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Sustainability and English Teachers' Professional Development Needs in the Era of Türkiye Century Education Model

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ABSTRACT

The Türkiye Century Education Model, the recent curriculum reform, positions sustainability literacy as an explicit goal of English language learning and expects teachers to integrate sustainability-related themes and competencies into ELT (English Language Teaching) classrooms. However, sustainability is often treated as the responsibility of other subject areas; thus, there is limited evidence on whether English teachers possess the sustainability-related competencies and receive professional support needed to meet the curricular expectations. Addressing this gap, the present study investigated English teachers' sustainability-related competencies through the lens of environmental literacy and examined how teachers understand ESD, integrate sustainability into ELT and articulate their professional development needs. Using an explanatory sequential mixed-methods design, an online Environmental Literacy Questionnaire was administered to 372 English teachers, followed by semi-structured interviews with 12 participants. The quantitative results indicated broadly positive orientations toward sustainability and sustainability integration into ELT. However, participants demonstrated only moderate environmental knowledge and engagement in environmental behaviors, with routine low-cost actions reported more frequently than civic or collective forms of participation. Qualitative findings converged with these patterns. Most teachers supported sustainability integration in principle but reported limited familiarity with ESD and tended to address sustainability mainly when coursebooks thematized it. Only a small minority described sustained integration, typically under more flexible school conditions. Overall, the findings suggest that successful implementation of sustainability will require systematic, practice-oriented professional training that strengthens conceptual understanding of ESD/SDGs, models ELT-appropriate pedagogies, and supports materials adaptation within curricular constraints.

Keywords: Education for sustainable development, environmental literacy, sustainability, English language teachers, curriculum

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1. INTRODUCTION

Increasing global problems threaten the sustainability of life on Earth and intensify civic challenges. This has directed education systems worldwide to revisit their curricula to prepare learners for the future. By recognizing education as central to sustainable development (SD), the United Nations (UN) launched the Decade of Education for Sustainable Development (ESD) (2005–2014). Since then, the efforts have expanded through UNESCO's action plans for education (UNESCO, 2014), the adoption of the 2030 Agenda with its 17 Sustainable Development Goals (SDGs) (UNESCO, 2017), and the identification of priority action areas in the 2030 roadmap (UNESCO, 2020). Within this roadmap, building the capacities of educators (priority action area 2 and 3) is emphasized by acknowledging that raising sustainability-literate citizens depends on teachers who themselves possess the necessary competencies as implementers of curricula and influential role models for students.

The latest curriculum reform, the *Türkiye Century Education Model*, is a national curriculum framework implemented from 2025. It adopts a holistic *maarif* approach (*maarif* referring to a broad educational orientation that integrates knowledge, skills, cultural formation, and moral development) to cultivate a competent and virtuous learner profile (Ministry of National Education, 2024). The model identifies key 21st-century literacies, including information, digital, visual, cultural, financial,

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sustainability, civic, art, and data literacies, as cross-curricular components to be developed. Accordingly, responsibility for fostering these competencies is shared across subject areas. In the English language curricula (Ministry of National Education, 2025a, 2025b), civic literacy is explicitly targeted from Grade 2 onward, and sustainability literacy is explicitly introduced from Grade 8 within thematic content.

Despite policy emphasis on interdisciplinary competencies, a long-standing misconception persists among teachers and researchers: civic and sustainability literacies are often treated as the responsibility of science and social studies, leaving English Language Teaching (ELT) underexplored in both research and practice (Maijala et al., 2024; Uitto & Saloranta, 2017). ELT, as a non-science discipline, presents an ideal site for interdisciplinary engagement through meaning-focused, communicative and content-based approaches (Arslan & Curle, 2024; Sund & Gericke, 2020), and offers unique opportunities to address sustainability issues not only as real-life contexts for language practice, but also as a means of developing critical thinking, intercultural awareness, and problem-solving skills (Maijala et al., 2026; Yu et al., 2024). Reflecting this potential, the new national curriculum calls for integrating sustainability-related themes and competencies into ELT classrooms. However, curriculum reform alone does not guarantee implementation (Rieckmann, 2019), and whether English teachers can meet the new curricular expectations is currently unknown.

Sustainability itself is a multidimensional concept that includes environmental, social, cultural, and economic dimensions (UNESCO, 2017). Among these, the environmental dimension tends to be the most visible in ELT materials and classroom practice (Arslan & Curle, 2024; Bedir, 2021) and is frequently addressed through themes (e.g., nature, pollution, climate). Given this prevalence and the need to delimit the scope of such a broad construct, the present study focuses on the environmental dimension as an analytically bounded entry point for examining English teachers' sustainability-related competencies. Therefore, rather than reducing sustainability to the environmental dimension, this study uses environmental literacy (EL) to operationalize one core, widely taught dimension of sustainability in ELT. Although prior research has examined teachers' EL across disciplines, English teachers have been included only marginally, most often as part of broader samples in studies focusing on pre-service teachers (e.g., Kuzu et al., 2024; Özonur, 2021; Tuncer et al., 2009). To the authors' best knowledge, no study has examined in-service English teachers' EL in Türkiye, particularly in relation to the new curriculum. Thus, the purpose of this study is to investigate levels of environmental knowledge, attitudes, and behaviors among English teachers, and to explore their professional development (PD) needs for integrating sustainability. Using a mixed-methods design, this study aims to provide timely, policy-aligned evidence and address the following research questions:

1. What are the levels and characteristics of environmental knowledge, attitudes, and behaviors among English teachers in Türkiye?
2. What professional development needs do English teachers identify to better integrate sustainability into their practice?

In this paper, SD refers to the overarching societal agenda, while ESD refers to the pedagogical and curricular approach intended to advance SD. The authors use sustainability and sustainability integration in ELT as umbrella terms for ESD-aligned practices in language classrooms.

1.1. Statement of the Problem

1.1.1. Education for Sustainable Development and Teacher Education

In UNESCO's framing, ESD is a lifelong learning process that aims to address interconnected global challenges by developing learners' knowledge, skills, attitudes, competencies, and values (UNESCO, 2018). ESD emphasizes transformative, action-oriented pedagogies, such as student-led projects and problem-solving tasks, supported by holistic and systems-thinking perspectives that help learners understand interdependencies across environmental, social, and economic dimensions of sustainability (UNESCO, 2020). In this approach, learning is oriented not only toward awareness but also toward building sustainability competencies that enable learners to envision alternative futures, evaluate values and strategies, and take informed action in their communities.

As a founding member of the UN, Türkiye has participated in international development initiatives and promoted SD in its educational policies (Arslan & Curle, 2024). As evidence of its commitment to the 2030 Agenda, Türkiye submitted Voluntary National Reviews in 2016 and 2019 (United Nations, 2019). Since 2018, the national language curricula have included sustainability by framing it as social/civic values and individual responsibility (Ministry of National Education, 2018, 2024). Most recently, the Türkiye Century Education Model has positioned sustainability literacy as an explicit goal of language learning alongside other inter-curricular literacies and promotes action-oriented, content- and language-integrated, and project-based approaches that connect language use to real-world issues (Ministry of National Education, 2025a, 2025b). However, these curricular goals implicitly assume that teachers already have a working understanding of SD and ESD, thereby placing demands on their professional knowledge and pedagogical competencies. Lenziardi et al. (2025) raise important questions regarding such demands: do all teachers possess the sustainability competencies needed to help students develop sustainability-related attitudes, values, and actions, and do teachers themselves believe that sustainability education can make a meaningful difference? These questions are central because integrating SD into practice requires teachers to be able to define

their own roles in the process and implement sustainability through pedagogy (Rieckmann, 2019). This underlines the significance of teacher education in ESD.

Previous research in ESD-aligned teacher education has aimed at empowering teachers to design transformative learning processes. Rieckmann (2019) argues that effective teacher education should address core SD and ESD concepts at local, national, and global levels; disciplinary, interdisciplinary, and transdisciplinary perspectives on sustainability challenges; project-oriented work on locally and globally relevant problems in collaboration with schools and local partners; research-informed analysis of ESD processes across learning settings (e.g., schools, higher education, non-formal education); and practical experience with ESD approaches accompanied by critical reflection. Furthermore, recent research has started to recognize the importance of value-oriented teacher education models. For instance, Lenziardi et al. (2025) propose a competence framework that makes values explicit part of teachers' professional preparation. In their synthesis, ESD readiness is not limited to knowing sustainability concepts; it also involves teachers' ability to reflect on their own assumptions and values, support learners in discussing norms, and create learning environments where different perspectives can be examined. Consistent with wider calls, Mason et al. (2024) designed a 10-week module which included structured learning design and micro-teaching to help pre-service English teachers integrate localized sustainability issues while still meeting core language-learning aims. By the end of the module, participants reported moving from uncertainty to viewing sustainability as important and expressed confidence in their understanding of key ESD concepts.

1.1.2. Sustainability Integration in English Language Teaching

Existing international research on ELT and ESD has largely focused on how language teachers conceptualize sustainability and the challenges they face in integrating it into their teaching. Studies show that language teachers often struggle to define their roles in relation to sustainability (Borg et al., 2012, 2014), tend to emphasize its social dimensions while lacking knowledge of the economic and environmental dimensions (Maijala et al., 2026; Sund & Gericke, 2020; Tavakkoli & Rashidi, 2020), and face difficulties in thematizing sustainability in their lessons (Uitto & Saloranta, 2017). Several studies have further examined the factors that limit integration. Alghamdi and El-Hassan (2019) found that, despite positive attitudes, English teachers considered their knowledge and skills insufficient. Mercer et al. (2023) similarly reported that teachers perceived more barriers than support, with the most common challenges stated as limited knowledge, lack of training, negative attitudes, and time constraints. Other studies highlight further barriers, such as limited local resources and a lack of experience with the ESD framework (Maijala et al., 2024), lack of teaching materials and difficulties in aligning sustainability content with language objectives (Yu et al., 2024).

There is a growing body of research exploring the integration of sustainability into ELT in Türkiye as well. Bedir (2021) found that English teachers tended to emphasize environmental aspects while overlooking social and economic dimensions, whereas Arslan and Curle (2024) reported a broader conceptualization that encompassed all three dimensions. Despite these differences, both studies suggested that English lessons provide room for sustainability, although teachers report barriers such as limited curricular space, insufficient lesson hours, limited parental awareness, and gaps in knowledge and skills. Studies on pre-service teachers also reveal similar challenges. Yılmaz Fındık et al. (2021) showed that most teachers had no training on SD, often conceptualizing sustainability in limited ways and with little connection to ELT practice. Several interventions have sought to strengthen pre-service teachers' sustainability conceptualization. For example, Arıkan and Zorba (2024) demonstrated the potential of literary texts for fostering positive orientations toward the UN's SDGs, while Kazazoğlu (2025) found that eco-literacy–focused writing activities improved engagement, vocabulary, and critical thinking despite limited prior knowledge.

Overall, studies in ELT–ESD have more often described teachers' beliefs and reported barriers than specified what sustainability integration in ELT requires in measurable terms of teacher competencies and professional support. As a result, readiness for sustainability integration is frequently inferred from attitudes or perceived constraints rather than examined through indicators that capture what teachers can actually do and the kinds of PD that would enable sustained integration. This leaves a conceptual gap between descriptive accounts of integration barriers and evidence that operationalizes ELT teachers' sustainability-related competencies and support needs, especially in contexts where curriculum reforms newly raise ESD-aligned expectations for English teachers.

1.1.3. Environmental Literacy as an Analytical Lens

To address the conceptual gap identified above, the present study draws on EL as an empirically measurable lens for examining English teachers' readiness for sustainability integration in ELT. This focus is appropriate because EL captures the kinds of knowledge, dispositions, and action tendencies that can shape teachers' capacity to engage with sustainability in ELT. Moreover, as one component of sustainability literacy, EL aligns closely with ESD's competency-oriented framing (UNESCO, 2017) by foregrounding multidimensional capacities that support informed and action-oriented engagement.

EL has been defined in various ways. Disinger and Roth (1992) describe EL as "one's capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore, or improve the health of those systems" (p. 3). In educational research, EL is commonly operationalized through three interrelated domains: cognitive,

affective, and behavioral (Hungerford & Volk, 1990). The cognitive domain concerns knowledge and understanding of environmental systems and the causes and consequences of environmental issues; the affective domain involves dispositions such as attitudes, values, and responsibility; and the behavioral domain refers to environmental actions ranging from individual routines to civic-level engagement. These domains interact dynamically rather than developing linearly (Disinger & Roth, 1992; Hollweg et al., 2011), meaning EL is best understood as a continuum shaped by ongoing interplay among knowledge, dispositions, and action tendencies.

2. METHODOLOGY

This study employed an explanatory sequential mixed-methods design (QUAN + qual), in which quantitative data were collected and analyzed first, followed by qualitative data to help explain and elaborate on the numerical results (Dörnyei, 2007). In the first phase of the study, English teachers' EL levels were assessed through a questionnaire. In the second phase, semi-structured interviews were conducted to explore self-perceived EL levels, familiarity with ESD, self-reported sustainability integration (frequency and typical approaches), and PD needs. Data sets from both phases were merged during the interpretation stage.

2.1. Participants

A total of 372 English teachers from Türkiye participated in the quantitative phase of the study through convenience sampling. The sample included participants from different school types, years of experience, grade levels, and related-training backgrounds, as shown in Table 1.

Table 1.
Demographics of the Participants

Characteristics	Category	Frequency	Percentage
Gender	Female	312	84
	Male	60	16
School type	Public	295	79.3
	Private	77	20.6
Years of experience	Fewer than 1 year	14	3.7
	1-5 years	85	22.8
	6-11 years	142	38.1
	12 years and more	131	35.2
Grade level	Pre-school level	11	2.9
	Elementary level	85	22.8
	Secondary level	134	36
	High school level	76	20.4
	University level	66	17.7
Prior training on sustainability	Yes	54	14.5
	No	318	85.5

For the qualitative phase, 12 volunteer participants from the same pool took part in semi-structured interviews. The interviewees varied in demographics as well. The group included 10 female and 2 male teachers, with teaching experience ranging from 1 to more than 12 years. They were employed across different levels, preschool (n = 1), primary (n = 3), secondary (n = 2), high school (n = 2), and university (n = 4), and represented both public (n = 8) and private (n = 4) institutions, and prior training on sustainability (n = 2).

2.2. Data Collection and Instrumentation

In the first phase, the environmental literacy questionnaire (ELQ) was administered online via Google Forms. The questionnaire link was disseminated through teacher networks on social media platforms, such as WhatsApp, LinkedIn, Facebook, and Telegram. Participation was entirely voluntary, and informed consent was obtained from all participants. The quantitative phase lasted two months, from November to December 2024. The questionnaire was composed of three sections, each targeting a different domain of environmental literacy (EL): 11 knowledge items, 18 attitude items, and 24 behavior items. To allow for standardized responses, all items were closed-ended, and the questionnaire was administered in the Turkish language for participants' full comprehension.

The knowledge section in ELQ consisted of 11 multiple-choice items designed to assess participants' overall environmental knowledge. The items are originally from NEETF/Roper (Coyle, 2005), which has been widely used to assess public environmental knowledge and has demonstrated reliability over time. For this study, however, an adapted version, modified for the Turkish context by Tuncer et al. (2009), was used to enhance contextual appropriateness. A histogram of 372 participants' total knowledge scores was generated to further establish the validity of the knowledge dimension in the sample. Figure 1 below provides evidence of the measure's construct validity by showing a well-distributed range of scores.

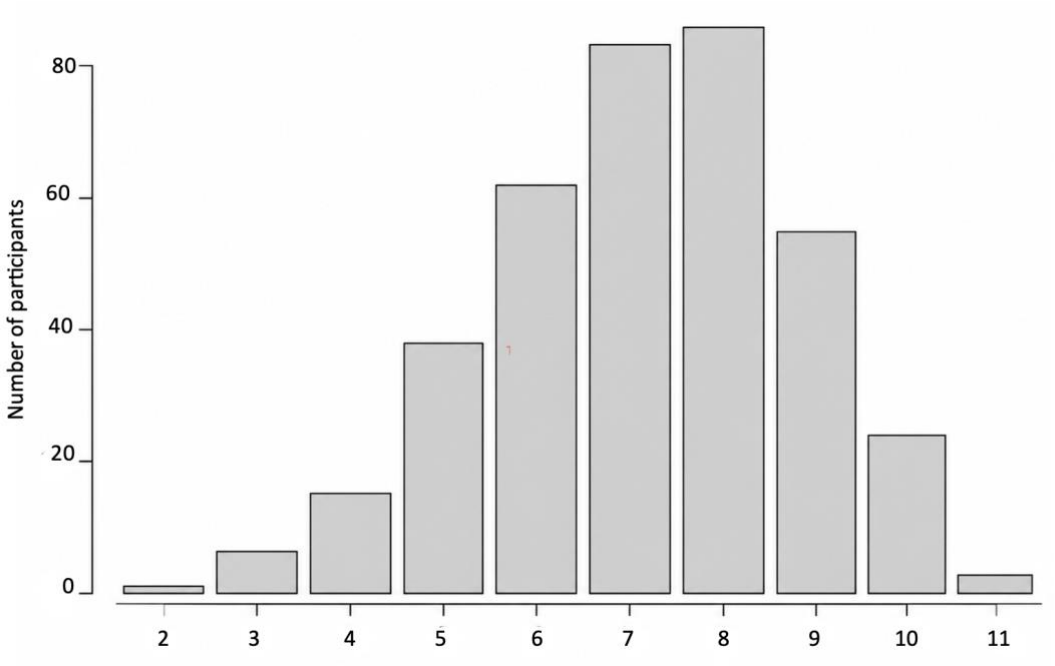

Figure 1. Distribution of total environmental knowledge scores

The attitude section included 18 Likert-type items adapted from Yavetz et al. (2009) and translated into Turkish using a back-translation procedure. Some items from the original scale were excluded to improve contextual relevance. As a result, the attitude section in this study should be understood as a set of individual attitude items rather than a multi-dimensional scale. The internal consistency of the section was measured using Cronbach's alpha ($\alpha = .84$).

The behavior section consisted of 24 Likert-type items adapted from previously established measures by Yavetz et al. (2009) and Mertig et al. (2003, as cited in Sahin et al., 2012). The items were carefully selected to represent a wide range of environmental behaviors, including sustainable consumption, energy and water conservation, civic engagement, recycling, and animal welfare, and were translated into Turkish using a back-translation procedure. The internal consistency of the section was calculated using Cronbach's alpha ($\alpha = .92$).

After the implementation of the ELQ, 20 voluntary participants were invited to semi-structured interviews in the second phase via email, and 12 of them responded. The interview protocol was developed by aligning the research questions with the ELQ domains and prior literature on ESD and sustainability integration in language education. The final guide included 8 main questions (see Appendix A). Content validity was supported by conducting comprehension checks during the early interviews. Interviews were conducted between March and May 2025, lasting approximately 30 minutes, and were held on a video-conferencing platform in participants' preferred language (Turkish or English).

2.3. Data Analysis

Regarding the quantitative analysis, all quantitative analyses were conducted in SPSS. For environmental knowledge, the 11-item test was scored dichotomously (1 = correct, 0 = incorrect), and total scores were calculated as the sum of correct responses. Descriptive statistics (means, standard deviations, and frequency distributions) were used to summarize participants' performance, and item-level frequencies were reported to highlight specific strengths and weaknesses. According to Coyle's (2005) NEETF/Roper rubric, participants with 8 or more correct answers (≥70%) were classified as having "Adequate" environmental knowledge. Descriptive statistics were also applied to the attitude and behavior items. For both domains, the mean and standard deviation of each item were calculated to demonstrate general tendencies and variability in participants' responses.

To examine whether prior training on sustainability was associated with significant differences in knowledge, attitudes, or behaviors, inferential tests were conducted. The distribution of each item in attitude and behavior measures and the total score in the knowledge measure were first checked for normality by using skewness and kurtosis values. Based on normality, either independent samples *t*-tests or Mann–Whitney U tests were applied to compare participants with and without prior training. In addition to statistical significance, mean differences between two groups were examined to determine the direction of the significance.

The qualitative data from the semi-structured interviews were analyzed using qualitative content analysis. This analytical method involves coding textual data to identify patterns and meanings by moving beyond surface-level descriptions toward interpretive, latent-level insights (Dörnyei, 2007). Based on predetermined categories (self-perceived EL levels, familiarity with

ESD, self-reported sustainability integration, and PD needs), coding was conducted deductively and inductively to allow new themes to emerge. Initial codes were generated directly from the transcripts; they were refined through repeated readings and organized into broader categories. To ensure reliability, a second coder independently analyzed the data, and full agreement was reached.

3. FINDINGS

3.1. Environmental Literacy Levels among English Teachers

The descriptive statistics indicated that English teachers in this study (N = 372) achieved a mean total correct score of 7.15 (SD = 1.68) out of 11 items on the environmental knowledge measure with varying results across individual items. The participants demonstrated strong familiarity with general environmental topics, such as the definition of biodiversity, major sources of surface water pollution, and the primary governmental agency for environmental protection in Türkiye. However, they struggled with more specific or technical issues, including the largest contributor of carbon monoxide, garbage disposal practices in Türkiye, and the common method for storing nuclear waste worldwide. Detailed item-level results and percentages of correct responses are presented in Table 2.

Table 2.
Item-level Performance on Environmental Knowledge Questions

Item no	Item topic	Percentage of correct response
1	Definition of biodiversity	97.5
2	The largest contributor of carbon monoxide	28.7
3	Electricity generation in Türkiye	49.4
4	The major sources for surface water pollution	89.7
5	Renewable resources	75.2
6	Role of ozone as a protective layer	70.6
7	Garbage disposal in Türkiye	46.2
8	Primary governmental agency for environmental protection in Türkiye	83.8
9	Hazardous household waste	65.0
10	The major reason for animal extinction	78.2
11	The common method for storing nuclear waste in the world	30.9

The distribution of participants' total environmental knowledge scores further highlighted these variations in Table 3. While 44% of the participants achieved adequate knowledge scores, more than half of the participants (55%) fell below this threshold by answering six or fewer items correctly.

Table 3.
Distribution of Participants' Total Environmental Knowledge Scores

Number of questions answered correctly	Score percentage range	Percent of participants per score	Adequacy of score
6 or fewer	59% or less	33.3	Inadequate
7	60–69%	22.0	Inadequate
8	70–79%	22.5	Adequate
9	80–89%	14.7	Adequate
10 or more	90–100%	7.2	Adequate

The environmental attitude measure indicated generally positive orientations, with an overall mean of 4.24 (SD = 0.37). Participants mainly supported the idea that protecting the environment is a shared responsibility (Item 5) and emphasized the importance of integrating environmental issues across curricula and lessons (Item 7, 12, 13). Support was also evident for national- and institutional-level actions, such as prioritizing environmental issues on the national agenda (Item 9) and requiring teacher education programs to include training on environmental topics (Item 8). However, areas of variation were also observed. Roughly one-quarter of participants expressed doubt about the effectiveness of individual behaviors (Item 6), and fewer than three-quarters believed increased knowledge would necessarily lead to more eco-friendly behavior (Item 3). Detailed results, including the means and standard deviations for each of the 18 attitude items, are presented in Table 4 below.

Table 4.
Participants' Agreement with Environmental Attitude Items

Item	Agree (%)	Unsure (%)	Disagree (%)	*M*	*SD*
1. I believe I can contribute to environmental quality through my actions.	90.6	3.8	5.6	4.32	0.9
2. There is no point in trying to influence my family or friends on environmental issues.	5.9	5.6	88.4	4.26	0.94
3. If I were more knowledgeable about environmental issues, my behavior could be more eco-friendly.	69.9	9.1	21.0	3.69	1.26
4. Laws reduce the damage done to the environment.	71.0	14.0	15.1	3.91	1.23
5. Protecting the environment is the responsibility of all individuals.	95.7	0.8	3.5	4.76	0.77
6. Even if I save water or energy or buy environmentally friendly products, it makes no difference because the negative impact caused by others is too great.	23.4	16.4	60.2	3.61	1.29
7. It is the responsibility of teachers from all disciplines to incorporate environmental issues into the learning process.	90.9	3.2	5.9	4.53	0.96
8. Every prospective teacher in a teacher education institution should be required to receive training on environmental issues.	87.6	6.7	5.6	4.45	0.97
9. Environmental issues should be given more priority on our national agenda.	92.5	3.0	4.6	4.56	0.87
10. The penalties imposed on those who harm the environment are not sufficiently deterrent.	92.5	1.3	6.2	4.56	0.95
11. Individuals should be allowed to benefit from nature as much as they need.	19.1	10.2	70.7	3.82	1.29
12. The inclusion of environmental issues in the education system is important.	94.4	1.1	4.6	4.61	0.84
13. In order to increase students' environmental awareness, eco-friendly activities (such as tree planting, nature trips, etc.) should be organized in schools.	94.6	1.3	4.0	4.66	0.82
14. The value of living beings in nature is determined solely by their usefulness to humanity.	11.3	3.0	85.8	4.35	1.18
15. Protecting the environment is the responsibility of the state rather than individuals.	18.5	17.2	64.2	3.65	1.21
16. Natural areas could be utilized for the construction of new living spaces for humans.	13.4	10.5	76.1	4.06	1.18
17. Individuals should be penalized for the environmental damage they cause.	88.2	4.0	7.8	4.37	1.04
18. Industries should be compelled to reduce air-polluting emissions, even if it leads to an increase in product prices.	78.2	11.0	10.8	4.14	1.17

The environmental behavior measure indicated moderate engagement overall (M = 3.71, SD = 0.64). High-frequency behaviors included turning off lights when leaving a room (Item 9), using less water during daily routines (Item 10), and turning off unused electronic devices (Item 16). Recycling practices (Item 7) and reducing electricity and water use (Item 8) were also commonly reported. Moderate engagement was observed in behaviors such as buying environmentally friendly products (Item 17), picking up litter in public places (Item 6), and considering environmental issues when voting (Item 11). Participants reported less frequent engagement in advocacy-oriented behaviors such as attending environmental protests (Item 3) and volunteering at environmental organizations (Item 22). Overall, behaviors related to daily conservation (e.g., energy, water, reusing materials) showed higher mean scores than collective or advocacy-oriented actions. Standard deviations ranged from 0.64 to 1.38, which indicates variability in behavioral frequency across the items. Detailed results are presented in Table 5 below.

Table 5.
Participants' Frequency of Environmental Behaviors

Item	Almost Always (%)	Often (%)	Sometimes (%)	Rarely (%)	Almost Never (%)	*M*	*SD*
1. I walk or bike instead of driving for short distances.	22.3	30.9	26.3	13.2	7.3	3.48	1.18
2. I buy locally produced food instead of imported products.	19.9	39.8	28.8	7.0	4.6	3.63	1.02
3. I attend protests or demonstrations to raise environmental issues.	3.2	4.3	14.5	27.7	50.3	1.83	1.04
4. I buy products in reusable or recyclable containers.	16.4	35.5	33.9	11.8	2.4	3.52	0.98
5. I avoid shopping from companies that don't value nature or animals.	25.3	33.3	23.9	12.4	5.1	3.61	1.14
6. I pick up litter in public spaces and throw it in the trash.	41.9	33.9	14.8	6.7	2.7	4.06	1.04
7. I recycle my waste such as paper, metal, glass, batteries, and plastic.	43.3	36.8	14.2	4.3	1.3	4.16	0.92
8. I try to use less electricity and water.	38.2	40.9	15.1	5.1	0.8	4.1	0.89
9. I turn off the lights if I'm the last to leave the room.	79.0	15.1	4.6	0.8	0.5	4.71	0.64
10. I use less water when brushing teeth, bathing, doing dishes, etc.	69.4	22.3	6.2	1.3	0.8	4.58	0.74
11. I consider politicians' environmental stance when voting.	32.3	34.9	22.0	7.0	3.8	3.85	1.07
12. I follow content related to environmental issues (digital or print).	22.3	28.0	30.1	13.7	5.9	3.47	1.15
13. I warn people about environmentally harmful behaviors.	28.8	35.8	24.5	7.5	3.5	3.79	1.05
14. I encourage others to take action on environmental issues.	25.5	31.5	26.9	10.8	5.4	3.61	1.14
15. I report environmental issues to relevant authorities or institutions.	18.3	28.0	28.8	13.4	11.6	3.28	1.24
16. I turn off unused electronic devices.	61.3	26.9	8.6	2.2	1.1	4.45	0.82
17. I try to buy environmentally friendly products.	39.8	36.3	16.9	4.8	2.2	4.07	0.98
18. I avoid using single-use items like straws or plastic utensils.	22.0	26.9	29.3	14.8	7.0	3.42	1.18
19. I participate in environmental group activities like tree planting.	21.0	22.3	20.4	21.0	15.3	3.13	1.37
20. I repurpose unused items instead of throwing them away.	30.1	34.7	20.7	9.4	5.1	3.75	1.13
21. I take care of stray animals as much as I can.	29.0	23.4	26.3	14.0	7.3	3.53	1.24
22. I volunteer at organizations or shelters that protect animals.	15.6	14.2	23.9	22.0	24.2	2.75	1.38
23. I reuse used papers as scrap paper.	59.9	23.7	9.7	4.6	2.2	4.35	0.98
24. I use sustainable shopping bags instead of plastic ones.	36.0	30.4	18.5	9.9	5.1	3.82	1.17

As the final step, inferential analyses were conducted to examine whether participants' environmental knowledge, attitudes, and behaviors differed based on their participation in prior training on sustainability. The results indicated no statistically significant difference in environmental knowledge scores between those who had received training and those who had not. For environmental attitudes, only one item showed a significant group difference. Participants without prior training were more likely to agree with the statement (Item 15) that protecting the environment is primarily the responsibility of the state rather than individuals (p = .024). No other attitude item yielded statistically significant differences. In contrast, some environmental behavior items revealed significant group differences. Of the 24 behavior items, 12 showed significant differences, all favoring participants with prior training, who reported higher engagement in the following behavior items: attending environmental protests or demonstrations (p = .042), buying products in reusable or recyclable containers (p = .002), picking up litter in public spaces (p = .032), and recycling waste (p = .047). The trained group was also more likely to consider politicians' environmental stances when voting (p = .003), follow environmental content via digital or print media (p < .001), warn others about environmentally harmful behaviors (p < .001), and encourage others to act on environmental issues (p = .005). Additionally,

they reported greater frequency in reporting environmental issues to authorities ($p < .001$), participating in environmental group activities ($p < .001$), reusing or repurposing used items ($p < .001$), and volunteering at animal shelters or protection organizations ($p = .029$). For all other behavior items, no statistically significant differences were found between groups.

3.2. Qualitative Findings on Self-Perceived Environmental Literacy, ESD Familiarity, Sustainability-Integration Practices, and Professional Development Needs

During the interviews, participants' self-perceived environmental literacy (EL) split evenly: six described their EL as adequate/high, while six reported limited or insufficient knowledge of environmental issues. Reported knowledge sources varied. Only two participants attributed their EL to professional seminars/training, while others described developing knowledge through international experiences (e.g., Erasmus+ project and AIESEC) ($n = 2$), personal interest and values ($n = 3$), or incidental exposure through media and social platforms ($n = 5$). How teachers positioned their knowledge reflected different pathways of professional learning. Illustrative excerpts include:

> *First, on this topic there's really, well, this general knowledge we've always seen, starting from primary school and then in later grades too. Like the classic idea that plastic takes a very long time to decompose in nature, but now, for example, some plastics can break down within a few years. So honestly, I feel like my knowledge needs updating. (Excerpt 1)*

> *About four years ago, there really wasn't anything. I did have some personal knowledge, but I was mostly limited to what was in the coursebooks until we joined an Erasmus project during the pandemic. The project focused on bioethics and sustainable environmental management as a subject in high schools, and I learned a lot through that process. (Excerpt 2)*

> *My environmental knowledge mostly comes from my own interest. Because you know resources are going to run out, and there are always posts around July and so on, like: "We've already used up 2025's resources; now we're borrowing from 2026," things like that. Posts from WWF or other NGOs make me feel anxious about the future. And when I look around, what I see is that we're really damaging nature, so I think, what's going to happen when I'm older?... (Excerpt 3)*

> *I could describe myself as someone who's environmentally conscious. I previously took part in Global Schools' education for sustainable development program, and honestly, I did a lot there and learned a lot. Of course, since I teach kindergarten, I sometimes wish I could reach further and do more with it. (Excerpt 4)*

Familiarity with ESD was uneven. Only three participants demonstrated a clear conceptual and pedagogical understanding of ESD, and this tended to be linked to prior involvement in sustainability-aligned international initiatives, structured training, or professional networks. By contrast, most participants ($n = 9$) reported no familiarity or only a partial, intuitive understanding, often approaching ESD through the wording of the term or equating it with isolated "environment" topics in course materials. This contrast is reflected in the excerpts 5 and 6 below:

> *I know the term ESD because when I was at university, I was involved in AIESEC, and I was on the executive board. So yes, I know about the Sustainable Development Goals. There are 17 of them and all that, but I don't remember each one individually right now. I do know that each one serves a different area. (Excerpt 5)*

> *I do carry a sense of environmental responsibility, but not really in the sense of "not harming the environment." I think it's just who I am. It's part of my character. I try not to produce waste; that's completely personal, that's just how I am. But I've never heard the term SDG before. And sustainability, what exactly it is, I couldn't really define it. (Excerpt 6)*

Reported sustainability integration in ELT was generally limited and often dependent on coursebook content. Only two teachers described integrating environmental themes regularly, and both linked this to prior sustainability-focused training; notably, both worked in private schools, where they reported having relatively greater flexibility for project work and institutional support. By contrast, most participants ($n = 10$) reported addressing sustainability topics mainly when they appeared in coursebooks and using them largely as brief discussion prompts rather than sustained lessons. Several teachers ($n = 4$) framed this pattern as a pragmatic response to time constraints and exam-oriented pressures, particularly in secondary and high school contexts. The excerpts below illustrate the typical integration when sustainability appears in coursebooks and a less common example of sustained integration from a private school teacher:

> *In class, we talk about these topics, I share my own experiences and simple things that are doable. If the book has questions, I ask them to the students and I want them to become aware of it… In middle schools, these topics need to come up more often. I think there's a problem with this in 5th grade. And 8th graders are already in a totally different headspace because of the exams, but even so, it could still be included. But overall, I mean not just for English, for every subject, it should be much more present at the primary school level. (Excerpt 7)*

For example, in one unit, we started by planting seeds, then we talked about what seeds need, and the kids watched when they would grow. They would go and check them… We're giving students a responsibility here to build that awareness. Then we keep coming back to it and teach things like parts of a plant and what does a plant need... The point of the curriculum is to use these kinds of things to give students responsibility and make them think about it. (Excerpt 8)

When asked about professional development (PD) needs, participants consistently emphasized that they need support that is usable in real classrooms rather than abstract awareness-raising.

Table 6.
Professional Development Needs for Integrating Sustainability in English Language Teaching

Themes	Description	*f*
Conceptual understanding	More systematic understanding of sustainability	8
Pedagogical strategies beyond grammar-based instruction	Task-based, inquiry-oriented, and action-focused approaches rather than grammar-driven coursebook activities	7
Age- and language-level–appropriate sustainability pedagogy	Need to scaffold sustainability concepts for young learners and lower language proficiency levels	6
Experiential, hands-on, and outdoor learning approaches	Need to design and sustain learning through observation, real-life responsibility, and out-of-class activities	6
Curriculum flexibility	Skills and institutional support to adapt or extend prescribed curricula for sustainability integration	5
Materials development and adaptation (including digital/AI tools)	Need to create, localize, or digitally adapt materials due to inadequacy of existing coursebooks	4

Across responses as seen in Table 6, they highlighted three recurring priorities: interdisciplinary content/conceptual knowledge, pedagogical guidance appropriate for learners' age and proficiency for integrating sustainability into ELT, and resources and conditions that make integration possible. Participants also stressed the importance of locally grounded examples that connect with their students' realities. Participants working in public schools, in particular, described conventional in-service seminars as overly theoretical or disconnected from realities. Overall, participants expressed willingness toward PD that is practical, interactive, and context-sensitive, with some also advocating more systematic integration of sustainability into pre-service programs and collaborative teacher learning models. A small minority (n = 2) viewed sustainability training as a low priority for language teacher education due to perceived subject mismatch.

4. RESULTS, DISCUSSION AND RECOMMENDATIONS

When the quantitative and qualitative findings are merged, the study indicates that English teachers in Türkiye demonstrate a broadly favorable orientation toward integrating sustainability into ELT. This is consistent with Bedir's (2021) findings, based on a comparable sample, which similarly reported that English teachers perceived sustainability as relevant to ELT and expressed willingness and motivation to incorporate it into their teaching. From the perspective of the new curriculum reform, this finding appears as an enabling condition, and it is contextually significant because curriculum reforms are vulnerable when teachers do not commit to the underlying rationale or perceive the reform agenda as pedagogically fit (Tao & Gao, 2017). At the same time, the present findings suggest that favorable orientations alone are unlikely to result in sustained integration. When teachers' attitudes are interpreted alongside other dimensions of environmental literacy (knowledge and behaviors), their familiarity with ESD, and their self-reported classroom practices, sustainability integration appears to be frequently constrained. This pattern aligns with previous research showing that limited knowledge or conceptual understanding of sustainability can function as a barrier to practice even when attitudes are positive (Kwee, 2021; Tavakkoli & Rashidi, 2020). The merged findings in this study suggest that English teachers in Türkiye experience similar constraints.

Considering the moderate knowledge gap, English teachers' existing knowledge may be sufficient for introductory engagement with familiar, everyday sustainability topics (e.g., pollution, recycling, protection), yet less adequate for addressing the interdisciplinary nature of sustainability, especially when teachers aim to connect environmental issues to broader social and economic dimensions. This matters from an ESD perspective, as many teachers in the study stated limited familiarity with ESD, consistent with Bedir (2021). ESD emphasizes competence development. Accordingly, teachers' capacity to design ESD-aligned learning depends partly on having the conceptual resources to explain causal relationships, interdependencies, and plausible solution pathways (UNESCO, 2017). Without such conceptual grounding, teachers may avoid deeper engagement not because they do not favor sustainability, but because they wish to reduce classroom uncertainty and the risk of oversimplification. At the same time, since teachers' knowledge in this study appears to be shaped largely through informal sources such as media exposure, personal interest, and coursebook content (Maijala et al., 2024; Sund & Gericke, 2020), sustainability integration is likely to remain episodic and inconsistent unless it is supported through more systematic and pedagogically targeted professional learning (Mercer et al., 2023). In line with this, Rieckmann (2019) argues that teachers require specific competencies to orient their practice, including structured knowledge of SD, the SDGs, and related challenges. From an ELT standpoint, this points to the need for a coherent competence framework that helps English teachers identify which

sustainability competencies can be targeted and how they can be integrated alongside language objectives and skills development (Mercer et al., 2023). These results, therefore, imply that curriculum expectations for sustainability integration could be difficult to realize without learning opportunities that strengthen teachers' foundational knowledge and support them in translating that knowledge into ESD-aligned classroom practice.

The findings also revealed a discrepancy between teachers' attitudes and their reported engagement in higher-cost environmental behaviors at the personal level. English teachers commonly reported routine, low-cost practices (e.g., saving water and electricity), yet reported far less engagement in behaviors that require time, effort, or collective organization (e.g., activism, advocacy, civic participation). This pattern is consistent with EL research suggesting that environmental behavior reflects the interaction of internal factors (e.g., knowledge, values, affect) and external conditions (e.g., infrastructure and social or cultural constraints) (Kollmuss & Agyeman, 2002). While further research is needed to identify which contextual factors are most salient in this setting, the presence of this gap is informative for interpreting classroom practices, given that sustainability-oriented pedagogies emphasize participation, agency, and collective action. If teachers' own engagement remains largely at the level of personal habits rather than civic involvement, they may have fewer experiential and pedagogical resources to model or facilitate participatory sustainability practices in their classrooms.

A parallel pattern emerged in the interviews. Despite expressing support for sustainability integration in principle, teachers rarely reported initiating integration independently and tended to address sustainability primarily when coursebooks explicitly introduced related themes. This aligns with Mercer et al. (2023) and Maijala et al. (2026), who argue that sustainability is often marginalized in language classrooms unless it is clearly thematized in curricular materials. These findings suggest that the primary challenge may be less about attitudes and more about a lack of pedagogical know-how and perceived structural constraints in ELT practice, such as reliance on prescribed materials under rigid curricula and limited access to adaptable, classroom-ready resources. This interpretation is consistent with Rieckmann's (2019) argument that sustainability education depends on the interaction between teachers' competencies and institutional and curricular structures. It is further supported by the present data, where sustained integration was reported only by two teachers working in private-school contexts characterized by greater curricular flexibility and institutional support. Accordingly, addressing external enabling conditions appears critical if the new curriculum is to achieve meaningful sustainability integration in ELT.

One of the most interesting findings concerns the role of prior training on sustainability. English teachers who reported prior training also reported higher engagement in civic and advocacy-oriented behaviors even though their knowledge and attitude scores were not markedly higher than those of their colleagues. However, the study cannot specify which types of training were most beneficial, since the content, duration, and format of participants' prior training were not examined. Still, the finding challenges deficit-oriented assumptions that teacher training primarily needs to "add knowledge." Instead, it suggests that effective sustainability-focused PD may be associated with personal engagement. Future research should therefore compare PD models (e.g., short seminars versus sustained, practice-based training) to identify which approaches most effectively support both personal engagement and classroom practice.

Although most English teachers in the sample reported having no prior sustainability-focused training, consistent with earlier research in Türkiye (e.g., Bedir, 2021; Canaran & Bayram, 2024; Yılmaz Fındık et al., 2021), they supported including sustainability in both pre-service and in-service teacher education. PD needs teachers described in the interviews align with the patterns identified in the questionnaire and point to PD as a key condition for more coherent integration. First, PD that introduces ESD and the SDGs, which is linked to local, national, and global contexts and supported through project- or inquiry-based work could strengthen teachers' conceptual understanding and offer a clearer framework for planning instruction (Rieckmann, 2019; UNESCO, 2017). Second, from an ELT perspective, PD should show teachers how to turn this framework into classroom practice by modelling approaches such as task-based, content-based, and action-oriented learning, including experiential, hands-on, and outdoor learning where feasible. However, modelling approaches is not sufficient unless PD also supports the practical work of ELT integration: aligning SDGs with language objectives, selecting level-appropriate materials, and designing or adapting lessons and resources for local contexts and classroom constraints (Mercer et al., 2023; Mason, 2024). Finally, teachers' emphasis on time, materials, and school conditions indicates that sustainability integration is difficult to sustain through personal effort alone; therefore, institutional, curricular, and material support is also necessary to move beyond coursebook-driven treatment (Rieckmann, 2019). At the policy level, these findings imply that sustainability-focused training should not be offered as isolated seminars but should be embedded more systematically within teacher education and professional learning pathways, with opportunities for practice and reflection in real teaching contexts (Rieckmann, 2019). To sum up, the findings indicate that well-designed, needs-responsive PD has strong potential to strengthen English teachers' capacity to integrate sustainability meaningfully into ELT (Maijala et al., 2024; Yu et al., 2024).

4.1. Limitations and Pedagogical Implications

This study is not without limitations. While the quantitative phase involved a relatively large number of participants, the qualitative findings from 12 teachers are limited in scope. Although the interviews added depth to the dataset, a larger sample could have broadened the insights. In terms of research instruments, the environmental knowledge measure relied on a fixed set of items. While effective in identifying overall patterns, it could not capture the full breadth of teachers' environmental knowledge. Moreover, the data on attitudes, behaviors, and PD needs were based on self-reports, which may be subject to bias.

Future research could employ more nuanced scales and incorporate classroom observations to gain a more comprehensive understanding of PD needs. Additionally, although this study highlighted the role of participants' prior training on certain environmental behaviors at the personal level, it did not analyze the content, duration, or delivery of the received training, which limits conclusions about which types of PD were most effective. Finally, the study was conducted prior to the full implementation of the Türkiye Century Education Model, so the findings reflect English teachers' readiness and perceptions in a transitional phase rather than responses to the enacted curriculum.

The findings of this study suggest several pedagogical implications for language teacher education programs. PD should move beyond one-off, lecture-style seminars and be designed as sustained, practice-based learning cycles (e.g., a short series across several weeks or a semester-long model) in which teachers participate in interactive workshops, collaborative planning, classroom try-outs, and structured follow-up reflection. Such PD should prioritize experiential, context-sensitive, and interdisciplinary formats, as participants repeatedly emphasized the need for classroom-feasible, "learning-by-doing" support. In concrete terms, PD can include demonstration lessons and micro-teaching, followed by structured peer feedback, and then a classroom experimentation phase in which teachers implement a sustainability-integrated lesson, gather brief evidence of student engagement (e.g., short reflections or samples of student work), and discuss adaptations afterwards. Given teachers' strong reliance on coursebooks, PD should also include a materials module that trains teachers to identify sustainability "entry points" in coursebook units, adapt tasks to align both language outcomes and sustainability goals, and supplement coursebooks with authentic, locally relevant resources. Alongside pedagogical training, PD should provide introductory sustainability content knowledge to strengthen conceptual confidence, ideally embedded within lesson planning rather than delivered as decontextualized content. Building on this foundation, PD should model ELT-appropriate approaches, such as action-oriented methods, project-based learning, problem-solving tasks, and socio-emotional learning activities, so that sustainability becomes a meaningful context for communicative language use rather than an "extra" topic. Finally, these implications extend to pre-service teacher education: embedding sustainability into coursework and practicum requirements (lesson planning, materials design, and assessment), combined with supervised classroom implementation and feedback, can help prospective teachers internalize sustainability as a professional responsibility.

Research and Publication Ethics Statement

Bursa Uludağ University Social and Human Sciences Research and Publication Ethics Committee stated that the research was ethically appropriate and granted permission to conduct the study (23.06.2023 / Meeting No: 2023-06 / Decision No: 3). All the information in the article was obtained within the framework of academic integrity, and the principles of publication ethics were followed during the article writing process.

Contribution Rates of Authors to the Article

The authors jointly designed the research and developed the study framework. The first author was responsible for data collection and initial analysis, while the second author refined the interpretation of findings and contributed to the development of recommendations.

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Statement of Interest

The authors declare no conflict of interest.

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Appendix A

1. What does "environmental literacy" mean to you?
2. How would you describe your level of environmental literacy?

3. Are you familiar with the term “Education for Sustainable Development (ESD)”? What does it mean to you?
4. Have you received any training related to sustainability, SDGs, environmental education, or ESD?
5. How often do you integrate environmental or sustainability topics into your English lessons?
6. Do you address environmental issues in class? If yes, how?
7. What factors make it easier or harder for you to integrate environmental/sustainability themes into ELT?
8. What kinds of professional development would support you in integrating sustainability/environmental issues into ELT?