

EDUCACIÓN Y HUMANIDADES EN TRANSFORMACIÓN

Investigación e innovación interdisciplinar

Chiara Gemma
Vincenzo Cafagna
Juan Francisco Álvarez Herrero

(Eds.)



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Índice

Presentación.....	7
Capítulo 1. Las metodologías y estrategias didácticas en las aulas rurales multigrado de las Eskola Txikiak en el País Vasco.....	9
Miren Aguirregoitia-Güenechea	
Capítulo 2. Género y discurso histórico en la educación básica: análisis crítico del texto escolar de 3º básico.....	22
Humberto Álvarez Sepúlveda	
Capítulo 3. Proyecto de innovación docente universitario basado en el Flipped Classroom + Breakout educativo.....	34
Cristian Ariza Carrasco	
Beatriz Aguilar Yamuza	
Francisco Manuel Espejo Jiménez	
Capítulo 4. Formar docentes en tiempos de inteligencia artificial: el prácticum como espacio para uso pedagógico, ético y reflexivo de la IA	44
Marcos Ascanio Zárate	
Daniel Rodríguez-Rodríguez	
Isabel María Gómez Trigueros	
Capítulo 5. From Story to Action: Transformative Learning for Sustainability in Foreign Language Teacher Education.....	56
Irene Balza	
Ruth Milla	
Capítulo 6. Francisco de Zamora en Málaga: las villas de Cártama, Alhaurín el Grande y Coín (5 al 24 de abril, 1797).....	69
Manuel Bermúdez Méndez	
Capítulo 7. Recibir una nueva voz: análisis del doblaje en español neutro y el redoblaje en español europeo de <i>La sirenita</i>	80
José-Fernando Carrero-Martín	
Capítulo 8. Análisis de necesidades y desempeño oral en francés para turismo: tareas situadas y automatización de rutinas (A1-A2).....	93
Gabriel Díez Abadie	
Capítulo 9. El Aprendizaje Basado en Retos como estrategia de innovación en el Grado de Educación Infantil	105
Adriana Gil-Juárez	
Salvador Viciano	
Capítulo 10. Inglés con fines específicos en Ingeniería de Telecomunicaciones: fundamentos, retos y propuestas aplicadas.....	115
Carolina González Quintana	

Capítulo 11. Transferencia interlingüística en la expresión de la modalidad en inglés como L2: análisis de corpus de estudiantes hispanohablantes universitarios	127
Carolina González Quintana	
Capítulo 12. Immortality, Identity, and Masculinity: Gothic Temporality and the Quest for Existential Meaning in <i>Dracula</i> (1992) and <i>Interview with the Vampire</i> (1994).....	136
Maria Grajdian	
Capítulo 13. Alfabetización transmedia en la educación superior. El Proyecto Social Media Palencia	147
José Miguel Gutiérrez Pequeño	
Capítulo 14. Untranslatable Subjects: Lesbian Epistemologies and Censorship in the Spanish Transition through Jane Rule's Nonfiction	156
Sara Llopis-Mestre	
Capítulo 15. Crítica marxiana y literatura vampírica: una aproximación pedagógica contemporánea.....	166
Daniel López Fernández	
Capítulo 16. Dos hipótesis sobre la posición teológica de Hobbes: entre la ortodoxia y el ateísmo	177
Daniel López Gómez	
Capítulo 17. Diseño y análisis de un modelo de REA colaborativo para la preservación e integración educativa de repertorios tradicionales	187
Andrea Martín Ferrero	
Sara González Gutiérrez	
Javier F. Merchán Sánchez	
Capítulo 18. Emoción, palabra clave del discurso político	199
Luisa A. Messina Fajardo	
Capítulo 19. Escritura testimonial y crónica de guerra. Literatura y experiencia bélica en <i>Campos de batalla</i> y <i>Campos de ruinas</i> de Gómez Carrillo	208
Trinis A. Messina Fajardo	
Capítulo 20. La lectura fácil en el sector museístico: una revisión bibliográfica sistemática con foco en la Comunidad Valenciana	219
Lucía Navarro-Brotons	
Capítulo 21. Integración y redes profesionales de escultores foráneos en el Renacimiento andaluz.....	231
María Teresa Rodríguez Bote	
Capítulo 22. Revisión sobre los mecanismos lingüísticos del francés y del español para indicar un cambio cromático	242
Carmen Quintero Álvarez de Eulate	

Capítulo 5. From Story to Action: Transformative Learning for Sustainability in Foreign Language Teacher Education

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Abstract: This study explores the impact of an interdisciplinary project combining storytelling and project-based learning (PBL) on pre-service teachers enrolled in a foreign language minor, focusing on their understanding of sustainability and their ability to integrate the Sustainable Development Goals (SDGs) into early education within the foreign language classroom. Using a mixed-methods design, the project aims to enhance sustainability knowledge while fostering critical thinking, emotional engagement, and pedagogical competence among future foreign language teachers. Results show significant gains in sustainability literacy and a broadening of students' understanding of the SDGs beyond the most familiar ones. The project also increased students' confidence in promoting transformative learning and deepened their awareness of engaging educational resources. In particular, storytelling emerged as a powerful tool for encouraging emotional and behavioural skills essential for disruptive competence. The project also strengthened perceptions of the university's commitment to sustainability, thereby enhancing its visibility. These outcomes highlight the value of active, affective pedagogies in preparing educators as change agents in alignment with the 2030 Agenda.

Keywords: storytelling, project-based learning, education for sustainable development, foreign language education, pre-service teachers

1. INTRODUCTION

Education plays a central role in addressing contemporary global challenges by equipping future educators with the knowledge, skills, and dispositions required to engage with complex social, environmental, and ethical issues. In teacher education, this has prompted growing interest in pedagogical approaches that move beyond awareness-raising to foster transformative learning, understood as the integration of cognitive, affective, and action-oriented dimensions that support critical reflection and informed action. Experiential methodologies such as project-based learning and storytelling have been widely identified as particularly promising in this regard, as they create meaningful learning contexts in which learners can actively construct knowledge, engage emotionally, and develop professional agency.

Within this context, this chapter reports on the evaluation of an interdisciplinary project implemented in foreign language teacher education that combines storytelling and project-based learning within an Education for Sustainable Development framework.

Specifically, the chapter aims to: (1) examine the extent to which the project contributes to pre-service teachers' understanding of key sustainability concepts and their thematic scope; (2) analyze participants' perceptions of the adequacy and accessibility of institutional information and communication channels related to the Sustainable Development Goals; (3) assess changes in pre-service teachers' perceived capacity to foster learners' commitment to transformative thinking and action in the classroom; and (4) explore the extent to which the project enhances awareness of pedagogical resources and strategies for integrating the Sustainable Development Goals into teaching practice.

2. TRANSFORMATIVE LEARNING: DEVELOPING CRITICAL THINKING AND ACTION FOR SUSTAINABILITY

Education plays a pivotal role in advancing sustainable development by equipping individuals with the knowledge, skills, and dispositions to address complex sustainability challenges. However, fostering sustainability-oriented behavior requires more than cognitive understanding; it demands transformative learning that cultivates critical thinking, creativity, and resilience while fostering critical awareness and driving shifts in sustainable norms, habits, and societal structures (Ojala, 2023; Varela Losada et al., 2022).

Effective sustainability education goes beyond raising awareness of the SDGs; it integrates affective and actional dimensions—such as empathy, emotional regulation, and value clarification—to foster “disruptive competence” (Varela Losada et al., 2022). This includes awareness of one's emotions and underlying values involved in learning, as well as knowledge of emotion-regulation strategies and their social influences, enabling learners to critically reflect and transform their emotional and behavioral responses in support of sustainable change. Research emphasizes that transformative learning should equip individuals not only with awareness and knowledge, which alone does not guarantee behavioral change (Cogut et al., 2019), but also with the capacity for adaptation, creativity, innovation, and resilience through essential skills such as critical and holistic thinking, problem-solving, and teamwork—aligning education with the broader goals of the 2030 Agenda (Varela Losada et al., 2022).

Cultivating disruptive competence requires pedagogies that engage learners experientially. Two compelling pedagogical strategies that support this goal in teaching are storytelling and project-based learning (PBL). These stand out as powerful tools for fostering emotional engagement, critical reflection, and collaborative problem-solving, as they not only integrate affective and cognitive dimensions, but also create immersive learning environments where students can internalize sustainable values and practice transformative action.

2.1. Sustainable storytelling and emotional, attitudinal and actional development

Storytelling, defined as the narration and dramatization of stories with educational intent (Wall et al., 2019), serves as a valuable tool in foreign language (FL) instruction—especially in early education—by fostering interaction, supporting language development, and making abstract sustainability concepts accessible to young learners (Asli et al., 2023; Fischer et al., 2022; Furu et al., 2021).

Storytelling nurtures social-emotional learning by promoting empathy, emotional engagement, and pro-sustainability attitudes in both learners and teachers. It transforms abstract sustainability concepts into relatable experiences, encouraging emotional connection and reflection on personal values and behaviors (Wilson, 2005 in Fischer et al., 2020). Sustainable storytelling also prompts learners to explore value dimensions like fairness and justice across generations (Fischer et al., 2022), inspiring pro-sustainability behaviors by uncovering unconscious biases (Tasnim et al., 2023)—an essential step toward developing disruptive competence.

Thus, storytelling helps translate cognitive understanding into actional change. As disruptive competence involves emotional and behavioral awareness alongside cognitive insight (Varela Losada et al., 2022), storytelling supports this by enabling learners to regulate emotions, engage with diverse perspectives, and practice adaptive responses in a safe learning environment (Fischner et al., 2022).

2.2. Project-based learning: Empowering action through real-world engagement

PBL fosters cooperative engagement with real-world problems and a deeper understanding of complex interdisciplinary topics—such as those related to sustainability—while also promoting critical thinking, communication, creativity, and transversal competencies essential for addressing such challenges (De la Fuente, 2022; Dogara et al. 2020). Furthermore, PBL also supports the development of social responsibility, emotional engagement, and interdisciplinary thinking—key pillars of Education for Sustainable Development (ESD) (Sánchez-García & Reyes-de-Cózar, 2025). When implemented with fidelity, PBL aligns with SDG4.7 by fostering inclusive, reflective, and future-oriented learning that empowers students to act on sustainability challenges.

In FL learning contexts, PBL enhances language acquisition by situating learners in authentic communicative contexts, enabling them to use language meaningfully in real-life scenarios (Haines, 1989). Additionally, PBL supports the development of academic writing through genre-specific outputs such as reports and abstracts, which are integral to ESD (Allen et al., 2011).

With this in mind, the STOIRE+i3 —the interdisciplinary ESD project examined in this research— emerged as an innovative effort to integrate the SDGs into FL teacher education. It aims to prepare future educators who are not only linguistically competent but also equipped to foster sustainability awareness and commitment in their classrooms, in line with the 2030 Agenda and recent educational reforms in Spain.

3. METHODS

This study sheds light on whether interdisciplinary PBL projects based on storytelling can promote pre-service infant and primary education teachers' understanding of sustainability concepts, their awareness of available teaching resources, and their perceived capacity to enact transformative pedagogical practices. To this end, the following research questions were formulated:

RQ1: To what extent has the STOIRE+i3 project contributed to pre-service teachers' understanding of key sustainability concepts, including their definitions and thematic scope?

RQ2: How do pre-service teachers at the University of the Basque Country (UPV/EHU) perceive the adequacy and accessibility of SDG-related information, and the effectiveness of the channels through which they receive it?

RQ3: How do pre-service education teachers perceive their ability to foster learners' commitment to the SDGs and to promote transformative thinking and action for sustainability in the classroom before and after the project?

RQ4: To what extent has the project enhanced pre-service teachers' awareness of resources and strategies available for integrating the SDGs into classroom practice?

The intervention, an interdisciplinary project designed for FL Minor students, revolved around storytelling and sustainability within a PBL framework. Guided by the question “Can stories across borders improve reality?”, students responded to a fictional call from University of the Basque Country's (UPV/EHU) UNESCO Chair to propose a grant project

promoting sustainability among young learners in multilingual, multicultural contexts through storytelling. It launched with a workshop on integrating SDGs, storytelling, active methodologies, and inclusiveness in diverse, multilingual and multicultural FL classrooms. Afterwards, students examined academic literature and picturebook repertoires to identify stories that aligned with selected SDGs. This initial training and research phase provided a theoretical foundation for critically evaluating and purposefully selecting narratives that reflected SDG values. Across all Minor courses, students compiled a sustainability-themed story collection and recorded storytelling performances, which were peer-assessed for narrative and oral delivery. Final outputs included an academic report and a poster presentation for submission to the hypothetical call.

To assess the project’s effectiveness in meeting its objectives, a quasi-experimental pre-test/post-test design was employed with the full cohort of students, without a control group. This quantitative approach was complemented by a focus group interview to gain qualitative insights. The initial sample comprised 64 students enrolled in the FL Minor, although only 58 responses were deemed valid due to errors or incomplete data.

The test was designed to evaluate participants’ knowledge, awareness, and self-perceived competence regarding ESD and SDGs. As shown in table 1, it combined factual items with perception-based and open-ended questions to capture both cognitive understanding and affective dimensions relevant to future teaching practices. The first four questions were adapted from the United Nations Academic Impact (UNAI) quiz, while item 11 was based on the SDG knowledge assessment tool developed by Zamora-Polo et al. (2019). The remaining items were developed and refined by the project researchers through a collaborative review.

Table 1. Questionnaire items.

1	What does the term “sustainable” mean?
2	Who are those “left behind” referred to in the 2030 Agenda for Sustainable Development?
3	How are the Sustainable Development Goals (SDGs) described in the 2030 Agenda for Sustainable Development?
4	Why is education for sustainable development relevant?
5	How many SDGs are on the United Nations agenda?
6	What additional SDG has the University of the Basque Country (UPV/EHU) added?
7	What is SDG number 4 related to?
8	Name two SDGs other than SDG 4
9	What is the time horizon for the fulfilment of these goals? Specify the year (e.g., 2022).
10	Does the University of the Basque Country (UPV/EHU) provide sufficient information about the SDGs? Where?
11	Through which means have you received information about the Sustainable Development Goals?
12	I am able to develop learners’ commitment to the SDGs.
13	I am able to transform learners’ ways of thinking and acting in the interest of sustainability.
14	Do you know of resources or strategies to work on the SDGs in the infant/primary classroom? Please provide an example.

Following informed consent, the questionnaire was administered in the classroom at both the beginning and the end of the course. Students completed the questionnaires individually, anonymously, and in the presence of one of the instructors, available to clarify any questions. The same set of questions was used in the post-test to enable a comparative pre- and post-intervention analysis.

To evaluate the impact of the intervention, a combination of non-parametric and categorical statistical tests was applied, selected according to the nature of each questionnaire item and the type of data collected. Items 1–5 and 9 were designed as cloze-test questions with ordinal or binary outcomes and were analyzed using the Wilcoxon signed-rank test for paired samples to assess whether participants' knowledge improved significantly after the intervention. Items 6, 7, 8, and 10 consisted of structured short-answer questions, with responses categorized into four levels: Correct, Partially Correct, Incorrect, and I Don't Know (IDK). To evaluate shifts in these categorical responses between pre- and post-test, the Stuart-Maxwell test was employed. For Items 8 and 11, which involved open-ended responses and multiple-choice selections respectively, the Chi-square test of independence was used to examine changes in the distribution of mentions or selected sources and for statistical significance. Item 14, which asked participants to identify resources for teaching the SDGs, was analyzed using McNemar's test, to evaluate changes in participants' knowledge of pedagogical tools. All statistical analyses were conducted using R V4.4.2.

4. RESULTS AND DISCUSSION

4.1. RQ 1: Prospective teachers' understanding of sustainability

The results (Table 2) indicate that the STOIREi3 project contributed to a notable improvement in students' knowledge of sustainability and the SDGs. Significant gains were observed in several key areas, particularly in understanding the meaning of "sustainable" (increasing from 57% to 80% correct answers, $p=0.0019$), the time horizon for the fulfillment of these goals (from 67% to 98%, $p<0.001$) and the number of SDGs on the UN's agenda (from 51% to 92%, $p<0.001$). Students also demonstrated a significant increase in knowledge regarding the additional SDG (17+1) introduced by the University of the Basque Country (UPV/EHU), with correct responses rising markedly from 8% to 38% ($p<0.001$).

Knowledge about the SDG4 (Quality Education) showed a significant increase (from 8% to 72%, $p<0.001$). Additionally, the Stuart-Maxwell test for marginal homogeneity confirmed a statistically significant shift in the distribution of answers ($\chi^2=40.321$, $p<0.000001$). This reflects a substantial reduction in incorrect and IDK responses, demonstrating a strong positive impact of the educational project on participants' understanding of SDG4.

Table 2. Correct answers by item: Pre and post-test.

Item	Questionnaire item	Pre-test (%)	Post-test (%)
1	What does the term “ <i>sustainable</i> ” mean?	57.00	80.00
2	Who are those “ <i>left behind</i> ” referred to in the 2030 Agenda?	69.00	74.00
3	How are the Sustainable Development Goals described in the 2030 Agenda?	87.00	90.00
4	Why is education for sustainable development relevant?	69.00	85.00
5	How many SDGs are on the United Nations agenda?	51.00	92.00
6	What additional SDG has been added by the UPV/EHU (17+1)?	8.00	38.00
7	What is SDG number 4 related to?	8.00	72.00
8	Name two SDGs other than SDG 4	34.00	87.00
9	What is the time horizon for the fulfilment of these goals?	67.00	98.00

Moreover, when participants were asked to name two other SDGs besides SDG4, the number of students who correctly named two valid SDGs increased significantly from 20 in the pre-test to 47 in the post-test. A McNemar’s test confirmed that this improvement was statistically significant ($p < 0.001$), indicating a meaningful gain in students’ awareness. In total, the number of valid SDG mentions rose from 66 to 117, reflecting a broader and more diverse understanding of the 2030 Agenda. While SDG5 (Gender Equality) remained the most frequently mentioned—rising from 13 to 24 mentions (19.7% to 20.5%)—several other goals showed notable increases. Mentions of SDG13 (Climate Action) rose from 1 (1.5%) to 14 (12.0%), SDG16 (Peace, Justice and Strong Institutions) from 2 (3.0%) to 8 (6.8%), and SDG 10 (Reduced Inequalities) from 3 (4.5%) to 7 (6.0%). Additional growth was observed for SDGs 11, 12, and 15, suggesting a more comprehensive recognition of the SDGs beyond the most familiar ones. A chi-square test of independence conducted on the aggregated SDG frequencies confirmed a statistically significant change in the distribution of mentions ($\chi^2 = 25.89$, $p = 0.039$). The post-test results indicate not only an overall improvement in recall but also a redistribution in the range of SDGs identified by participants. While the most familiar goals continued to be frequently mentioned, students increasingly referred to a wider set of less prominent SDGs, reflecting a more balanced and differentiated understanding of the 2030 Agenda.

The predominance of certain SDGs in students’ responses—particularly SDG5 (Gender Equality), SDG10 (Reduced Inequalities), SDG13 (Climate Action), and SDG16 (Peace, Justice and Strong Institutions)—can be interpreted in light of existing literature on sustainability education in higher education. These goals often resonate more strongly

with students due to their high visibility in public discourse, media, and educational initiatives, as well as their direct relevance to social justice and global citizenship themes commonly emphasized in higher education curricula (Avelar et al., 2025). Moreover, student-led initiatives frequently focus on gender equality and climate action, making these issues more visible, relatable, and memorable. A recent Nordic study found that youth most frequently prioritized climate action (58%) and gender equality (36%), with young women more actively engaged in sustainability movements than young men (Sand, 2024). These themes also figure prominently in global youth movements like Fridays for Future, where climate activism is tied to justice, equity, and inclusion (Woods et al., 2024), and global campaigns like Me Too and International Women's Day (#EachForEqual), which have helped sustain feminist activism, particularly among younger generations increasingly supportive of gender equality (World Economic Forum, 2020).

Crucially, the increased diversity of SDGs mentioned post-intervention suggests that structured educational efforts—such as PBL—can effectively broaden students' understanding beyond the most familiar goals. This supports findings from recent studies that highlight the importance of integrating SDGs into curricula through participatory and reflective pedagogies to foster deeper and more comprehensive engagement with sustainability challenges (Avelar et al., 2025).

Other areas, such as identifying those "left behind" in the 2030 Agenda and describing how SDGs are characterized, showed smaller, non-significant increases.

Overall, the findings suggest that the intervention effectively enhanced participants' comprehension of sustainability concepts, their relevance to education — an understanding that is essential for their development as future educators. This is further supported by focus group feedback, where students identified workshops, peer feedback, and PBL as particularly effective sources of SDG-related knowledge and engagement.

The significant gains in students' understanding of sustainability and the SDGs are especially noteworthy given that the project did not include direct instruction on these topics. The initial workshop focused solely on how to integrate sustainability into the FL classroom, without addressing the principles, goals, or challenges of the 2030 Agenda. Instead, students engaged in an autonomous PBL approach, as described in the methods section. This process required them to independently explore and construct their understanding of sustainability concepts and the SDGs agenda. Thus, the findings align with research highlighting the effectiveness of PBL and self-directed learning in promoting deeper understanding and critical engagement with complex, interdisciplinary topics (De la Fuente, 2022; Dogara et al. 2020). Such active learning strategies are particularly valuable in ESD, where fostering learner autonomy and critical thinking is essential (Cavadas & Linhares, 2023). This reinforces the potential of active, student-centered learning methods in preparing future educators to integrate sustainability into their teaching practice effectively.

4.2. RQ2: Pre-service teachers' perception of accessibility to SDG-related information

Regarding participants' awareness of the sustainability information disseminated by the University of the Basque Country and the main channels through which they learned about the institution's commitment to the 2030 Agenda (item 10), results show a significant shift following the intervention. In fact, before the intervention, only 21.8% of students believed the university provided adequate information about the SDGs, while 49.1% felt it did not, and 29.1% were unsure. After the intervention, 76.4% of students

viewed the university as adequately communicating its sustainability efforts, while only 7.3% maintained a negative perception.

A statistical analysis was conducted to evaluate whether students' responses to this question changed significantly after the educational intervention. Using the Stuart-Maxwell test for marginal homogeneity, we found a test statistic of 35.55 with 3 degrees of freedom, and a p-value < 0.0001. This result indicates a highly significant shift in students' responses from the pre-test to the post-test. In other words, the intervention had a clear and measurable impact on how students perceived the university's communication about the SDGs.

Following the intervention, students also demonstrated a marked increase in awareness in terms of where the University of the Basque Country provides information and how they have received it more broadly. For instance, in Item 10 (Does the University of the Basque Country provide sufficient information about the SDGs? Where?), nearly half of the students (44.4%) identified curriculum-related sources as key channels for SDG information, with 22.2% specifically citing the FL Minor—highlighting the direct impact of the educational initiative. Other university-related sources such as the canteen, campus facilities, website, library, and media also saw increased recognition. For example, in Item 11 (Through which means have you received information about the Sustainable Development Goals?), students reported a broader range of information channels, with significant growth in the use of Formal Education and Formal Training. While Social Networks and Traditional Media remained stable, slight increases were noted in Email and Other sources. Importantly, the drop in responses selecting "None of the Above" suggests a general improvement in SDG-related awareness and outreach. These trends were supported by statistical analysis using chi-square tests of independence, which confirmed significant differences between pre- and post-test responses for Formal Education ($p=0.0026$), Formal Training ($p=0.0003$), and None of the Above ($p=0.0412$), indicating that the intervention had a measurable impact on students' exposure to SDG-related information. In essence, the pre- and post-test comparison indicates a transition from a fragmented pattern of SDG information—largely reliant on informal or incidental sources—toward greater reliance on institutional and curricular channels within students' overall information landscape.

Despite the availability of sustainability-related information, a post-test comment revealed that it is not always accessible or clearly presented—highlighting a gap between content availability and visibility. Addressing this requires universities to adopt inclusive, multimodal communication strategies and embed sustainability meaningfully across curricula. This aligns with Zamora-Polo et al. (2019), who emphasize that while SDGs are increasingly present in discourse, their impact depends on participatory pedagogies, institutional transparency, and frameworks that place students at the center of learning. Enhancing visibility is thus essential to empower future educators as agents of change.

4.3. RQ3: Pre-service teachers' perceived capacity to foster commitment to the SDGs and transformative sustainability thinking

Prior to the implementation of the training, the students rated their ability to impact on children's commitment, thinking and action for sustainability (items 12 and 13) around 3 (out of 5) in the Likert scale, so they did not perceive themselves as agents of great change in this respect. However, if we pay attention to the standard deviation, we find notable variability in the responses in this pre-test, both in the participants' perception of their ability to promote children's compromise to sustainability (item 12=0.98) and to transform thinking and action (item 13=0.91).

The results are significantly higher in the post-test (p-values: 6.228e-10 for question 12 and 1.158e-07 for 13). This indicates that the training through the storytelling-based project was effective in reassuring students' perceived ability to impulse children's engagement and initiative to work towards sustainable goals. Thus, in the post-test the mean response was higher than 4, around one point higher than in the pre-test. Interestingly, the standard deviation was lower (0.55 for Item 12 and 0.58 for Item 13), pointing to a greater homogeneity in the students' perception.

The project appears to have enhanced prospective teachers' understanding of how to address children's attitudes toward sustainability, echoing findings from prior research (Ojala, 2023; Varela Losada et al., 2022). While participants demonstrated improved knowledge of sustainability (RQ1), awareness alone does not guarantee behavioral change (Cogut et al., 2019). It is therefore essential that future educators also develop confidence in applying this knowledge through effective strategies and resources. As noted by Thomas (2009) and UNESCO (2015), cited in Varela Losada et al. (2022), transformative teaching involves not only knowledge transmission but also fostering the capacities needed to contribute meaningfully to society and the environment. In this study, participants expressed confidence in their ability to deliver transformative teaching, particularly through storytelling. Focus group data support this interpretation: students reported gaining autonomy, resourcefulness, and pedagogical competence—"we learned how to work by ourselves, look for resources, build didactic units." The workshop was especially valued for its practical relevance: "it was very useful... the speeches were about different topics." Students also noted growth in critical thinking and decision-making—"we thought we knew things but didn't know how to justify them"—and appreciated the collaborative nature of the project, which helped them navigate real-world team dynamics: "real life is like that... you have to cope."

4.4. RQ4: Pre-service teachers' awareness of resources and strategies for integrating the SDGs into classroom practice

In the pre-test, the analysis of trainee teachers' perception about their knowledge to instruct their pupils about sustainability (item 14) revealed a lack of knowledge of the resources and techniques that they might use for that aim. A total of 40 students (69%) responded having no knowledge of resources or techniques to work on sustainability in the infant/primary classroom, while only 11 (31%) were able to give an example of how to integrate the SDGs in the FL lessons. This perception was echoed in the focus group, where one student stated: "It has been the most difficult part, to adapt our stories to pre-primary; it was new".

This picture was radically changed in the post-test. After the project, 100% of the students responded positively to this question and provided an example. The evolution in this respect was found to be significant ($\chi^2=38.03$, $p<0.001$), pointing to the benefits that working on sustainability has for prospective teachers, as in previous research (Aguirregoitia et al., 2025). In addition, the use of the PBL methodology seems to have been successful in developing not only students' knowledge about sustainability but also in their ability to put that knowledge to use in their teaching to work towards real-world problem-solving (De la Fuente, 2022; Cavadas & Linhares, 2023). This change reflects a shift from limited ability to identify pedagogical resources for sustainability to a more consistent capacity to articulate concrete classroom applications.

A second noteworthy finding concerns the types of resources proposed by students. In the pre-test, students mentioned a range of methods—seven cited storytelling, while 11 referred to others such as films, games, or PBL. In the post-test, responses largely converged on storytelling, a pattern that reflects consolidation around a pedagogical

resource perceived as particularly accessible and transferable to early educational contexts rather than a reduction in students' methodological awareness.

Therefore, it seems that the project's structure encouraged students to explore its practical applications and educational value, helping them develop both confidence and competence in using it to engage young learners. This was reinforced in the focus group, where students emphasized how the hands-on experience with storytelling techniques contributed to their pedagogical growth. One highlighted that "through storytelling, recording the videos – they learned a lot" and that recording it twice has been really useful to see what we did wrong and improve storytelling techniques); another one added: "the techniques were amazing, to see them live in the project". Peer-assessment was considered especially useful: "Comparing the two recordings was very useful too to be more aware of the techniques to be used." Beyond its practical benefits, storytelling has been widely recognized for its capacity to frame abstract sustainability concepts within meaningful, contextualized narratives (Fischer et al., 2022) —an approach particularly effective in infant and primary education (Asli et al., 2023; Furu et al., 2021).

Nonetheless, some students felt the fixed framework—combining storytelling and a pre-assigned SDG—limited their creative freedom. One student described the topics as "very narrowing," while another noted that the project "did not foster creativity" and suggested allowing for alternative methodologies or follow-up activities. These reflections stress the need to balance guided structural design with flexibility in ESD projects.

5. CONCLUSION

Pedagogically, this study highlights the value of integrating sustainability in teacher education through meaningful, active learning experiences such as PBL and storytelling, which promote deep engagement and transferable skills. The intervention significantly improved students' understanding of sustainability and boosted their confidence in teaching it.

At the same time, the evaluation of the project reveals a set of teaching implications that inform future instructional design. While storytelling proved an effective motivating and sense-making classroom strategy, an exclusive focus on narrative formats was perceived by some participants as creatively limiting, reducing opportunities to explore alternative modes of expression and engagement. This suggests the need to retain storytelling as a core pedagogical resource while broadening the methodological repertoire to include multimodal and interdisciplinary practices. In addition, the project demonstrates a further strengthening of students' perceptions of the university's commitment to sustainability—thereby illustrating how engaging pedagogical approaches such as project-based learning and storytelling can enhance the visibility of sustainability within higher education contexts. Nevertheless, the educational impact of these approaches may remain limited if sustainability is addressed primarily through curricular innovation rather than being coherently aligned with institutional practices and with the everyday information habits through which students encounter, interpret, and engage with sustainability-related issues. This observation points to the need for more inclusive and multimodal strategies capable of bridging pedagogical innovation with broader institutional and communicative frameworks.

In response to these considerations, the project is being reoriented toward a broader and more integrated project-based learning (PBL) framework, REALMS+i³, in which storytelling remains a central component but is embedded within holistic learning situations structured around sustainability challenges. Within this framework, stories function as an initial entry point that facilitates engagement with more complex learning

tasks, including CLIL-oriented activities, music-based resources, and social media content creation. This integrated approach is intended to preserve the transformative potential of storytelling while situating it within a wider repertoire of pedagogical practices aligned with the dual objectives of sustainability education and language learning. The inclusion of digital formats, particularly social media outputs, enables the project to engage students within the communicative environments that shape their everyday information practices, thereby enhancing the visibility and resonance of sustainability-related issues. The project is designed to culminate in a simulation of an ESD UNESCO Chair Book Fair. Furthermore, in order to move beyond an isolated classroom intervention and foster institutional engagement, the initiative is planned to be extended into end-of-degree service-learning. This extension allows students to implement sustainability-focused interventions in collaboration with local schools and communities, while simultaneously strengthening connections with campus-level initiatives and ensuring that individual projects contribute to a more coordinated and visible institutional sustainability strategy (Álvarez-Vanegas et al., 2024).

Overall, the evaluation of this project highlights that preparing future educators for sustainability extends beyond the transmission of disciplinary knowledge and isolated pedagogical techniques. Effective sustainability-oriented teacher education requires the deliberate situating of classroom practices within broader institutional and societal commitments, the creation of learning environments that support autonomy and collaboration, and the careful balancing of structured pedagogical guidance with opportunities for learner agency. From this perspective, the project highlights the importance of ongoing pedagogical reflection in teacher education, whereby instructional practices are continuously examined and refined in relation to wider systemic and holistic frameworks for sustainability in education.

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