raising students' awareness of the soft skills they need for their future professional careers.

Keywords: Service-learning, e-service-learning, soft skills development, higher education, active learning



The higher education system is the primary site of free training and research and is a place of learning and critical development of knowledge. In the Italian context, where the present study was carried out, the higher education system is divided into two functionally different sections, the university sector and higher education for arts (e.g., music or dance). Despite some differences, all these institutions share an essential feature: new 21st century policy guidelines for students' educations. The prominent change in higher education policies, both nationally and internationally, requires universities not only to educate students in knowledge-based specializations, but also to pursue an integral education of the individual in relation to the cultural and social context (High Level Group, 2013). Indeed, according to Cinque (2016), based on the dramatic current global and social changes,

it is important to develop and implement useful teaching and training methodologies to promote students' attitudes and behaviors needed to fulfill and deal with the present challenges (e.g., today's varied and unpredictable career paths). In recent years, the European Higher Education Area (EHEA) has also pioneered a significant change in the knowledge paradigm, shifting the focus from academic disciplines to the development of skills related to the real world in which the student grows both professionally and as a citizen (Escofet & Rubio, 2019). Thus, according to Cornalli (2018), higher educational institutions are faced with a complex teaching challenge, that is, to prepare students for integration into an ever-changing society where knowledge and hard skills rapidly become obsolete.

However, according to Hernández-Barco et al. (2020), this educational scenario is still too distant from the daily reality. Indeed,

universities' courses are mainly based on content transmission instead of offering programs aimed at developing metacompetences and personal and social skills. In line with this reality, Cinque (2016) pointed out the necessity for European universities to focus not only on the teaching of traditional scientific and professional skills, but also on the soft and complementary ones. This evidence highlighted the importance of opting for alternative teaching methodologies that enhance the active role of students during the learning process in order to allow them to grow as future professional citizens. This study will explore the pedagogical potential of the service-learning (SL) approach, considering the challenges imposed by the Covid-19 pandemic. Indeed, the research investigates the application of SL in the digital environment, known in the literature as e-service-learning (e-SL; Waldner et al., 2010). The goal is to close the literature gap on how to develop soft skills in university students and to determine precisely the role of e-SL in promoting this development. We also present a possible modelization of interaction types that technology can fulfill in e-SL, related particularly to students' skill levels.

A Necessary Assumption: Soft Skills and Active Learning Methods

The definition of “soft skills,” also called “transversal skills,” has been heavily debated in the research field (Chamorro-Premuzic et al., 2010). Even so, no singular definition of the term exists, so that, in Europe, soft skills are interpreted differently from country to country (Carlotto, 2015). For the present research, by *soft skills* we mean “a dynamic combination of cognitive and

meta-cognitive skills, interpersonal, intellectual and practical skills. Soft skills help people to adapt and behave positively so that they can deal effectively with the challenges of their professional and everyday life” (Arnold et al., 2020, p. 60).

This definition is based on the European project ModEs (Haselberger et al., 2012) and was developed in the European projects eLene4work (2015–2018) and eLene4Life (2018–2021). The eLene4Life Soft Skills Framework (eLene4Life, 2019, p. 6; Cinque, 2017) takes into account four clusters of skills as represented in Figure 1 (for more details about the definitions of each soft skill, see <https://elene4life.eu/project-outputs/trans-analysis-he/>).

Soft skills not only have a problem of definition, but their assessment might also be difficult. According to Pellerey (2017), the difficulty is in defining soft skills operationally so that they can be assessed. For example, although several methods have been implemented in order to measure soft skills (performance tests; e.g., Kyllonen, 2016), according to Chamorro-Premuzic et al. (2010) and based on the available literature, the self-report measures are still the most used tool in this regard. Despite the above-mentioned critical points, soft skills are crucial in the university's new mission. Teaching soft skills requires active learning methodologies that are based on the idea that students learn better if they actively participate in their own learning. The focus is on how to learn rather than what to learn, placing the learners at the center of their learning process (Center for Educational Innovation, 2014). Furthermore, according to Kechagias (2011), the best way to teach

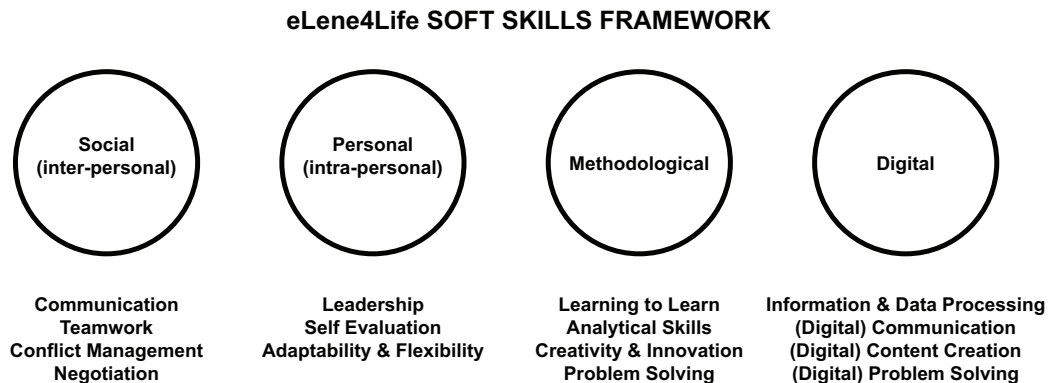


Figure 1. eLene4Life Soft Skills Framework.

soft skills is by mixing them with technical hard skills. Indeed, even if it represents a challenge, this approach increases the odds of perceiving soft skills as more relevant, consequently increasing the motivation to learn them.

Service-Learning

Definitions and Theoretical Frameworks

The literature defines SL as a pedagogical approach based on experiential learning (Salam et al., 2019; Sparkman et al., 2020) particularly successful for the development of the human being in all his/her dimensions, valuing the empowerment of the subject who actively contributes to the construction of both her/himself and the community in which s/he lives (Selmo, 2018). SL, which has been spreading around the world since the end of the 1960s, has its roots in the civic concern of John Dewey and in Paulo Freire's concept of transforming the world through reflection and action. These two authors are frequently cited, as the educational process is composed of actions and reflection, of theory and practice (Deans, 1999). Since the beginning of the 21st century, SL has also been spreading in Europe thanks to the work of national and international networks such as the European Association of Service-Learning in Higher Education (EASLHE), founded on 21 September 2019 in Antwerp on the occasion of the Second European Conference of Service-Learning in Higher Education.

As a result of this widespread popularity, it is difficult today to find a common definition of this approach; indeed, as reported by Albanesi et al. (2020), SL has been defined as a pedagogical concept, a learning technique, an experience, and a philosophy, as well as a pedagogy and social movement. According to Whitley et al. (2017), in the last two decades, the most commonly cited definition of SL is that of Bringle and Hatcher (1999):

a course-based, credit-bearing educational experience in which students participate in an organized service activity that meets identified community needs, and they reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the academic discipline, and enhanced sense of civic responsibility. (p. 180)

According to Butin (2010), this definition is considered a model by several scholars because of its balanced and meaningful linking of service and learning components.

Regardless of the definition, according to Escofet and Rubio (2019), SL allows practitioners to overcome educational institutions' dichotomies, in which theory and practice, classroom and reality, training and commitment, and cognition and emotions are usually clearly discerned elements. Specifically, in its application, SL can be defined as an active-experiential learning method. According to Kolb's (1984) Cycle of Experiential Learning, students understand better when they experience four phases of learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. As stated by Ahmad et al. (2014) and Whitley et al. (2017), Kolb's model clearly contains a situation where students actively interact with the environment. In this way, the learning is characterized by reflection, action, and experience, to (ideally) integrate new learning within prior constructs. Similarly, SL creates a learning environment in which learners apply their skills and knowledge to do something meaningful and thus confer added value on their learning. In order to evaluate the impact of SL projects, it is necessary to consider the level of interest—that is, students' learning—instructional organization impact, and/or community impact (Holland, 2001). Several tools might be used, ranging from questionnaires and interviews to reflective journals (Caspersz & Olaru, 2017). However, as Caspersz and Olaru have observed, given the several components that are generally involved in SL projects, it would be beneficial if scholars start to analyze all the previously mentioned levels.

Instructional Design and Service-Learning Models

From a functional point of view, there are several models that guide the development of SL-based courses in order to ensure an effective learning experience (Cinque & Culcasi, 2021; Sparkman et al., 2020). Models can be distinguished on two levels: institutional and instructional (see Figure 2). As regards the institutional one, two models of SL can be highlighted: bottom-up and top-down. In the bottom-up SL

model the students choose both the social needs and the activities they want to focus on (connected to their degree courses competences) and contact community partners in order to carry out their project. In the top-down SL model, the university offers a prestructured project in collaboration with a community partner, in which students can participate and be directed in service activities that already have curricular connections to their degree courses (Culcasi, 2020).

As regards the instructional level, a common model is the one developed by the University of Maryland, called the P.A.R.E., which stands for preparation (analyzing community needs and identifying partners), action (designing solidarity actions with stakeholders), reflection (reflecting on the activities and on what they are learning), and evaluation (measuring the impact of the project; Commuter Affairs and Community Service, 1999). Sparkman et al. (2020) stated that these four components result in positive outcomes for both the student and the community. In Europe, and more specifically in Italy, the SL instructional model developed by Tapia (2006) of the Centro Latinoamericano Aprendizaje y Servicio Solidario (Latin American Center

for Solidarity Service-Learning; CLAYSS) is commonly used (Culcasi & Cinque, 2021; Fiorin, 2016). This model describes five steps and three transversal processes for the development of a SL project. The five steps are

1. *Motivation.* The students are introduced to SL and are asked to take an active role. It is fundamental to make them aware that it is not a top-down educational proposal but a project to be built together, starting from personal and community needs. Moreover, the motivation is not only individual, but also institutional.
2. *Diagnosis.* Students analyze the needs of the context and choose the problem to focus on, considering both causes and consequences. In this phase, it is essential to engage local stakeholders, in order to involve the community in the problem-solving process.
3. *Planning.* Solidarity actions are developed in collaboration with the community, and both service and learning objectives are defined.
4. *Execution.* This is the operational phase

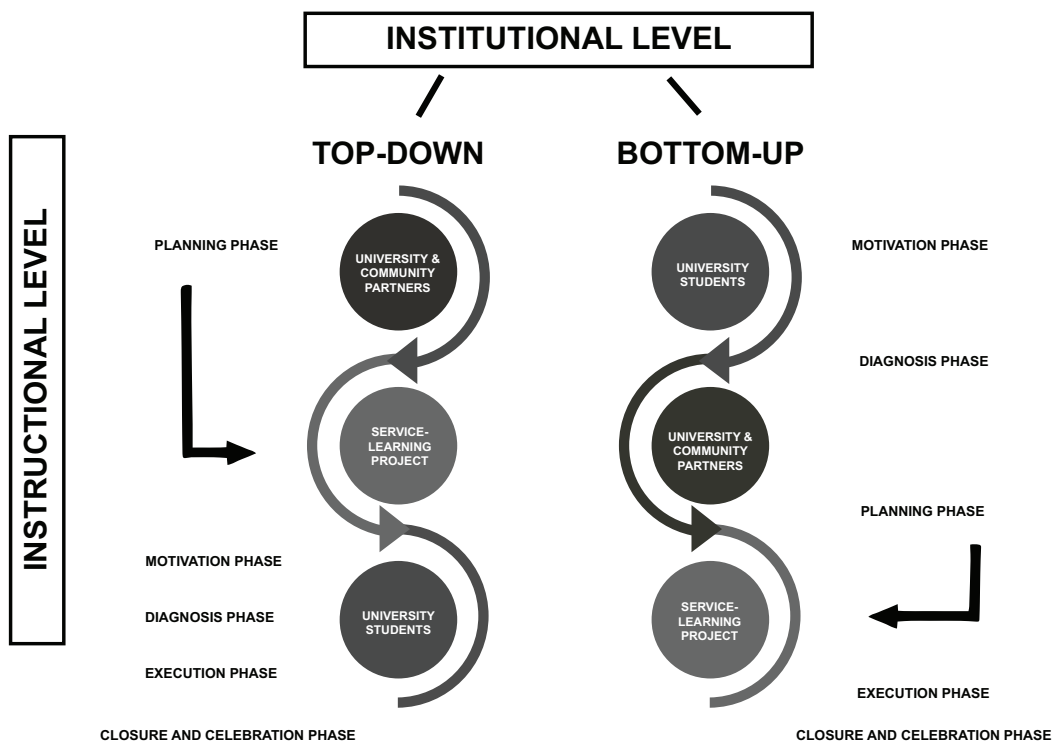


Figure 2. Service-Learning Development Models: Institutional and Instructional Levels in Comparison.

where the collaborations activated with the local partners are implemented and the service activities are carried out according to the preestablished objectives.

5. *Closure and celebration.* A reflection and evaluation of the project in terms of both learning and service objectives is made. A celebration is organized to disseminate the results and thank those who participated.

Following these steps for developing a SL project, other transversal processes need to be considered, such as reflection. As asserted by Furco (2009), reflection is the factor that transforms an interesting and challenging experience into a significant, impactful experience for students' learning and development. In other words, SL is not simply a pedagogy of "doing"; instead, it is to be understood as reflection-based learning, in which reflection helps students connect theory and practice. Indeed, it must be remembered that experience in itself neither involves learning nor is educational (Talavera & Perez-Gonzalez, 2007). Thus, not taking care of the reflective dimension means performing SL in which service and learning are present but remain two distinct and separate actions in which learning could remain superficial (Consegnati, 2019).

e-Service-Learning

Rethinking the Model in the Pandemic Scenario

Due to the Covid-19 global pandemic, most higher education institutions translated their traditional courses to virtual learning courses (Culcasi et al., 2022). This scenario, which saw many faculty members uncomfortable in moving their courses online due to a lack of educational technology training

(Hollander et al., 2020), posed challenges that are still relevant in the new context in which distance and face-to-face teaching are integrated in a useful and flexible way. Higher education institutions are asked to maintain the high-quality delivery of instruction. Researchers in educational technology emphasized that when the three types of typical educational interaction—"student-content," "student-student," and "student-learner"—are meaningfully integrated, learning outcomes increase (Albanesi et al., 2020; Bernard et al., 2009). Thus, the teacher's task in planning learning includes the identification of digital tools to support teaching, and the choice of didactic methods to ensure interaction in the digital dimension. In this scenario, it is essential to move away from the transmissive teaching perspective and design paths based on active learning through technological mediation (Cinque & Culcasi, 2021). In this regard, e-service-learning provides many opportunities, because it offers an experiential praxis in which students are involved, by the technology in civic inquiry, in reflections and actions, collaborating with the community (Albanesi et al., 2020). Stefaniak (2020) noted that the number of studies exploring the use of e-SL as a pedagogical strategy in distance education has increased considerably. According to Waldner et al. (2012) and Manjarrés-Riesco et al. (2020), e-SL is a "Service-Learning course mediated by Information and Communication Technologies (ICTs) wherein the instructional component, the service component or both are conducted online, often in a hybrid model" (Albanesi et al., 2020, p. 23). Waldner et al. (2012) also identified a total of five SL types, including three hybrid models, classified according to the "place"—in-person or online—where the instruction and the service components occur (see Table 1).

Table 1. Types of e-SL in Waldner et al., 2012

	Traditional SL	e-SL Hybrid Type I	e-SL Hybrid Type II	e-SL Hybrid Type III	Extreme e-SL
Service component	In-person	In-person	Online	Blended	Online
Instruction component	In-person	Online	In-person	Blended	Online

Considering only the e-SL areas (from e-SL Hybrid Type I to Extreme e-SL), we can observe that digital technologies can be included in different ways. According to García-Gutiérrez et al. (2020), two modes of interaction can be highlighted, defined from the role that technologies play within the project. In the first case (relationship-based e-SL), technology plays an instrumental role because it facilitates and optimizes project development, whereas in the second case (service-based e-SL), technology can also be the objective of learning or service. However, García-Gutiérrez et al. did not consider the various roles fulfilled by technology and digital devices, nor the students' digital, personal, and social skill levels. Thus, in our vision, this model can be expanded, considering the different roles played by technology and digital devices in e-SL and students' level of digital, personal, and social skills. Therefore, we suggest a categorization based on four types of technological interaction (Figure 3):

1. *Instrumental channel-type technological interaction.* Technology is the e-SL instrumental channel. Thus, technology is basically the medium in order to implement the SL project. Students do

not need to have any particular technological knowledge. An example could be psychology students who learn assertive communication becoming peer educators of vulnerable people, using the laptop to conduct their meetings.

2. *Integrated channel-type technological interaction.* Technology is the e-SL integrated channel. The technology remains the channel of the SL project but requires digital knowledge. For example, a group of education students creates teaching activities suitable for distance education and disseminates them via social media.

3. *Instrumental objective-type technological interaction.* Technology is the e-SL instrumental objective. Thus, technology is the SL project's objective, but it does not include the creation of new technological tools. Specifically, students learn how to use existing technological tools related to their future professional sector, and they use them to provide a service for the community. For example, a group of communication students learn how to design a strategic communication campaign, developing one

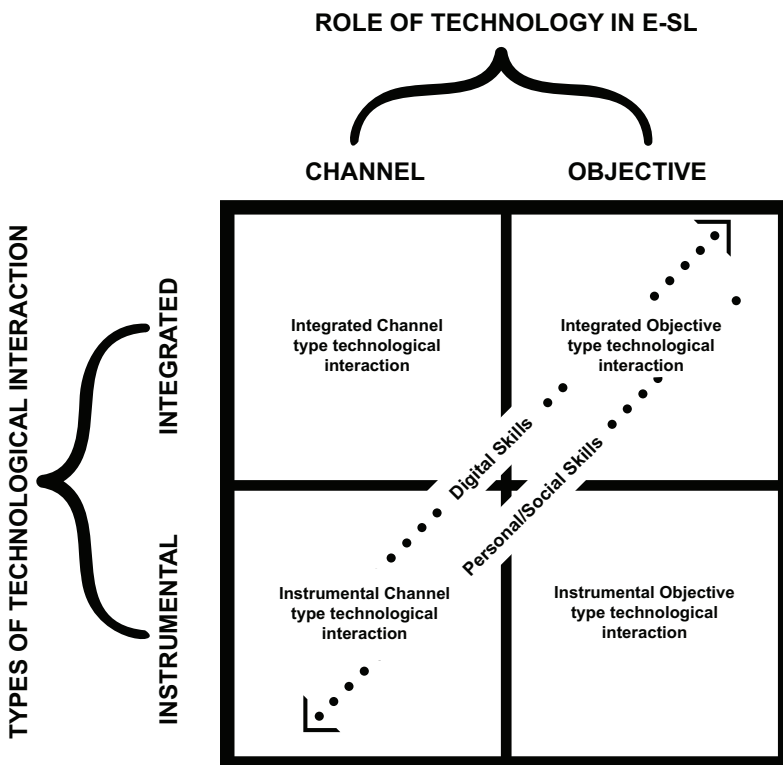


Figure 3. Types of Technological Interaction in e-SL.

for a nonprofit organization.

4. *Integrated objective-type technological interaction.* Technology is the e-SL integrated objective. Thus, technology is the SL project's objective, including the creation of new technological tools. An example could be a group of students taking a master's-level course in sustainable engineering and management designing software to create virtual models of sustainable housing.

Comparing this categorization with that of García-Gutiérrez et al. (2020), in the first type of technological interaction, we suggest that students' personal and social skills are the most important while technological skills are not essential. On the other hand, in the last type of technological interaction, we suggest that students' personal and social skills may be minimal while technological skills are paramount. Using SL as an educational modality, the technological mediation must always be subordinated to the pedagogical goals. As trainers, it is therefore important to always promote a humanistic approach; consequently, technology is only a medium and should always foster solidarity and its social function (Albanesi et al., 2020).

The Potential Benefit of (e-)Service-Learning on Soft Skills Development

At an international level, several studies have demonstrated that SL is a teaching/learning strategy that has a positive impact on students' development, even beyond the improvement of technical knowledge and skills related to the degree course (Brozmanová-Gregorová et al., 2019; Culcasi et al., 2021; Furco & Root, 2010). In particular, several research studies have highlighted that SL can have significant positive effects on soft skills development in all four areas concerning social, personal, methodological, and digital skills. Some researchers have also pointed out a positive impact on social skills, such as communication (McNatt, 2019), teamwork (Hébert & Hauf, 2015), conflict management (Khatani & Liu, 2020), and negotiation (Deeley, 2014). Regarding personal skills, scientific literature reports benefits in terms of leadership (Hébert & Hauf, 2015), self-evaluation (Lai & Hui, 2018), and adaptability and flexibility (Sanft & Ziegler-Graham, 2018). As far as methodological skills are concerned, evidence supports significant and positive effects on learning to learn, analytical

skills, creativity, and innovation and problem solving (Marcus et al., 2019). Finally, although less explored, digital skills can be developed through SL, namely digital communication (Brozmanová-Gregorová et al., 2019) and digital content creation (Marcus et al., 2019). Research indicates that all soft skills play a significant role in human lives; however, it is noteworthy to understand that some of them seem to be more relevant than others. For example, according to Deeley (2014), self-evaluation is valuable as an employability skill and is also vital to lifelong learning. Moreover, the job outlook survey (National Association of Colleges and Employers, 2014) indicated that this is the skill most desired by employers; furthermore, effective leadership is strongly related to team skills, communication skills, and problem-solving skills.

For these potential benefits, in recent years many universities have been implementing SL for soft skills development (McNatt, 2019). The pedagogical background and the purposes might be different, for example, to provide an integral holistic education (Hernández-Barco et al., 2020), to improve students' employability (Deeley, 2014), or to implement the civic engagement of the university, known as the Third Mission (Goslin et al., 2016). Nevertheless, according to McNatt (2019), among the five categories of existing studies on SL—namely conceptual studies, literature reviews, normative studies, research focusing on the perceptions of SL project participants, and research on the benefits of SL—the category studying benefits is the smallest and often produces inconsistent results. Therefore, more research is needed in order to better highlight the effects of SL on soft skills and positive student development. Furthermore, the above-introduced results refer to traditional SL (Waldner et al., 2012), indicating that the impact of e-SL on soft skills development is not widely explored. Although e-SL maintains the same pedagogical aims as traditional SL, it presents a new educational setting, different modes of solidarity service, and new ways of interacting with community partners, colleagues, and instructors.

Aims and Hypothesis

Based on the above assumptions, in the present study we take into account e-SL, specifically e-SL Hybrid Type II (Waldner et al., 2012). The aim of the study is to in-

investigate whether students who participate in e-SL develop soft skills and whether e-SL can be relevant for their future employment. In particular, we are interested in understanding whether soft skills development occurred despite the adaptation of SL to the digital dimension during the pandemic. The sample of our study consists of students from different courses attending a 9-month service-learning lab. Therefore, the SL projects are not linked to a specific discipline. Regarding technological interaction, the e-SL projects considered in this study can be classified in the category of “instrumental objective.”

Based on several previous studies (e.g., Hébert & Hauf, 2015; Lai & Hui, 2018) that highlighted SL’s positive impact on soft skills development related to personal skills, we hypothesized that e-SL would have an impact at least on these soft skills (H1). Moreover, since the SL activities were carried out online—e-SL Hybrid Type II—with an instrumental objective-type technological interaction, we also expected an increase in the digital soft skills area (H2).

Method

Participants and Procedure

Participants were 46 university students (85.1% female) aged between 21 and 34 ($M = 24.66$, $SD = 2.84$), attending the following degree courses: psychology (61.7%), education (27.7%), and marketing communication (10.6%). Originally, the SL projects should have been carried out in person; however, because of the Covid-19 pandemic, they were transformed into online formats. Thus, the projects can be considered e-SL Hybrid Type II, because the instructional component took place in person and the service was online (during the Covid-19 pandemic). The 9-month Service-Learning Lab program is based on the bottom-up model and included five 2-hour training meetings between October and November 2019 and 40 hours of reflection and service activities from March to May/July 2020. In these first five face-to-face training meetings, the students were introduced to SL pedagogy and developed the phases of motivation, diagnosis, and planning (Fiorin, 2016). Solidarity service activities (execution) and project closure (closure and celebration) took place online. The reflections took place in a synchronous online format, guided by the instructor in small groups, and were also supported by

discussion groups on WhatsApp.

The SL projects carried out covered the following areas: educational support (52.4%), well-being promotion (16.7%), solidarity and cooperation (14.3%), active citizenship (7.1%), promotion of human rights (7.1%), and environmental protection (2.4%).

The present study adopted a longitudinal design because we asked participants to complete an online questionnaire before (T1) and after (T2) the SL Lab. We chose to adopt this study design using a quantitative research method because we believe that filling in a questionnaire with closed-ended questions takes less time than participating in an interview, thus making students more likely to respond carefully. Moreover, research aimed at investigating the impact of SL on students often uses qualitative methods (McNatt, 2019). Thus, the present study represents an attempt to analyze its potential impact on soft skills quantitatively.

All participants gave their formal consent for their research participation before filling in the questionnaires. Each questionnaire took approximately 15 minutes. This study was approved by the Ethical Committee of the LUMSA University of Rome; it was carried out according to the European law of privacy and informed consent (GDPR 2016/679) and according to the ethical guidelines of the Italian Psychological Association (AIP).

Measure

Soft Skills. In order to assess the participants’ perception of their soft skills, we used a short, adapted version of the European project eLene4work scale (2015–2018). The present scale has been adopted in several previous research studies (Culcasi, 2020, 2022). The Italian version (see Figure 1) was obtained by a process of back translation. The scale is composed of 15 items, with each item covering a specific skill, namely: communication, teamwork, conflict management, negotiation, leadership, self-evaluation, adaptability and flexibility, learning to learn, analytical skills, creativity and innovation, problem solving, digital information and data processing, digital communication, digital content creation, and digital problem solving. Participants were asked to rate how capable they feel in each competence area on a scale ranging from 1 (not able at all) to 4 (very able). An example of an item related to communication is “Thinking about your capabilities, to what

extent do you feel able to communicate?"

Soft Skills in a Future Career. To assess the participants' perception of the importance of soft skills in their future career, we used the above-mentioned scale, composed of the same 15 items. In this case, participants were asked to rate how important they consider each item for their future career for each skill on a scale ranging from 1 (not important at all) to 4 (very important). An example of an item related to communication is "How important for your future work activity is being able to communicate?"

Data Analysis

We used SPSS-20 software for the data analysis. At the baseline, we described the study variables in terms of means, standard deviations, and range across the two data points (pre- and post-SL). Then, we employed the paired *t*-test in order to assess whether there were differences in variable mean levels between the two times within-

person. In order to explore the replicability of our results, we used the standard bootstrap 95% confidence interval; parameter estimates were based on 5,000 bootstrap samples.

Results

Descriptive statistics of study variables are reported in Table 2.

The paired sample *t*-test highlighted an increase, over the two data collection points, in mean levels among the following soft skills: leadership [$t(37) -2.775$, 95%CI $-.546$, $-.085$, $p < .01$] and self-evaluation [$t(37) -2.634$, 95%CI $-.559$, $-.073$, $p < .05$]. Moreover, the paired sample *t*-test pointed out an increase, over the two times, in mean levels among the importance ascribed to the following soft skills during one's career: digital communication [$t(42) -2.308$, 95%CI $-.488$, $-.047$, $p < .05$] and digital content creation [$t(42) -2.305$, 95%CI $-.558$, $-.047$, $p < .05$].

Table 2. Descriptive Statistics of Study Variables

	Pre-SL			Post-SL		
	M	SD	Range	M	SD	Range
<i>Soft Skills</i>						
Communication	3.00	0.62	1-4	3.14	0.47	2-4
Teamwork	3.07	0.55	1-4	3.16	0.57	2-4
Conflict management	3.05	0.49	2-4	3.07	0.55	2-4
Negotiation	2.88	0.59	2-4	3.05	0.57	2-4
Leadership	2.56	0.73	2-4	2.93	0.55	1-4
Self-evaluation	2.88	0.76	1-4	3.23	0.61	2-4
Adaptability and Flexibility	3.35	0.72	1-4	3.21	0.51	2-4
Learning to learn	3.44	0.50	2-4	3.53	0.55	2-4
Analytical skills	3.19	0.66	1-4	3.21	0.63	2-4
Creativity and Innovation	2.95	0.61	2-4	3.02	0.77	1-4
Problem solving	3.23	0.57	2-4	3.19	0.59	1-4
Information and data processing	2.81	0.59	1-4	2.84	0.69	1-4
Digital communication	2.88	0.73	1-4	3.05	0.65	1-4
Digital content creation	2.81	0.85	1-4	3.05	0.87	1-4
Digital problem solving	2.79	0.77	1-4	2.93	0.74	1-4

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Table 2. Continued

	Pre-SL			Post-SL		
	M	SD	Range	M	SD	Range
<i>Soft Skills in a Future Career</i>						
Communication	3.91	0.29	3–4	3.80	0.45	2–4
Teamwork	3.53	0.62	2–4	3.48	0.66	1–4
Conflict management	3.62	0.58	2–4	3.59	0.50	3–4
Negotiation	3.09	0.73	1–4	3.24	0.60	2–4
Leadership	2.96	0.85	1–4	2.96	0.76	1–4
Self-evaluation	3.64	0.53	2–4	3.48	0.59	2–4
Adaptability and Flexibility	3.56	0.59	2–4	3.35	0.64	2–4
Learning to learn	3.76	0.48	2–4	3.61	0.58	2–4
Analytical skills	3.60	0.54	2–4	3.41	0.72	1–4
Creativity and Innovation	3.40	0.72	1–4	3.26	0.77	1–4
Problem solving	3.71	0.51	2–4	3.67	0.47	3–4
Information and data processing	3.27	0.62	2–4	3.09	0.75	1–4
Digital communication	2.96	0.75	1–4	3.17	0.85	1–4
Digital creativity	2.58	0.75	1–4	2.85	0.67	1–4
Digital problem solving	2.91	0.87	1–4	3.00	0.82	1–4

Note. M = Mean, SD = Standard deviation.

Main Findings

Our findings showed that, after the 9-month SL Lab, students perceived an increase in their levels of leadership and self-evaluation. Moreover, at the end of the SL Lab, students attributed more importance to digital communication and digital content creation skills for their future professional careers.

Discussion

Service-learning is a pedagogical approach based on experiential learning (Salam et al., 2019; Sparkman et al., 2020) that contributes to the positive development of students, empowering them and underlining their active role in the community in which they live. Due to the Covid-19 global pandemic, most university courses have been converted into an online format. In this scenario, SL has also been transformed into e-SL, and several universities adopted different models of technological interaction. LUMSA University implemented the e-SL

Hybrid Type II strategy (Waldner et al., 2012), with an instrumental objective type of technological interaction.

The main aim of this study was to test the effectiveness of Hybrid Type II e-SL during the Covid-19 pandemic in increasing soft skills development in university students. We also anticipated providing some pedagogical and practical contributions for e-SL implementation while being attuned to both our study's limitations and directions for future research.

The results confirmed, at least in part, our initial hypotheses. Regarding the first hypothesis (H1), our results indicated that after the 9-month SL Lab, there was a statistically significant pre-post change concerning students' perception of their soft skills level in leadership and self-evaluation. These findings are in line with existing literature, which provides supporting evidence that SL enhances students' perception of their self-evaluation abilities (Lai & Hui, 2018) and leadership skills (Hébert & Hauf, 2015). SL programs connecting students

with community partners to solve real-life problems, even in the virtual dimension, inevitably help students develop these skills in order to accomplish their goals successfully. Moreover, we suggest that in the bottom-up SL model, students' leadership is more evident, although the risk of failure is higher. In the absence of institutional coordination, students need greater self-awareness and self-evaluation abilities. We believe that students' awareness of the increase in their self-evaluation and leadership skills was enhanced through specific design elements: intentional reflection, focused discussions on how to impact the community positively, and activities to foster awareness of their own strengths and improvement areas. According to Weiler et al. (2013), through reflection on one's skills and direct feedback and supervision from the instructor, students may be more aware of their abilities. With particular reference to leadership skills, Diamond (2014) stated that although leadership is primarily learned through experience, experience cannot guarantee that a person will learn all they need to know to be effective. Thus, leadership acquisition requires both experiential learning and reflection (Guthrie & Jones, 2012).

Regarding the second hypothesis (H2), we expected an increase in digital soft skills development, as the SL was conducted online. However, findings did not support our hypothesis, because there was not an increase in the perception of digital skills. On the other hand, participants reported an increase in the perceived importance of digital soft skills (i.e., digital communication and digital content creation) for their future career. These results could be explained by the type of technological interaction that characterized the projects: Students designed solidarity activities exploring the potential of technological tools in relation to their future professional field.

These results could also be explained in relation to the contextual challenges imposed by the Covid-19 pandemic that made students more aware of the importance of digital skills. Related to this, the literature suggests that when the awareness of the meaning and importance of a particular competence increases, the self-evaluation of this competence might decrease. This cognitive distortion is known as the Dunning-Kruger effect, whereby people who are not very skilled in a field tend to overestimate their abilities, whereas people with high skill levels are inclined to underestimate

their real competence (Dunning, 2011). This result could also be explained because the implementation of service activities in the digital dimension took place in a limited time frame (from March to May/July 2020), so it probably did not allow the development of these two competences but only the awareness of their importance. Indeed, according to the European Commission's (2006) definition of digital competences, these competences are supported by basic ICT skills. However, it is interesting to note that awareness of the importance of digital communication and digital content creation skills in future careers has increased. This awareness may increase the student's motivation to achieve these skills. As is common knowledge, the motivation to learn is one of the best predictors of learning achievement (e.g., Meece et al., 2006).

To sum up, our study pointed out that e-SL provided students with opportunities to practice and improve leadership and self-evaluation skills as well as to recognize the need to develop digital skills for their future career. To the best of our knowledge, this study is the first one aiming to explore the benefits of e-SL Hybrid Type II on soft skills development in university students.

Our study also represents a relevant contribution for SL empirical literature, which is still relatively small: McNatt (2019) noted that the majority of studies in this field are "exploratory anecdotal accounts" of the benefits of service-learning projects. In the present research we tested, adopting a pre- and posttest design, the impact of multiple SL projects on the soft skills development of students from different degree courses. Indeed, too often, SL studies examine the impact of only one project, and the unique characteristics of a specific project could be the cause of the results (or lack thereof), thus potentially limiting the generalizability of the results to service-learning as a whole (McNatt, 2019).

In this research, we also made an effort to systematize and modelize the role and type of interactions that technology can fulfill in e-service-learning, taking into account the development of students' soft skills.

Limitations of the Present Study

Despite these promising results, the findings from the present study must be interpreted considering its limitations. First, our sample size is relatively small, and it

was composed solely of Italian students. Moreover, we adopted a single-item measure self-assessment tool, which does not allow the observation of all shades related to each soft skill and represents only the subjective perception of the participants. Nevertheless, most SL studies have involved smaller samples, ranging from 11 to 16 students (McNatt, 2019), and they often have used self-reported single-item measures (Rama et al., 2000). Thus, future studies should involve a larger sample of students and might focus on soft skill subdimensions, investigating the effect of e-SL on specific items—for example, in the context of communication skills specifically, the oral dimension, written production, and presentation skills. Furthermore, future research could also start designing studies to test what specific activities or strategies in (e-) service-learning projects might produce effective results.

However, this is one of the first attempts to investigate the impact of e-SL on soft skills development of university students during the Covid-19 health and educational emergency. As the demand to extend education to digital environments is growing and the number of available technological resources is increasing (Stefaniak, 2020), future studies should place more emphasis on promoting online authentic learning experiences, such as e-SL, and should also explore the effects related to the types of technological interaction in e-SL.

Conclusions

Service-learning, even in its digital version, opens up new possibilities for learning and acting. On a pedagogical level, it contributes to both curricular contents and methodolog-

ical aspects. Concerning curricular contents, SL responds to the need to make students aware of social reality and its problematic aspects, intercepting our times' significant issues. With regard to methodological aspects, SL emerges as an innovation of transmissive didactics favoring an empowering and responsible way of teaching (Fiorin, 2016). The technological aspect of e-service-learning introduces new challenges and possibilities that cannot be disregarded. This article provides a new modelization of technological interactions in e-SL. Our modelization aspires to be a useful integration of García Gutiérrez et al.'s (2020) categorization; furthermore, it aspires to become an operational tool for instructors in order to provide them guidelines during the design phase. Indeed, to maximize the success of SL activities, we consider it extremely important that teachers understand the kind of technological immersion the project requires of students and community partners. Using the proposed model, instructors can better define the requirements in terms of students' and community partners' equipment and technological skills, providing for training if necessary. Similarly, depending on the type of technological interaction of the project and, consequently, the type of human interaction, the instructor can develop specific activities to enhance personal and social skills. However, as trainers, it is important to point out that our goal is always to promote a humanistic approach; consequently, in e-SL, technology represents mediation and should always foster solidarity and its social function (Albanesi et al., 2020).



Declaration of Interest

The authors declare that there is no conflict of interest.

Ethics Approval

This study was approved by the ethical committee of the LUMSA University of Rome.

About the Authors & Author Contributions

Irene Culcasi is a post-doctoral fellow in education (e-Service-learning) in the Department of Human Sciences, LUMSA University of Rome, Italy. Culcasi was responsible for planning and implementing the study, preparing the original draft, revising the work, developing the theoretical and graphic modeling, and the editing.

Claudia Russo is a Ph.D. in social psychology at the Department of Human Sciences, LUMSA University of Rome, Italy. Russo was responsible for the preparation of the original draft, the analysis of quantitative data, review of the work, and the editing.

Maria Cinque is full professor of didactics and special pedagogy at the Department of Human Sciences, LUMSA University of Rome, Italy. Cinque supervised the work.

References

- Ahmad, I., Said, H., Mansor, S. S., Mokhtar, M., & Ghani, F. A. (2014). Role of reflection in moderating the relationship between service-learning and civic development. *Review of European Studies*, 6(3), 74–80. <https://doi.org/10.5539/res.v6n3p74>
- Albanesi, C., Culcasi, I., & Zunszain, P. (Eds.). (2020). *Practical guide on e-service-learning in response to COVID-19*. European Association of Service-Learning in Higher Education. https://www.eoslhe.eu/wp-content/uploads/2020/10/Practical-guide-on-e-Service-Learning_web.pdf
- Arnold, D., Cinque, M., Uggeri, M., & Mazalu, M. (2020, November 3–7). *Mix and match: University-corporate cross-fertilisation in active learning approaches for soft skills development* [Paper presentation]. ICDE World Conference on Online Learning, Dublin, Ireland.
- Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. S., Tamim, R. M., Surkes, M. A., & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243–1289. <https://doi.org/10.3102%2F0034654309333844>
- Bingle, R., & Hatcher, J. (1999). Reflection in service learning: Making meaning of experience. *Educational Horizons*, 3(77), 179–185.
- Brozmanová-Gregorová, A., Heinzová, Z., Kurčíkov, K., Nemcová, L., & Šolcová, J. (2019). Development of the key competencies through service-learning. *UNES: Universidad Escuela y Sociedad*, 6, 34–54. <https://revistaseug.ugr.es/index.php/revistaunes/article/view/12119>
- Butin, D. W. (2010). *Service-learning in theory and practice: The future of community engagement in higher education*. Palgrave Macmillan.
- Carlotto, G. (2015). *Soft skills: Con-vincere con le competenze trasversali e raggiungere i propri obiettivi* [Soft skills: Convincing with soft skills and achieving one's goals]. Franco Angeli.
- Caspersz, D., & Olaru, D. (2017). The value of service-learning: The student perspective. *Studies in Higher Education*, 42(4), 685–700. <https://doi.org/10.1080/03075079.2015.1070818>
- Center for Educational Innovation. (2014). *Active learning*. University of Minnesota. <https://cei.umn.edu/active-learning>
- Chamorro-Premuzic, T., Arteche, A., Bremner, A. J., Greven, C., & Furnham, A. (2010). Soft skills in higher education: Importance and improvement ratings as a function of individual differences and academic performance. *Educational Psychology* 30(2), 221–241. <https://doi.org/10.1080/01443410903560278>
- Cinque, M. (2016). “Lost in translation”: Soft skills development in European countries. *Tuning Journal for Higher Education*, 3(2), 389–427. [https://doi.org/10.18543/tjhe-3\(2\)-2016pp389-427](https://doi.org/10.18543/tjhe-3(2)-2016pp389-427)
- Cinque M. (2017). MOOCs and Soft skills: a comparison of different courses on Creativity. *Journal of e-Learning and Knowledge Society*, 13(3), 83–96. <https://doi.org/10.20368/1971-8829/1386>
- Cinque, M., & Culcasi, I. (2021). L’impatto della pandemia sull’istruzione superiore: Limiti e opportunità dell’e-service-learning [The impact of the pandemic on higher education: Limitations and opportunities of e-service-learning]. *Quaderni di Pedagogia della Scuola*, 1, 113–126.
- Commuter Affairs and Community Service. (1999). *Faculty handbook for service-learning*. Dr. C. C. and Mabel L. Criss Library, University of Maryland. <http://digitalcommons.unomaha.edu/slceguides/19>
- Consegnati, S. (2019). Costruire percorsi di service-learning in cinque tappe [Designing service-learning paths in five stages]. In CIOFS Scuola FMA (Ed.), *Didattica della solidarietà: Service Learning e pedagogia salesiana* [Didactics of solidarity: Service learning and Salesian pedagogy] (pp. 149–168). Franco Angeli.
- Cornalli, F. (2018, June 20–22). *Training and developing soft skills in higher education* [Paper

- presentation]. 4th International Conference on Higher Education Advances (HEAd) 18, Valencia, Spain.
- Culcasi, I. (2020). Esplorare il ruolo del service-learning nello sviluppo personale: Competenze trasversali nella formazione universitaria [Exploring the role of service-learning in personal development: Soft skills in higher education]. *La Ricerca Educativa e Didattica nelle Scuole di Dottorato in Italia*, 4, 242–257.
- Culcasi, I., & Cinque, M. (2021). L'impatto del service-learning universitario: Il progetto HOPE [The impact of university service-learning: The HOPE project]. *Excellence and Innovation in Learning and Teaching*, 6, 137–151. <https://doi.org/10.3280/exioa1-20210a12076>
- Culcasi, I., Brozmanová-Gregorová, A., & Cinque, M. (2022). Aprendizaje-servicio virtual y buenas practicas: Una mirada desde Europa [E-service-learning and best practices: A European perspective]. In J. García-Gutiérrez & M. Ruiz-Corbella (Eds.), *Aprendizaje-servicio virtual: Marco teórico y propuestas de acción innovadoras* (pp. 129–143). Narcea.
- Culcasi, I., Romano, L., & Cinque, M. (2021). Aprendizaje-servicio virtual 100% online: Un estudio de caso en una muestra de estudiantes universitarios italianos [100% online e-service-learning: A case study of a sample of Italian university students]. *EDUTEC: Revista Electrónica de Tecnología Educativa*, 78, 180–195. <https://doi.org/10.21556/edutec.2021.78.2255>
- Culcasi, I., Véliz García, L., Serrano Berríos, C., & Russo, C. (2022). Innovar la enseñanza de la Biología en tiempos de pandemia: eficacia, desafíos y oportunidades del Aprendizaje+Servicio Virtual en la educación superior [Innovating Biology teaching in times of pandemic: effectiveness, challenges and opportunities of virtual service-learning in higher education]. In O. Jerez Yañez & M. Rojas Pino (Eds.), *Innovar y Transformar desde las Disciplinas: Experiencias claves en la Educación Superior en América Latina y el Caribe 2021-2022* (pp. 400–412). Universidad de Chile. <https://libros.uchile.cl/files/presses/1/monographs/1297/submission/proof/400/index.html>
- Deans, T. (1999). Service learning in two keys: Paulo Freire's critical pedagogy in relation to John Dewey's pragmatism. *Michigan Journal of Community Service Learning*, 6, 15–29. <http://hdl.handle.net/2027/spo.3239521.0006.102>
- Deeley, S. J. (2014). Summative co-assessment: A deep learning approach to enhancing employability skills and attributes. *Active Learning in Higher Education*, 15(1), 39–51. <https://doi.org/10.1177%2F1469787413514649>
- Diamond, A. (2014). Pre-service early childhood educators' leadership development through reflective engagement with experiential service learning and leadership literature. *Australasian Journal of Early Childhood*, 39(4), 12–20. <https://doi.org/10.1177%2F183693911403900403>
- Dunning, D. (2011). The Dunning-Kruger effect: On being ignorant of one's own ignorance. *Advances in Experimental Social Psychology*, 44, 247–296. <https://doi.org/10.1016/B978-0-12-385522-0.00005-6>
- eLene4work. (2015–2018). <http://elene4work.eu>
- eLene4Life. (2018–2021). <http://elene4life.eu>
- eLene4Life (2019). *Transnational analysis on innovative higher education learning models on soft skills*. <http://elene4life.eu/project-outputs/trans-analysis-he/>
- Escofet, A., & Rubio, L. (2019). Impact analysis of a service-learning university program from the student perspective. *Journal of Higher Education Outreach and Engagement*, 23(3), 159–174. <https://openjournals.libs.uga.edu/jheoe/article/view/1526>
- European Commission. (2006). *Recommendation of the European Parliament and of the Council on key competences for lifelong learning*. Office for Official Publications of the European Communities.
- Fiorin, I. (2016). *Oltre l'aula: La proposta pedagogica del service learning* [Beyond the classroom: The pedagogical proposal of service learning]. Mondadori.
- Furco, A. (2009, August 20–21). *La reflexión sobre la práctica, un componente vital de las experiencias de aprendizaje-servicio* [Reflection on practice, a vital component of service-

- learning experiences; paper presentation]. XII Seminario Internacional de Aprendizaje Servicio Solidario, Buenos Aires, Argentina.
- Furco, A., & Root, S. (2010). Research demonstrates the value of service-learning. *Phi Delta Kappan*, 91(5), 16–20. <https://doi.org/10.1177%2F003172171009100504>
- García-Gutiérrez, J., Ruiz-Corbella, M., & Del Pozo, A. (2020). Innovación y aprendizaje-servicio virtual: Elementos para una reflexión basada en la experiencia [Innovation and virtual service-learning: Elements for experiential reflection]. *RIDAS: Revista Iberoamericana de Aprendizaje Servicio*, 9, 62–80. <https://doi.org/10.1344/RIDAS2020.9.4>
- Goslin, A., Van der Klashorst, E., Kluka, D., & Van Wyk, J. G. U. (2016). Formative reflections of university recreation science students in South Africa as catalyst for an adapted service-learning program. *Australian Journal of Adult Learning*, 56(1), 111–130. <https://repository.up.ac.za/handle/2263/52914?show=full>
- Guthrie, K. L., & Jones, T. B. (2012). Teaching and learning: Using experiential learning and reflection for leadership education. *New Directions for Student Services*, 2012(140), 53–63. <https://doi.org/10.1002/ss.20031>
- Haselberger, D., Oberhuemer, P., Pérez, E., Cinque, M., & Capasso, D. (2012). *Mediating soft skills at higher education institutions: Handbook of the ModEs Project*. Education and Culture DG Lifelong Learning Programme. https://gea-college.si/wp-content/uploads/2015/12/MODES_handbook_en.pdf
- Hébert, A., & Hauf, P. (2015). Student learning through service learning: Effects on academic development, civic responsibility, interpersonal skills and practical skills. *Active Learning in Higher Education*, 16(1), 37–49. <https://doi.org/10.1177%2F1469787415573357>
- Hernández-Barco, M., Sánchez-Martín, J., Blanco-Salas, J., & Ruiz-Télliz, T. (2020). Teaching down to earth—service-learning methodology for science education and sustainability at the university level: A practical approach. *Sustainability* 12(2), 542–565. <https://doi.org/10.3390/su12020542>
- High Level Group on the Modernisation of Higher Education. (2013). *Improving the quality of teaching and learning in Europe's higher education institutions*. Publication Office of the European Commission.
- Holland, B. A. (2001). A comprehensive assessment model for assessing service-learning and community university partnership. *New Directions for Higher Education*, 2001(114), 51–60.
- Hollander, A., Vavasseur, C., & Robicheaux, H. (2020). A service-learning approach for faculty development focused on remote delivery of courses during a pandemic. *Journal of Service-Learning in Higher Education*, 11(2), Article 301. <https://journals.sfu.ca/jslhe/index.php/jslhe/article/view/301>
- Kechagias, K. (2011). *Teaching and assessing soft skills*. 1st Second Chance School of Thessaloniki.
- Khiatani, P. V., & Liu, J. K. K. (2020). Reciprocal learning in service-learning? Measuring bidirectional outcomes of college students and service recipients in tutor-based services in Hong Kong. *Innovations in Education and Teaching International*, 57(3), 364–373. <https://doi.org/10.1080/14703297.2019.1607765>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.
- Kyllonen, P. C. (2016). Designing tests to measure personal attributes and noncognitive skills. In S. Lane, M. R. Raymond, & T. M. Haladyna (Eds.), *Handbook of test development* (pp. 190–211). Routledge.
- Lai, C. S., & Hui, P. C. (2018). Perceived values of service-learning: A study on students engaged in a fashion-related programme. *International Journal of Fashion Design, Technology and Education*, 11(3), 375–383. <https://doi.org/10.1080/17543266.2018.1448463>
- Manjarrés-Riesco, A., Pickin, S. J., Alonso Meana, H., & Rodríguez-Fernández, N. (2020). Virtu@al-ApS: Technological support for virtual service-learning. *RIED: Revista Iberoamericana de Educación a Distancia*, 23(1), 85–109. <https://doi.org/10.5944/ried.23.1.24397>

- Marcus, V. B., Atan, N. A., Talib, R., Latif, A. A., & Yusof, S. M. (2019). Promoting students' generic skills with the integration of e-service learning platform. *International Journal of Emerging Technologies in Learning*, 14(20), 4–17. <https://doi.org/10.3991/ijet.v14i20.11455>
- Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology*, 57, 487–503. <https://doi.org/10.1146/annurev.psych.56.091103.070258>
- McNatt, D. B. (2019). Service-learning: An experiment to increase interpersonal communication confidence and competence. *Education and Training*, 62(2), 129–144. <https://doi.org/10.1108/ET-02-2019-0039>
- National Association of Colleges and Employers. (2014). *Job outlook 2014*. <http://www.naceweb.org>
- Pellerey, M. (2017). *Soft skills e orientamento professionale* [Soft skills and career orientation]. CNOS-FAP.
- Rama, D. V., Ravenscroft, S. P., Wolcott, S. K., & Zlotkowski, E. (2000). Service-learning outcomes: Guidelines for educators and researchers. *Issues in Accounting Education*, 15(4), 657–692. <https://doi.org/10.2308/iace.2000.15.4.657>
- Salam, M., Iskandar, D. N., Ibrahim, D. H., & Farooq, M. (2019). Service learning in higher education: A systematic literature review. *Asia Pacific Education Review*, 20, 573–593. <https://doi.org/10.1007/s12564-019-09580-6>
- Sanft, R., & Ziegler-Graham, K. (2018). Mathematics practicum at St. Olaf College: Project-based learning through academic civic engagement. *PRIMUS*, 28(4), 335–349. <https://doi.org/10.1080/10511970.2016.1249319>
- Selmo, L. (2018). Service-learning e l'eredità pedagogica di Paulo Freire [Service-learning and the pedagogical legacy of Paulo Freire]. In S. Colazzo & P. Ellerani (Eds.), *Service learning: Tra didattica e Terza Missione: Ripensare e riprogettare l'organizzazione nelle scuole e nelle università* [Service learning: Between didactics and Third Mission: Rethinking and redesigning organization in schools and universities] (pp. 91–102). Università di Salerno.
- Sparkman, K. N., Vajda, A., & Belcher, T. (2020). Advancing human services education: Exploratory study of international service-learning and digital pedagogy. *Journal of Service-Learning in Higher Education*, 18, Article 186. <https://journals.sfu.ca/jslhe/index.php/jslhe/article/view/186>
- Stefaniak, J. A. (2020). Systems view of supporting the transfer of learning through e-service-learning experiences in real-world contexts. *Tech Trends*, 64, 561–569. <https://doi.org/10.1007/s11528-020-00487-3>
- Talavera, E. R., & Perez-Gonzalez, J. C. (2007). Training in socio-emotional skills through on-site training. *European Journal of Vocational Training*, 40, 83–102.
- Tapia, M. N. (2006). *Educazione e solidarietà: La pedagogia dell'apprendimento servizio* [Education and solidarity: The pedagogy of service learning]. Città Nuova.
- Waldner, L., McGorry, S., & Widener, M. (2010). Extreme e-service-learning (XE-SL): E-service learning in the 100% online course. *MERLOT Journal of Online Learning and Teaching*, 6(4), 839–851. https://jolt.merlot.org/vol6no4/waldner_1210.pdf
- Waldner, L., McGorry, S., & Widener, M. (2012). E-service-learning: The evolution of service-learning to engage a growing online student population. *Journal of Higher Education Outreach and Engagement*, 16(2), 123–149. <https://openjournals.libs.uga.edu/jheoe/article/view/936>
- Weiler, L., Haddock, S., Zimmerman, T. S., Krafchick, J., Henry, K., & Rudisill, S. (2013). Benefits derived by college students from mentoring at-risk youth in a service-learning course. *American Journal of Community Psychology*, 52(3–4), 236–248. <https://doi.org/10.1007/s10464-013-9589-z>
- Whitley, M. A., Walsh, D., Hayden, L., & Gould, D. (2017). Narratives of experiential learning: Students' engagement in a physical activity-based service-learning course. *Journal of Teaching in Physical Education*, 36(4), 419–429. <http://dx.doi.org/10.1123/jtpe.2016-0141>

